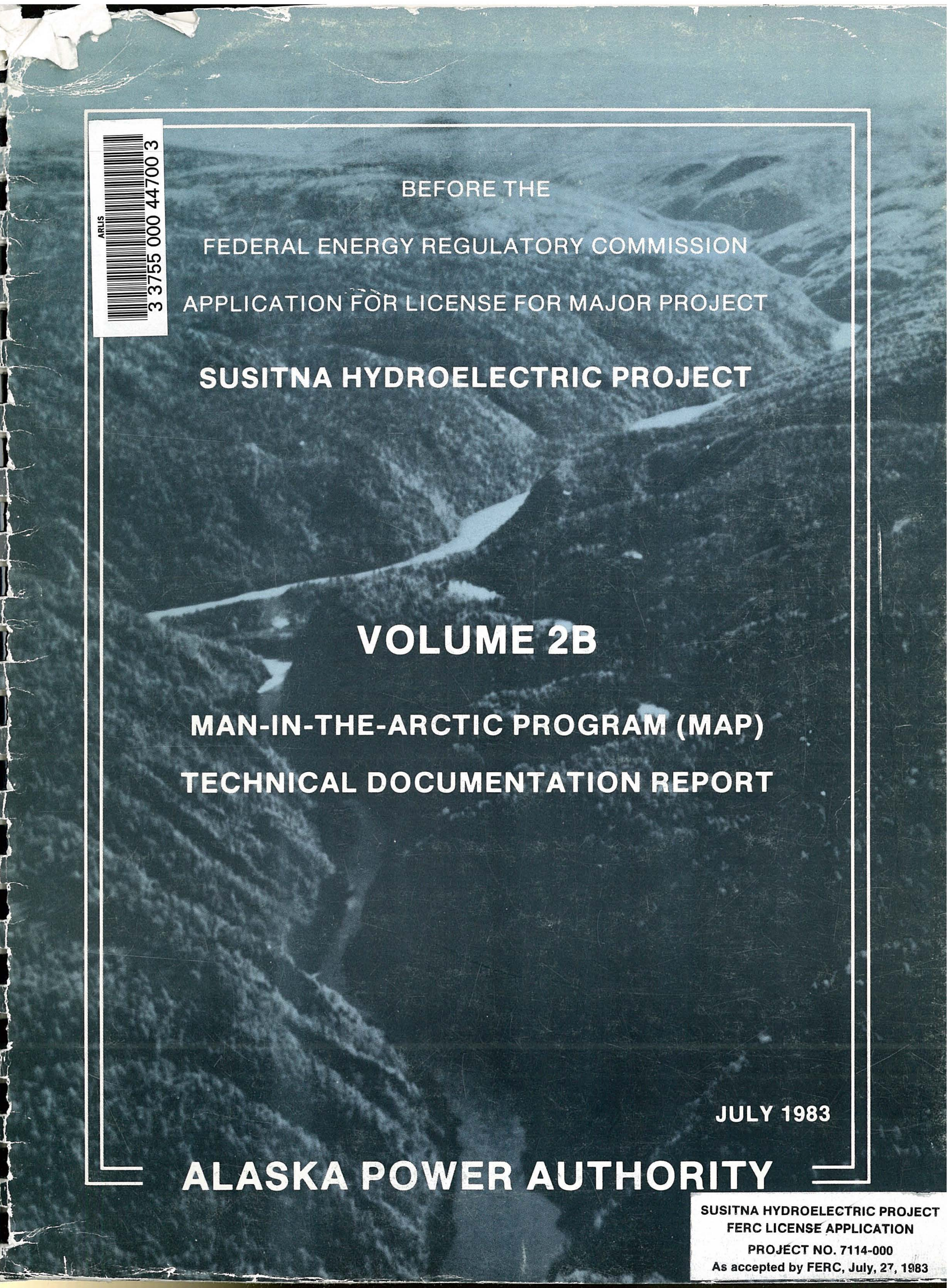

BEFORE THE

FEDERAL ENERGY REGULATORY COMMISSION

APPLICATION FOR LICENSE FOR MAJOR PROJECT

SUSITNA HYDROELECTRIC PROJECT

VOLUME 2B

MAN-IN-THE-ARCTIC PROGRAM (MAP)
TECHNICAL DOCUMENTATION REPORT

JULY 1983

ALASKA POWER AUTHORITY

SUSITNA HYDROELECTRIC PROJECT
FERC LICENSE APPLICATION
PROJECT NO. 7114-000
As accepted by FERC, July, 27, 1983

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MAN-IN-THE-ARCTIC PROGRAM (MAP)
ECONOMIC MODELING SYSTEM
TECHNICAL DOCUMENTATION REPORT

Prepared for

Harza-Ebasco Susitna Joint Venture

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MAN-IN-THE-ARCTIC PROGRAM (MAP)
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MAN-IN-THE-ARCTIC PROGRAM (MAP) TECHNICAL DOCUMENTATION REPORT

Introduction

This report is the culmination of an effort to completely document the Institute of Social and Economic Research (ISER) Man-in-the-Arctic Program (MAP) Modeling System and simultaneously to develop timely projections of economic activity for Alaska's Railbelt. The purpose of the study is to provide input into the process of planning for the electric power requirements for the Railbelt and, specifically, to support the state licensing application before the Federal Energy Regulatory Commission (FERC) for the Susitna hydroelectric project. Funding for the study was provided initially by the Alaska Power Authority (APA), and subsequently by Harza-Ebasco Susitna Joint Venture when they were retained by APA to complete the licensing application and plan the project. Harza-Ebasco Susitna Joint Venture provided coordination and guidance to ISER during the performance of the Modeling System update.

This introduction serves three purposes. The first is to provide the reader with a guide to the model documentation which forms the bulk of this report. The second is to provide a description of how the projections used in the licensing application were prepared. The third is to provide the reader with a short historical review of the sources of growth of the Alaska economy and the implication of this growth for planning purposes.

Documentation Guide

The ISER MAP Economic Modeling System produces annual projections of a large variety of economic and demographic variables based upon user inputs representing the development of basic industry and state government fiscal behavior. The system consists of a number of computerized models; computer programs for model creation and utilization; parameter and variable files for model implementation; and data sets for creation and estimation of model variables and parameters. All model components are written in the computer language called TROLL[1] and are physically located on a computer in Cambridge, Massachusetts, which is accessible on an interactive basis through the TELENET telecommications network by a local phone number in Anchorage.

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[1]The interested reader is referred to TROLL Users Guide, MIT Center for Computational Research in Economics and Management Science, 1980, for a detailed description of TROLL capabilities.

The overview of the modeling system presented in Figure 1 shows that at the heart of the system is the statewide economic model (current version entitled A83.2). Although virtually always run as a unit, the model is divided into four modules for convenience in model construction, updating, and documentation. Three of the modules-- economic, fiscal, and population--are simultaneous, while the fourth--household formation--is simply a derivative of the population module. Not depicted in Figure 1 are some other derivative modules of the statewide economic model which are not used in the current project, but which, for completeness, do appear in this documentation. These are the following--Native economic activity module; definitional equation module (converts variables into real and real per capita terms); and income distribution model links. (The income distribution model is simultaneous with the economic model, but currently nonoperational.)

General module descriptions, as well as specific structural descriptions of each equation, can be found in the following locations in the documentation: economic module-B.1 and B.2; fiscal module-B.1 and B.3; population module-C.1, C.2, and C.9; household formation module-D.1. A complete listing of all equations forming the economic model (economic, fiscal, population, and household formation modules) appears in Appendix G, which also lists the names of all of the variables and parameters used in the model.

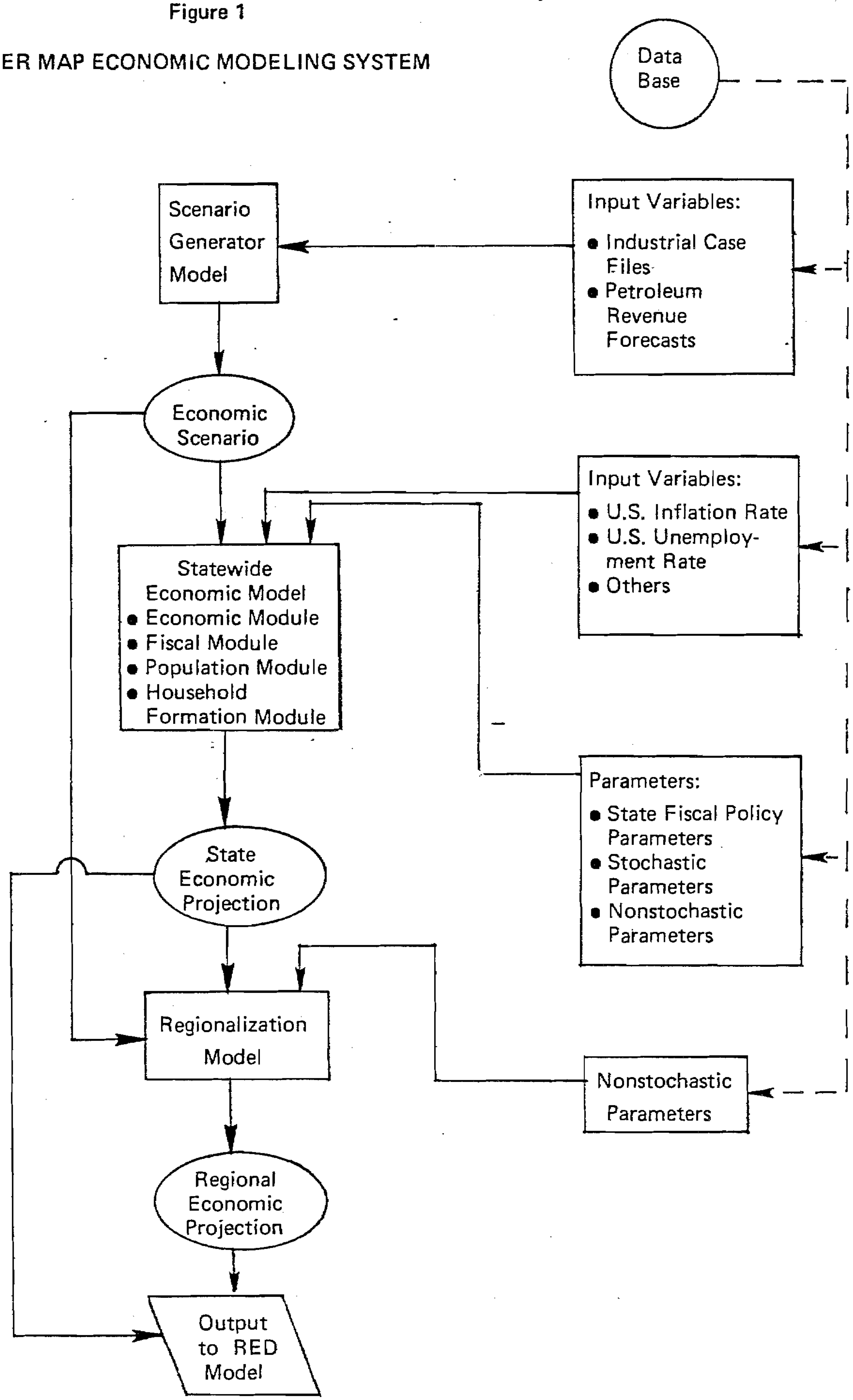
Because of the large number of different variables and parameters used in the model, a complete dictionary has been prepared (Appendix F) which lists and defines variables and parameters and, where appropriate, indicates the source for the historical values used in model construction and utilization. Since the names assigned to the variables display some internal, albeit obscure, logic, the naming conventions are summarized for the economic and fiscal modules in section B.5 and for the population and household formation modules in sections C.3, C.4, C.5, and C.6.

The economic model is operationalized by assigning specific values to model and coefficient parameters by providing a set of startup values for those variables that are the primary model output (startup values for the endogenous variables are a requirement of the computer simulation algorithm), and by entering into the computer for every simulation year a specific value for each variable which is exogenous to the model. (In the TROLL system, variables in the POLICY category are computationally identical to those in the EXOGENOUS category.)

Model and coefficient parameters consist of all constants which assume a fixed value throughout all the years of a particular simulation. They differ in the manner in which they are developed because the coefficient category is restricted to those constants

Figure 1

ISER MAP ECONOMIC MODELING SYSTEM



which are developed stochastically by regression analysis and the parameter category includes all other constants. Regression analysis is utilized where time series data is available for developing historical statistical relationships among variables. This is generally the case for the economic and fiscal modules for which the regression equations used in coefficient development are presented in Appendix H and briefly summarized in section B.11. The population module contains one stochastic equation shown in section C.10. The household formation module contains no stochastic equations.

Parameters take the place of coefficients in the household formation module, most of the population module, and in particular instances in the economic and fiscal modules, and are used either when no historical time series of sufficient length or continuity is available, or where structural change has occurred such that the historical relationships do not reflect expected future behavioral relationships. The parameters (as well as the coefficients) for the economic model are listed in Appendix G. A description of the sources and methods used in the derivation of all parameter values (as well as the values themselves) is included for each module as follows: economic and fiscal modules--B.6; population module--C.11; and household formation module--D.2 And D.3.

After model construction and prior to simulation, the model is initialized by adjusting the values of certain parameters and coefficients so that the output for the most important variables corresponds as closely as possible to the most current actually-observable historical values. All such adjustments currently used are documented and explained in section B.10.

Initial-year startup values for primary output variables (ENDOGENOUS) are, in most cases, immaterial to the final results of simulation. The computer algorithm simply requires a starting value for each variable to initiate the search for a solution. (As a default, the computer can use a value for the previous year to initiate the search.)

The choice of startup values is only important for those variables which enter equations with a time lag because these initial conditions form a part of the datum for the current year model solution. This situation occurs most frequently in the population module where the population in year t, before migration, is equal to the surviving population from the year t-1. These startup values must be chosen with care to ensure that the model begins on the correct trajectory. In all instances where lagged startup values are required, they come directly from historical data, and this is also the case for the majority of the noncritical startup variables. Since the model is currently set to begin projective simulation with the year 1981, startup values for ENDOGENOUS variables for the years 1980 and 1981 are necessary. These are presented in section L.2.

The final element necessary to run the state economic model consists of values for all the exogenous variables (in TROLL terminology, this includes both EXOGENOUS and POLICY variables). This input data is of two general types--variables which have values assumed outside the model, and a small number of parameters which change in value from year to year. The variables can further be subdivided into economic variables and fiscal policy variables with the former consisting of basic sector employment levels and various state and local revenues, and the latter consisting of state expenditure policy switches controlling such policies as the disposition of Permanent Fund earnings. A complete listing of these input variables for the economic model is contained in section B.4.[2] The source for the default values for each input variable is described in section B.8, and the default values themselves are all presented in section L.1. A subset of these input variables may be, at the discretion of the user, provided by the scenario generation model described below. In all of the simulations presented in this report, certain of the default input variables, primarily various petroleum revenues, are superseded by alternative input data sets. This process is described in the following section of the introduction.

Throughout the model development stage and before simulation, the model is tested for its ability to accurately represent the structure of the economy and population, as well as to monitor its properties. These tests are described in detail in section B.7 for the economic and fiscal modules; in section C.12 for the population module; and in D.3 for the household formation module. One particularly important element of this continuous testing and monitoring of the model is sensitivity analysis, in which the implications of model performance to changes in individual input variables, parameter and coefficient values, and equation structures are assessed. A report on the most current set of sensitivity analyses is presented as Appendix J.

The regionalization model (current version A83.CD) uses selected output from the ISER MAP Alaska Economic Model to produce regional

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[2]The population module is simultaneous with the economic and fiscal modules but can be detached and run separately. The input variables which would be required to accomplish this (and which are normally supplied by the economic module) are presented in sections C.7 and C.3.

projections of employment, population, and households. The regional projections are consistent with and cover the same range of years as the statewide model because the regionalization model is essentially a nonstochastic algorithm for allocating statewide employment, population, and households to the regional level. As such, it is not an integral part of the state model which can be, and often is, used without the regionalization model.

A complete description of the regionalization model is contained in Appendix E, including a general description in sections E.1 and E.2, variable and parameter names in section E.4, and procedures for model validation in section E.6. A complete listing of all model equations is contained in Appendix I which also includes a listing of all the parameter values. (Since the model is nonstochastic, it contains no coefficients.) The derivation of all the parameter values is explained in section E.5.

The regionalization model is complicated by the fact that it requires input variables from two sources in order to produce a regional allocation of a statewide simulation. Control totals from a statewide simulation for population, employment, and households must be provided by the output of the economic model. In addition, regionalized basic and government sector employment assumption consistent with the statewide assumptions used in the corresponding statewide simulation are required. Complete documentation of what these variables consist of, how these input variables are obtained, and how consistency between the state and regionalization models is assured is contained in sections E.3 and E.7.

Because the regionalization model is a procedure for the allocation of statewide simulation results, its input data will consist of a portion of the output of a particular statewide simulation as well as output of the scenario generator. One such input data set is presented in section M.1. A small number of startup values are needed for model simulation. These are presented in section M.2.

The choice of input variables to produce a simulation of the economic model and, if required, the corresponding regionalized allocation, rests with the model user. The scenario generator model is usually utilized for the purpose of producing the most important of these variables in a consistent and convenient manner. It is described in Appendix A. The output of the scenario generator is, however, neither necessary nor sufficient to provide all the input data necessary to run either the economic model or the regionalization model.

The scenario generator is a program which aggregates a series of case files into an economic scenario. The individual case files describe, primarily with employment variables, the economic dimensions of particular industries such as fish harvesting, individual large projects such as a gas pipeline, and petroleum revenue projections. A large library of case files is maintained on the computer and successive scenarios can be produced by choosing different case files.

The output of the scenario generator is a set of sixteen basic employment, petroleum, and tourist visitor data series which conform to input requirements of the state model, as well as a consistent set of forty regionalized employment variables which conform to input requirements of a corresponding run of the regionalization model.[3]

The control scenario produced by the scenario generator for this current study is described in section K.1 in the form of a list of economic assumptions for each basic industry. The output of the scenario generator for use in the economic model using these economic assumptions is shown in section K.2 and also included as a subset of the variables listed in section L.1. The corresponding output for use in the regionalization model is shown as a subset of the data in section M.1. The input for the regionalization model, in the form of a description of each of the case files used to form the control scenario, is contained in section K.3.

Appendix O briefly reviews the relation of the current study to earlier work by ISER in projecting Railbelt electricity demand. Appendix P is a bibliography of publications and papers relating to the MAP modeling system.

A substantial computerized data base supports the modeling system. Documentation of the data base is available on request.

Creation of the Projections

Once the models have been constructed, tested, and calibrated, the parameter and coefficient values have been calculated, and an input data set (including startup values) has been constructed, the models can be repeatedly and easily run to simulate future employment, population, and household levels for the Alaska Railbelt region. This process is facilitated by a series of programs especially written for this purpose as described in section B.9 of this documentation.

For those simulations for which selected inputs and outputs are presented in Appendix N, selected control input assumptions described in sections B.4 and B.8 and listed in Appendix K and

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[3]The scenario generator model also provides consistent input to a new experimental model of the Anchorage economy (ANKMOD) which is currently in the final stages of development.

section L.1 were overridden. A number of different petroleum revenue assumptions were chosen by Harza-Ebasco and used as input to the economic model. In addition, ISER economists altered certain state economic policy variables in response to different levels of petroleum revenues to maintain a reasonable mix of public sector expenditures. The overriding input variables are presented for each case in Appendix N.[4]

The sequence of events for a typical simulation is as follows: First, the Alaska economic model is prepared for simulation by assembling the model, parameters and coefficients, the control input data, and the startup data. A portion of the control data (sixteen variables) is supplied by the scenario generator model, which needs only to be run when forming a new economic scenario. At this time any changes are made to the input data (or the parameters, coefficients, startup data, or model structure) for the particular simulation to be done. In this study, this involves substitution of alternative petroleum revenue assumptions and alternative state fiscal policy parameters. The simulation then occurs and the output is reviewed. In many instances, the state fiscal policy parameters need to be adjusted prior to additional model run iterations before a satisfactory solution is obtained.

When a satisfactory simulation has been completed, the regionalization model can be run. This requires a subset of the output of the Alaska economic model as input, as well as input directly from the scenario generator model (regionalized version of similar input fed into the Alaska economic model). No other specific changes are required for completing different simulations.

The output which is provided to the electricity end use Railbelt energy demand (RED) model comes primarily from the regionalization model. Only households by age of head and nonagricultural wage and salary employment enter the RED model directly from the economic model.

Historical Overview of Alaska Economy

The pattern of economic growth of Alaska is shown in Figure 2, and is measured by four categories of employment. The growth since statehood in 1959 has been dramatic, particularly in the 1970s. The average annual growth rate measured between 1961 and 1980 has been

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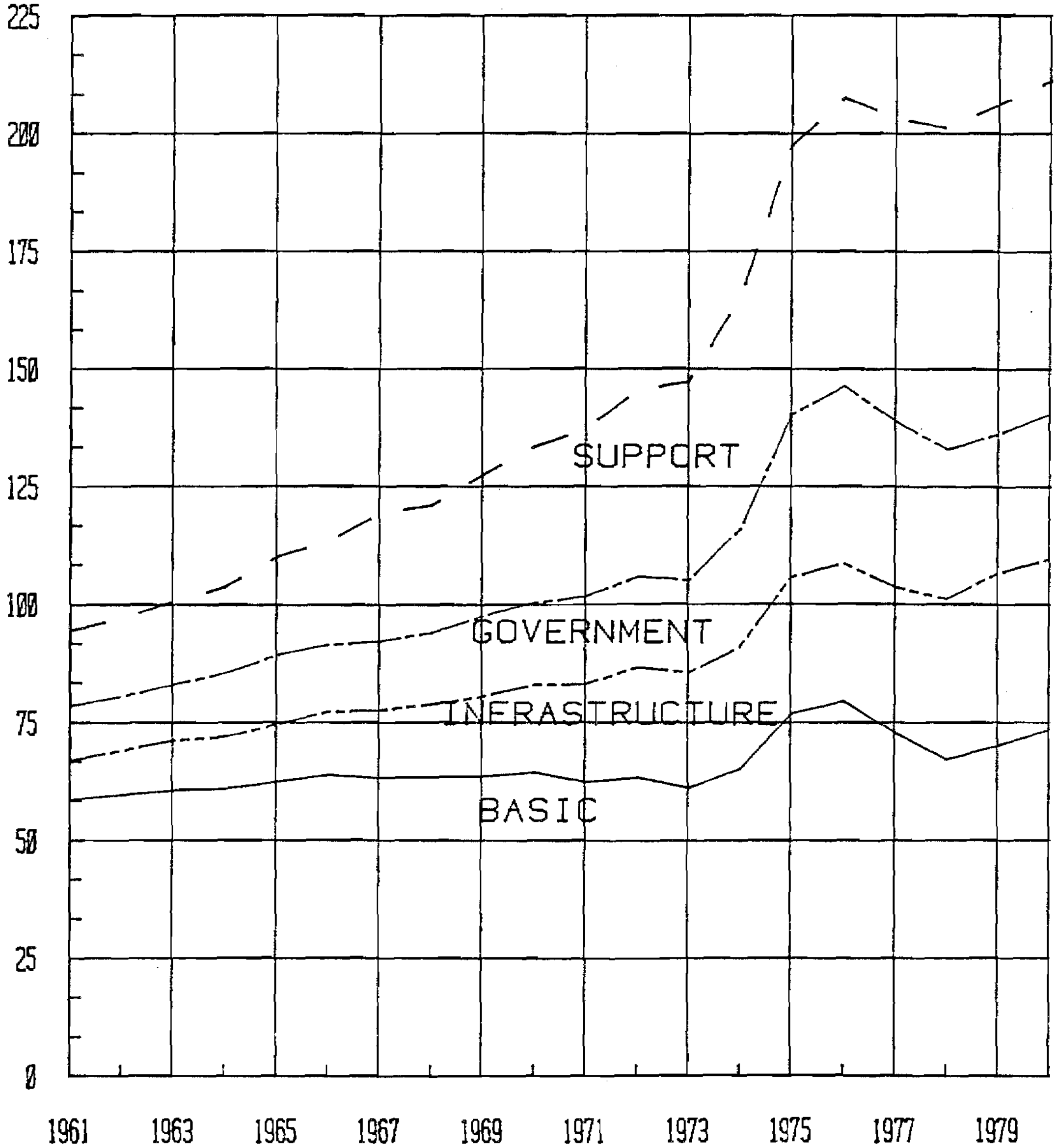
[4]In all simulations reported in this document, incremental power requirements for the Alaska Railbelt are supplied by a combination of new hydroelectric facilities (Chackachamna and Bradley Lake), treated exogenously, and new gas turbines, treated endogenously.

FIG. 2: ALASKA EMPLOYMENT GROWTH

(THOUSANDS)



4.3 percent, more than double the national average over the same period.[5]

Of particular interest in understanding the possible future direction of the Alaska economy is the information about past sources of growth which can be obtained from an examination of the past behavior of the different categories of employment. Conventional wisdom is that the economic growth of a region is dependent upon the growth of its basic sector industries--those industries for which the region has a comparative advantage in producing goods and services for export outside the region, such as manufactured goods. Around these industries cluster support industries both for the basic sector and for the labor force employed in those industries. Basic sector employment (defined to include mining, petroleum, fish harvesting, timber harvesting, manufacturing for export, tourism, agriculture, pipeline construction, operations, and federal government--civilian and military) has grown since statehood, but only by an annualized rate of 1.2 percent per year, and displayed practically no growth during the decade of the 1960s. Basic sector employment growth has contributed to growth in the overall economy both directly and indirectly through the multiplier process, but clearly by itself it has not been a significant factor in the rapid economic growth of the past.

Two important characteristics of basic sector employment in Alaska are not indicated by the relatively stable level of this sector during the last twenty years. The first is that the stability is largely the result of the federal government, which is the largest employer in the state and which dominates, in numbers, basic sector employment. In fact, federal employment in Anchorage is surpassed only by Washington, D.C. (among the BEA Economics Areas) as a proportion of total employment.[6] This component of basic employment forms a large and stable anchor for the whole sector.

This is particularly important because of the inherent instability of the remainder of the basic sector in Alaska. Because Alaska's remote location and harsh climate result in high production costs, basic sector activity has historically been confined to the

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[5]The annualized growth in total civilian employment between 1959 and 1980 was 2.0 percent. Valerie Personick, "Industry Output and Employment: BLS Projections to 1990," Monthly Labor Review, April 1979, p. 10.

[6]Arlon Tussing, Lee Huskey, and Tom Singer, "The Place of Support Sector Growth, Import Substitution, and Structural Change in Alaska's Economic Development," ISER, February 1983, p. III.3.

extraction of rich deposits (low average cost of production) of natural resources. The past pattern has been one of exploitation of one resource after another--furs, gold, timber, copper, fish--by nonresident labor and outside capital in a rush to deplete each resource as rapidly as possible. The result has been an economy dominated by a succession of booms and busts as new resources were discovered, extracted, and depleted. Since the basic sector held a more dominant position in the total economy in past times (for example, 63 percent of the total in 1961 versus 36 percent in 1980) than currently, the cyclical nature of basic activity meant that the whole economy was subject to instability.

Even in the best situations, the production of primary commodities is highly cyclical. Although the smaller proportional contribution of basic to total employment today tends to disguise the cyclical influence of natural resource extraction, it is important to keep in mind for two reasons. First, the cyclical nature of primary commodity markets makes it difficult to project future demand (and price levels); and second, the industries are heavily dependent upon supplies which are highly uncertain. For example, very little is known about mineral occurrences in the state or the dynamics of the different fishery stocks.

The other three employment categories shown in Figure 2 have all displayed much more rapid employment growth since statehood than the basic sector. The reasons for their growth reveal much about the process of economic growth in the state. The infrastructure sector is loosely defined to include the transportation, communication, public utility, and construction industries, as well as business services. Annualized growth in this sector has been 5.5 percent since 1961 with a prominent "bulge" during the mid 1970s. This growth is largely the result of the undeveloped conditions of the economy prior to statehood combined with the scattered distribution of population in a huge state with sparse population. Thus, the level of infrastructure employment necessary to link the population together is high, and the process of building the infrastructure itself magnifies employment in this sector in the short run. The building is both for the purpose of "catching up" to the infrastructure levels of other regions, and also to meet the needs of the rapidly expanding Alaskan population. This is reflected in the fact that state and local government capital outlay per capita have historically averaged three to five times the national average.[7]

An important variable in the future economic growth of the state is the extent to which this process of infrastructure enrichment will continue to occur independent of growth in the basic sector.

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[7]U.S. Department of Commerce, Bureau of the Census, Governmental Finances, annual.

The answer in large part depends upon two factors. The first is the availability of public capital to fund infrastructure additions. Particularly in the early years after statehood, the funds to construct infrastructures came primarily from the federal government. During the 1970s, state government had been able to provide an increasing share of the funding for infrastructure as a result of the receipt of substantial oil revenues.

The second is the future rate of population growth. The faster this growth occurs, the more infrastructure development is required and the higher will be construction activity on a per capita basis.

State and local government forms the third sector of the economy. Employment growth in this sector has been particularly dramatic since statehood growing at an annualized rate of 8.2 percent. Interestingly, the rate of increase during the first decade after statehood--9.4 percent--exceeds that of the decade of the 1970s when the state began to receive substantial amounts of oil revenues. State government revenues currently are derived almost exclusively from petroleum, and a large proportion of local government revenues are also dependent upon petroleum through state transfers and taxes on petroleum property. Consequently, the future size of this sector of the economy, which is second only to federal government in numbers employed, is closely tied to the future receipt of petroleum revenues.

The final category of employment is support, consisting of the trade, finance, and service sectors of the economy. It has grown on an annualized basis at approximately the same rate, 8.3 percent, as state and local government; and like state government, the growth rate was slightly faster, at 8.6 percent, during the first decade since statehood. The growth in this sector is only partially in response to the growth in the other three sectors of the economy. In 1961, for example, there were nineteen jobs in this sector for every 100 jobs in the rest of the economy, and if the same ratio held in 1980, there would be 27 thousand, rather than the 75 thousand support sector jobs which the economy actually provided in 1980.

This structural change of the economy can be characterized in three dimensions. First, there has been a change over time in the market basket of goods consumed within the state. Second, there has been a change over time in the methods by which support sector goods and services are produced within the state. Third, there has been a change over time in the goods and services which are locally available (import substitution).

These changes have primarily been the result of an increase in the size of the local market. First, and most obviously, the population of the state nearly doubled in the first twenty years of statehood--exhibiting a 2.9 percent annualized growth rate compared to 1.0 percent for the United States as a whole. Less obvious, but more importantly, has been the growth in income. Figure 3 shows the growth of the average annual wage, and personal income per capita; both have increased markedly in real terms since statehood. Both have, in addition, increased in relation to the national average. This is illustrated in Figure 4, which shows that the Alaska/United States ratio of real disposable personal income, which historically hovered around .8, climbed above one briefly in the mid-1970s. The future direction of this indicator of the strength of the Alaskan market will be an important determinant of economic growth.

Several other factors have contributed to the structural change characterized by support sector growth. One is the increasing stability of the marketplace as measured both by the decreasing importance of seasonal and cyclical (associated with natural resource extraction activities) variations in economic activity, and by increasing wealth of the population. This provides a cushion which allows a region to support itself independent of wage and salary income. Alaska's personal income is more dependent on wages and salaries than most other states, but that dependence is gradually falling as the proportion of income from other sources increases. Between 1959 and 1980 that proportion more than doubled from 9 to 19 percent. This increase in market stability makes investment in support sector businesses less subject to the risks associated with economic fluctuations.[8]

A second factor is indicated by Figure 5, which shows the dramatic increase since statehood in the proportion of the civilian population which is employed.[9] Between 1961 and 1979, it increased from 30 to 49 percent of the civilian population. This accounts for the fact that personal income per capita has historically grown more rapidly than the average wage rate (Figure 3). This trend reflects a more market-oriented, consumption-oriented economy which can sustain a larger support sector.

One additional factor contributing to the growth of the support sector has been the downward trend in the ratio of the cost of doing business in Alaska relative to the U.S. average. Figure 6 shows that this downward trend has been historically interrupted only during the mid-1970s when Alyeska oil pipeline construction generated local inflationary pressures in excess of the national average.

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[8]An example of this new wealth is the ANCSA transfer of land and money to the Alaska Natives.

[9]This measure is only an indication of the trend because employment is by place of work and population is residence-based.

FIG. 3: AVG. ANNUAL WAGE & PER CAPITA INC.

(1967 U.S. $)

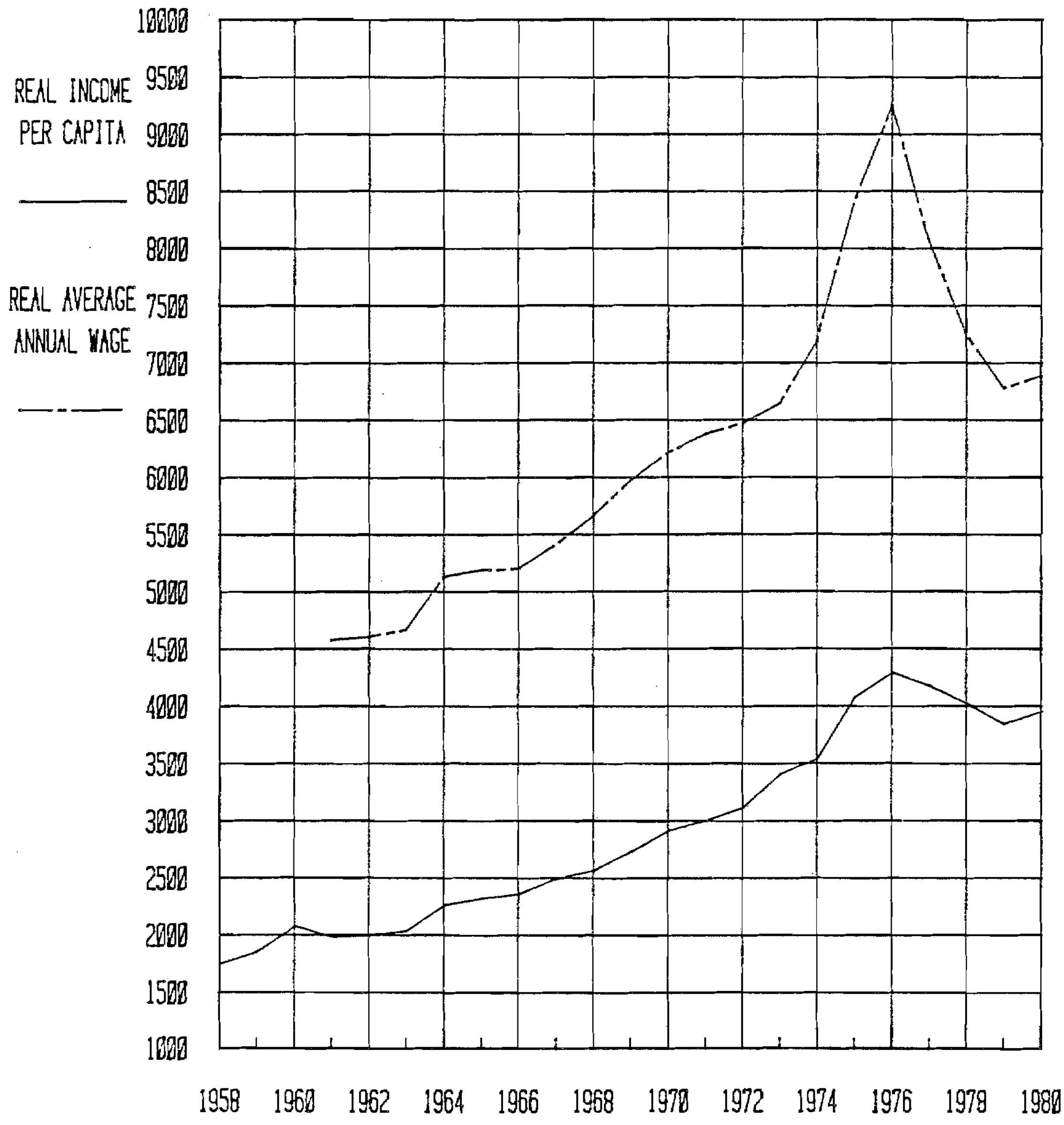


FIG. 4: REAL DISPOSABLE PERSONAL INCOME

(ALASKA/US RATIO)

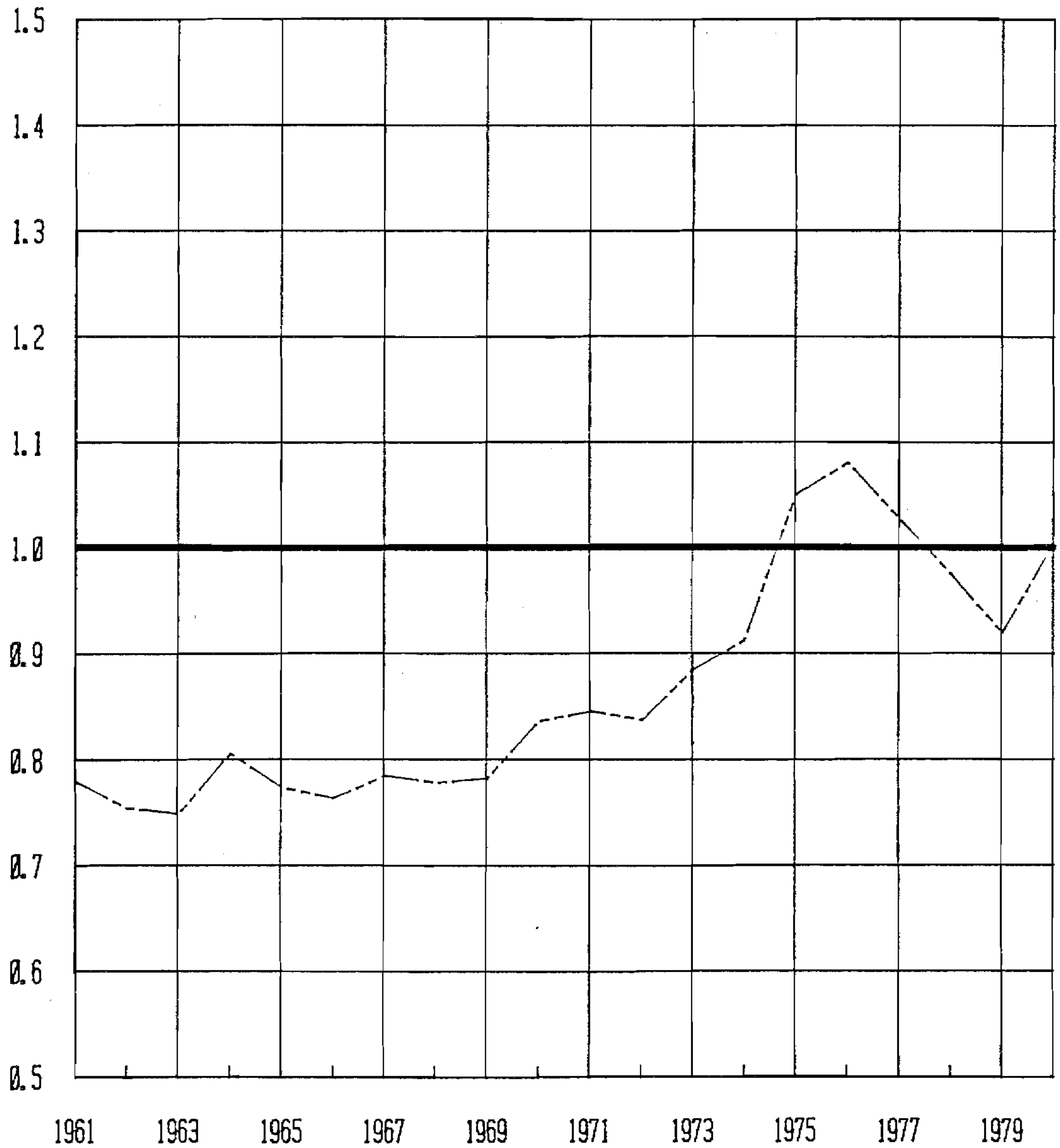


FIG. 5: PERCENT OF CIVILIANS EMPLOYED

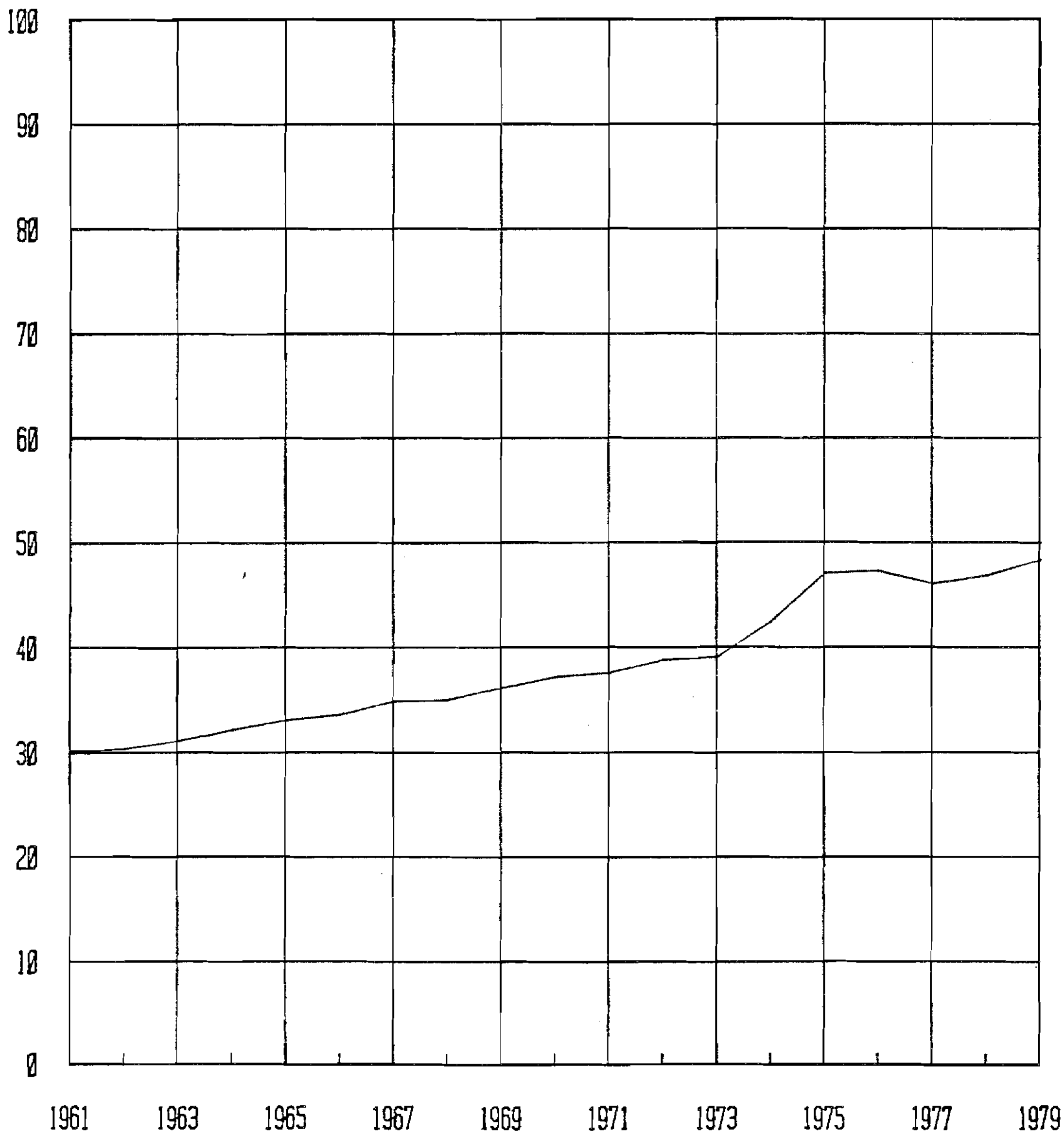
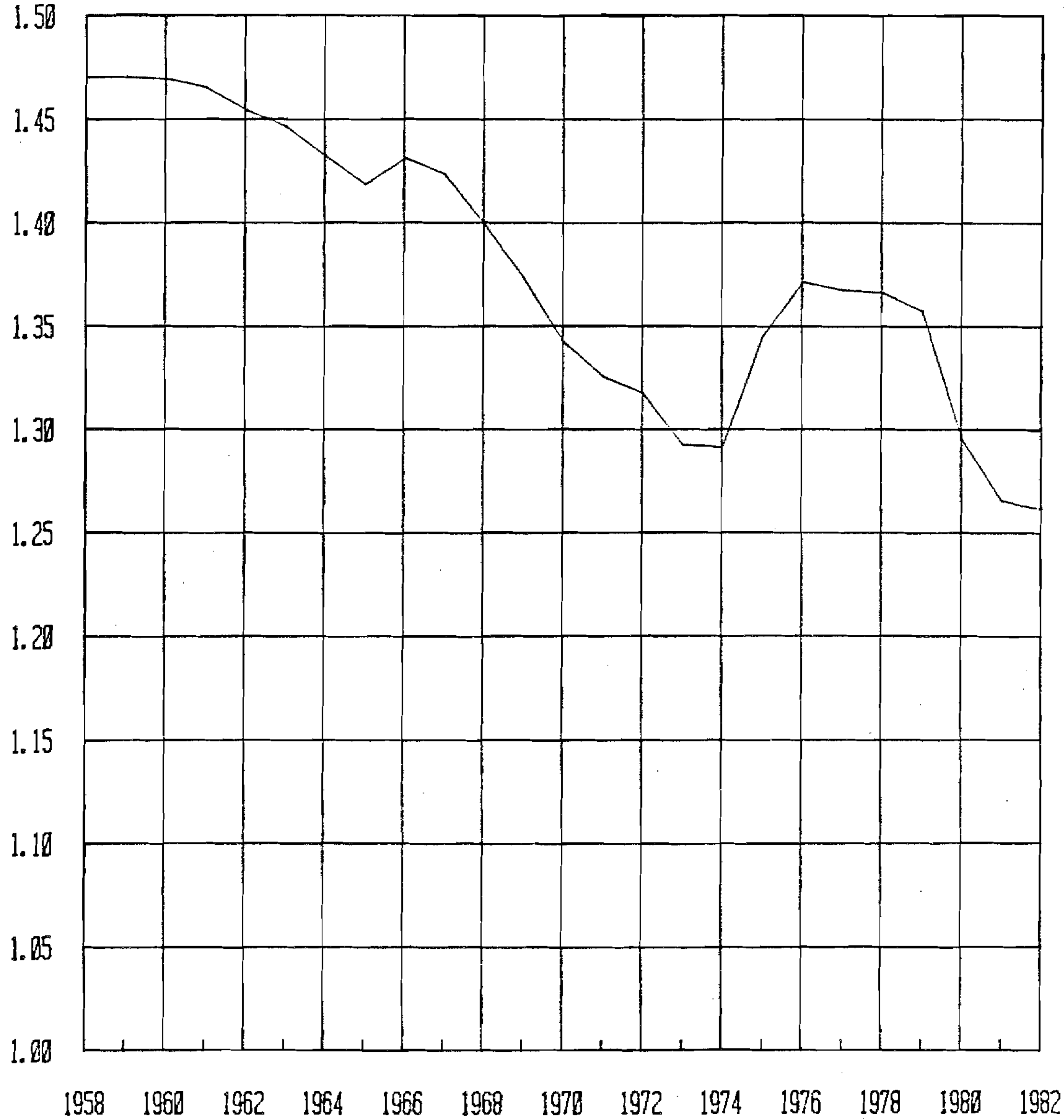


FIG. 6: RATIO OF ANCHORAGE TO US CPI



In sum, the pattern of employment growth in Alaska is characteristic of an underdeveloped economy undergoing structural change and rapid growth from a large number of causes.

The problem of projecting future economic activity then becomes one of sorting out those various factors contributing to past growth and trying to determine both how they will change in the future and how those changes will affect the growth trajectory of the economy. The exercise is complicated by the poor quality of the historical record (which is a result of this underdevelopment and rapid growth), which limits our understanding of the quantitative dimensions of the growth in the past.

It should be clear from this short discussion that there is a large degree of inherent uncertainty surrounding any projections of the future size of the Alaskan economy, and that unanticipated rapid economic change can easily occur. This uncertainty can be reduced, but not eliminated, by further analysis of the past.

This phenomenon is vividly demonstrated by the unprecedented growth of the Alaskan economy between 1980 and 1982. Primarily in response to a more than doubling of oil prices in 1979, employment increased 14 percent, and population 15 percent over the ensuing two-year period. The magnitude of the increase was similar to the growth when the Alyeska pipeline was under construction. Few, if any, analysts anticipated the rapidity and magnitude of the conversion of petroleum revenues into economic activity. Most importantly, this illustrates the dependence of the economy on natural resource industries and the volatility that dependence continues to impart to the whole economy.

Institute of Social
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MAP Documentation
May 1983

APPENDIX A
ISER MAP ECONOMIC MODELING SYSTEM

SCENARIO GENERATOR MODEL

DOCUMENTATION

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May 1983

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May 1983

0. Introduction

The scenario generator model consists of a set of data files, macros, and programs designed to create and manipulate a library of the various assumptions required for a run of each of the three major ISER models--the MAP statewide model version A83.2, the regionalization model version A83.CD, and the Anchorage Municipality model version BIGMOD.

Part I documents the organization of data files in the archives related to the scenario generation tasks. Part II describes the use of the scenario generation macro in constructing a scenario. Part III then describes a set of macros which have been developed for conveniently manipulating, editing, and examining the files contained in the library archives.

A-1. Organization of the Library Archives

Each of the three ISER economic models requires a set of data series corresponding to each of the variables treated as exogenous by that model. The scenario generator model provides the most important of those variables to each model.

Specifically, for use in a run of the MAP statewide model version A83.2, the scenario generator provides a data series for each of the sixteen (16) exogenous variables listed in Table A-1.

The scenario generator provides for use in a run of the regionalization model A83.CD a set of assumed data series for each of the forty (40) exogenous variables shown in Table A-2. (Model A83.CD also requires output from a run of the MAP statewide model A83.2., although it would be possible to modify the model to operate independently.)

Finally, the scenario generator provides for use in a run of the Anchorage Municipality model BIGMOD a set of assumed data series for the forty-six (46) exogenous variables shown in Table A-3. Currently, a run of model BIGMOD requires output from a run of the MAP statewide model A83.2, although it would be possible to modify the model to operate independently.

TABLE A.1. EXOGENOUS VARIABLES REQUIRED FOR MAP STATEWIDE MODEL RUN

Variable Name	Description
EMAGRI	Agriculture Employment
EMP9	Mining Employment
EMCNX1	High Wage Exogenous Construction Employment
EMCNX2	Low Wage Exogenous Construction Employment
EMMX1	High Wage Exogenous Manufacturing Employment
EMMX2	Low Wage Exogenous Manufacturing Employment
EMT9X	Exogenous Transportation Employment
EMFISH	Fish Harvesting Employment
EMGM	Active Duty Military Employment
EMGC	Civilian Federal Employment
RPTS	State Production Tax Revenue
RPRY	State Royalty Income
RPBS	State Bonus Payment Revenue
RPPS	State Property Tax Revenue
RTCSPX	State Corporate Petroleum Tax Revenue
TOURIST	Tourists Entering Alaska

TABLE A-2. EXOGENOUS VARIABLES REQUIRED FOR REGIONALIZATION MODEL RUN

Variable	Description
Bii	Basic Sector Employment, Region ii
Gii	Government Sector Employment, Region ii

Where ii:

Ø1	for	Aleutian Islands CD
Ø2	for	Anchorage CD
Ø4	for	Barrow/N. Slope CD
Ø5	for	Bethel CD
Ø6	for	Bristol Bay*
Ø8	for	Cordova/McCarthy CD
Ø9	for	Fairbanks CD
11	for	Southeast**
12	for	Kenai/Cook Inlet CD
14	for	Kobuk CD
15	for	Kodiak CD
16	for	Kuskokwim CD
17	for	Matanuska/Susitna CD
18	for	Nome CD
21	for	Seward CD
24	for	S.E. Fairbanks CD
25	for	Upper Yukon CD
26	for	Valdez/Chitina/Whittier CD
27	for	Wade Hampton CD
29	for	Yukon Koyukuk

*Includes Bristol Bay CD and Bristol Bay Borough CD.

**Includes: Angoon CD
Haines CD
Juneau CD
Ketchikan CD
Outer Ketchikan CD
Prince of Wales CD
Sitka CD
Skagway-Yakatat CD
Wrangell-Petersburg CD

TABLE A-3. EXOGENOUS VARIABLES REQUIRED FOR RUN OF ANCHORAGE MUNICIPALITY MODEL ANKMOD

Variable	Description
M.MIL	Employment by Place of Work, Anchorage, Military Personnel
M.PRX	Employment by Place of Work, Anchorage, Proprietors
M.ØØ	Employment by Place of Work, Anchorage, Unclassified
M.Ø1	Employment by Place of Work, Anchorage, Agriculture-Forestry-Fisheries
M.1Ø	Employment by Place of Work, Anchorage, Metal Mining
M.13	Employment by Place of Work, Anchorage, Oil & Gas Extraction
M.14	Employment by Place of Work, Anchorage, Nonmetallic Minerals Mining
M.2Ø	Employment by Place of Work, Anchorage, Food Manufacturing
M.22	Employment by Place of Work, Anchorage, Textile Manufacturing
M.26	Employment by Place of Work, Anchorage, Paper Manufacturing
M.29	Employment by Place of Work, Anchorage, Petroleum & Coal Product Manufacturing
M.31	Employment by Place of Work, Anchorage, Leather Product Manufacturing
M.33	Employment by Place of Work, Anchorage, Primary Metal Manufacturing
M.36	Employment by Place of Work, Anchorage, Electrical Equipment Manufacturing
M.38	Employment by Place of Work, Anchorage, Instrument Manufacturing
M.46	Employment by Place of Work, Anchorage, Pipeline (Ex. Natural Gas) Transport
M.84	Employment by Place of Work, Anchorage, Museums & Gardens Svcs.
M.88	Employment by Place of Work, Anchorage, Private Households Svcs.
M.91	Employment by Place of Work, Anchorage, Federal Civilian Govt.
M.92	Employment by Place of Work, Anchorage, State Government
M.93	Employment by Place of Work, Anchorage, Local Government
r.MP.ss*	Employment by Place of Work, Region r, Sector ss

*Where r =
- B Matanuska/Susitna Region (Matanuska/Susitna CD)
- C Southcentral Region (Kenai-Cook Inlet, Kodiak, Valdez/Chitina/Whittier, Cordova/McCarthy, and Seward CDs)
- D Interior Region (Fairbanks, Yukon/Koyukuk, and Upper Yukon CDs)
- E Southeast Region (Juneau, Ketchikan, Prince of Wales, Sitka, Wrangell, Petersburg, and Lynn Canal CDs)
- F Northern Region (Barrow/North Slope, Kobuk, and Nome CDs)
- G Southwest Region (Aleutian Islands, Bethel, Bristol Bay, Wade Hampton, and Kuskokwim CDs)

ss =
- B1 High Wage Basic Sector
- B2 Low Wage Basic Sector
- G9 Government Sector
- PR Proprietor Sector

These scenarios are composed of sets of individual assumptions, or cases, each of which is itself an archive of individual component assumptions. These individual components are filed in an archive called SCEN_, which can be considered to be the library from which scenarios may be constructed using the scenario generator. The scenario generator combines these cases according to user-specified instructions into scenarios, which are then filed in an archive called SCENARIO_. The scenarios archived in SCENARIO_ may be used directly in running the various ISER economic models.

a. Input File Archives--The Case Library (SCEN_)

The SCEN_ archives contain sets of data files which will be termed "cases." A "case" may be a particular exogenous development project, such as the gas pipeline or the Alpetco refinery, or a particular set of revenue estimates, such as those published by the Alaska Department of Revenue, or an assumption concerning the development of a component of an exogenous industry, such as commercial fishing or agriculture. Each "case" has implications for some subset of the exogenous variables in the ISER economic models.

A "case" consists of a set of data files, consisting of the effects of that case on the exogenous variables in one or more of the ISER economic models. In addition, each case contains an additional data file called COMMENT, containing no data but rather a comment which provides a short description and documentation of the case.

Each case is given a user-specified name which becomes the name of a sub-archive within the SCEN_ archive. The convention to be used in giving such names is as follows: the name will take the form ccc.nnn, where ccc is a three-digit code identifying the particular case, such as an OCS sale, which would be called OCS.nnn, or Prudhoe Bay field employment, which would be called PRB.nnn. The final three digits (nnn) are an identifier of the particular set of assumptions employed to describe this case. For example, there may be a series of PRB.nnn cases, each corresponding to a different set of assumptions regarding the future development of Prudhoe Bay.

It should be noted that not all cases will be usable with all models. For example, certain cases such as revenue assumptions may affect only variables in the MAP statewide model. On the other hand, any cases which involve exogenous employment will typically affect the exogenous variables in all three models, but information may be inadequate to provide sufficient regional disaggregation to use either the regionalization model or the municipality model. Alternatively, the user may have sufficient information to regionally disaggregate the statewide data to the level required by BIGMOD, but not to the level required by A83.CD. Finally, there may be some cases which affect exogenous variables in the municipality model but have no bearing on the statewide model (an example is state and local government employment, which is endogenous to A83.2 but exogenous to BIGMOD).

In order to deal with such possibilities without having to set up three special model-specific libraries in which there would be a great deal of duplication, the comment file in each case should include a list of the models with which the case may be appropriately utilized. Many cases initially entered into the library as "state" cases, usable only with the statewide model A81.7, may be gradually upgraded as more information and/or more effort is put into disaggregating the data to a regional level appropriate for use in one or both of the regional models.

b. Output File Archives--The Scenario Library (SCENARIO-)

Output of the scenario generation macro is filed in the SCENARIO_ t.ddddd archive, where t is a one-digit code indicating the model to which the scenario is appropriate (S = statewide A83.2, C = regionalization CDMBT, A = municipality BIGMOD). A type S scenario archive contains the 16 data files listed in Table 1a; a type C scenario archive contains the 40 data files listed in Table 1b; a type A scenario archive contains the 45 data files listed in Table 1c; and each contains an additional COMMENT file which documents the scenario.

A-2. Using the Scenario Generator

a. Capabilities and Organization

The scenario generator is simply an elaborate macro for combining the various cases contained in the SCEN_ library archives according to a variety of user-specified instructions and filing the resulting scenario in the SCENARIO_ library archives.

It expects input files in the format decribed above for the SCEN_ library and produces output in the form of data files in the format described above for the SCENARIO_ library.

It permits the user to alter the timing of events described in the individual case archives by moving the entire set of data series forward or backward in time.

In addition to the SCENARIO_ data files output which are automatically stored on disk following a run of the scenario generator, several online outputs are produced during and immediately following a run.

After receiving all instructions from the user, the scenario generator prints an acknowledgment that processing is beginning, of the form:

GENERATING SCENARIO t.dddd ...

and presents the total of the number of cases it is about to process:

CONSISTS OF n CASES, as follows:

After which it presents a description of each case as it is processed, consisting of the contents of the comment filed in the COMMENT file for that case and an acknowledgment of any moves in the timing of the case that have been made from that found in the SCEN_ library archives.

Upon completion of processing, it prints the message

SCENARIO t.dddd FILED IN SCENARIO ARCHIVE

Finally, following this message, it will request that the user provide a written description of the scenario, which will be filed as a comment in the COMMENT file corresponding to the newly generated scenario. This request will be indicated by the prompt:

NEW COMMENT:

at which point the user should type in a short description of the scenario. This description may be more than one line, but the prompt "NEW COMMENT:" will precede each line. Following completion of the description, the user should type a semicolon ";" followed by the command "FILE;".

b. Instructions for Using &SCENGEN

The command &SCENGEN will activate the scenario generator, which will proceed to ask the user a series of questions. First, the user will be asked to provide the type and name for the scenario, with the prompts:

SCENARIO TYPE (S, C, or A)
SCENARIO NAME:

Once this has been provided, the scenario generator will begin to ask questions about each of the cases to be included in the scenario. The first question,

CASE NAME:

it expects to be answered with one of the ccc.nnn names found in the SCEN_ library. It then prompts:

START:

and expects the user to provide an integer representing the number of years forward or backward in time that the case should be moved. For example, if the user wishes to leave the timing of the case as it is recorded in the library, he should respond with 0; if he wishes to delay the case by two years, -2; or move it forward five years, 5; and so on.

After providing this information for the first case, the computer will again give the prompt:

CASE NAME:

which it expects to be answered with the name of the second case, followed by prompts for the start and type of the second case, and so on. Currently, the user may specify as many as 97 cases to be included in a scenario. Once all of the case information has been entered, respond to the CASE NAME: prompt with a semicolon to indicate the end of the input list. No further information is required from the user until processing is completed, after which the user will receive the prompt:

NEW COMMENT:

and should type in a short description of the scenario contents, followed by a semicolon and the word "file", followed by a second semicolon.

c. An Example

Before beginning to generate a scenario, the user may want to scan the cases in the SCEN_ library available for use in the scenario. This can be done using the &LISTLIB command, which provides a complete listing of currently available cases, as follows:

```
&LISTLIB

DATA_      SCEN_      AGR.SCM
                      BCF.003
                      BCL.04T
                      DOR.381
                      FLP.SCM
                      GFC.EPM
                      GFM.EPM
                      NPR.MOD
                      NWG.MG1
                      OCS.BFM
                      OCS.55X
                      OCS.57X
                      OCS.60X
                      OCS.70L
                      OCS.71M
                      OCS.75H
                      OCS.75L
                      OCS.75M
                      OCS.751
                      OCS.754
                      OCS.755
                      OMN.EPH
                      PRB.081
                      TAP.XXX
                      TCF.001
                      TRS.MOD
                      UPC.011
```

If the user is unfamiliar with one or more of these cases, he may use the &DESCASE or &DESCLIB commands explained in the following section.

After deciding on the cases he wishes to include in the scenario, the user proceeds to invoke the scenario generator with the &SCENGEN command.

In this example, we generate a scenario for use with statewide model A83.2 called S.TEST1, consisting of 14 cases selected from the 27 available cases in the SCEN_ library. Note that we have changed the timing of two of those cases: OCS.60X has been moved forward 4 years, and NWG.MG1 has been moved back 1 year. After completing the questions for the desired cases, the user responds with a semicolon.

TROLL COMMAND: .&SCENGEN

TYPE OF SCENARIO (S, C, or A): S

NAME OF SCENARIO:
PROJECT CODE:.AGR.SCM
START:.0

CASE NAME:.BCF.003
START:.0

CASE NAME:.DOR.381
START:.0

CASE NAME:.FLP.SCM
START:.0

CASE NAME:.GFC.EPM
START:.0

CASE NAME:.GFM.EPM
START:.0

CASE NAME:.OCS.55X
START:.0

CASE NAME:.OCS.BFM
START:.0

CASE NAME:.OCS.60X
START:.4

CASE NAME:.OMN.EPH
START:.0

CASE NAME:.TAP.XXX
START:.0

CASE NAME:.TCF.001
START:.0

CASE NAME:.TRS.MOD
START:.0

CASE NAME:.NWG.MG1
START:.-1

CASE NAME:.;

The computer will now begin processing the required cases. As it completes each case, it provides a description of the case, as follows:

```
GENERATING SCENARIO TEST1 ...
CONSISTS OF 14 CASES AS FOLLOWS:
CASE AGR.SCM
MOVED 0 YEARS


SCEN_AGR.SCM_COMMENT -

    MODERATE CASE AGRICULTURAL DEVELOPMENT FROM :
    GOLDSMITH AND PORTER, ALASKA ECONOMIC PROJECTIONS
    FOR THE RAILBELT, ISER, 10/81, P. A-75


CASE BCF.003
MOVED 0 YEARS


SCEN_BCF.003_COMMENT -

    BOTTOMFISHING EMPLOYMENT ESTIMATES PREPARED BY
    GUNNAR KNAPP FOR OCS SALE 75 STUDY, FEB 1982


CASE DOR.381
MOVED 0 YEARS


SCEN_DOR.381_COMMENT -

    THIRD QUARTER 1981 PETROLEUM PRODUCTION REVENUE
    FORECAST, ALASKA DEPARTMENT OF REVENUE, 9/81


CASE FLP.SCM
MOVED 0 YEARS


SCEN_FLP.SCM_COMMENT -

    LUMBER MANUFACTURING EMPLOYMENT
    ASSUMES TIMBER OUTPUT RISING TO 960 MILLION
    BOARD FEET BY THE YEAR 2000.
```

CASE GFC..EPM
MOVED 0 YEARS

SCEN_GFC.EPM_COMMENT -

FEDERAL CIVILIAN EMPLOYMENT
ASSUMED TO GROW AT HISTORICAL RATE OF 0.5 %
ANNUALLY THROUGH 2000

CASE GFM.EPM
MOVED 0 YEARS

SCEN.GFM.EPM_COMMENT -

FEDERAL MILITARY EMPLOYMENT
ASSUMED CONSTANT AT CURRENT LEVEL (1979)

CASE OCS.55X
MOVED 0 YEARS

SCEN_OCS.55X_COMMENT -

DEVELOPMENT FOLLOWING OCS SALE 55, EASTERN GULF OF AK
ASSUMES ONLY EXPLORATION EMPLOYMENT, NO DISCOVERIES OF
COMMERCIAL OIL OR GAS
FROM USDOI, BLM AK OCS OFFICE, EASTERN GULF OF AK:
FINAL EIS : PROPOSED FEDERAL OIL AND GAS LEASE SALE 55,
TABLE E-2, P.A-1

CASE OCS.BFM
MOVED 0 YEARS

SCEN_OCS.BFM_COMMENT -

DEVELOPMENT FOLLOWING JOINT FED/STATE OCS SALE BF
ASSUMES DISCOVERY OF .75 BBO AND 1.625 TCFG
DEVELOPMENT SCENARIO FROM USDOI, BLM AK OCS OFFICE,
BEAUFORT SEA FINAL EIS : PROPOSED FEDERAL/STATE OIL AND
GAS LEASE SALE

CASE OCS.60X
MOVED 4 YEARS

SCEN_OCS.60X_COMMENT -

DEVELOPMENT FOLLOWING OCS SALE 60, LOWER COOK INLET
ASSUMES ONLY EXPLORATION EMPLOYMENT, NO DISCOVERIES OF
COMMERCIAL OIL OR GAS
FROM:
USDOI, BLM AK OCS OFFICE, LOWER COOK INLET, FINAL EIS :
PROPOSED FEDERAL OIL AND GAS LEASE SALE 60

CASE OMN.EPH
MOVED 0 YEARS

SCEN_OMN.EPH_COMMENT -

OTHER MINING EMPLOYMENT
MINING SECTOR EMPLOYMENT NOT ACCOUNTED FOR BY OTHER
SPECIFIC PROJECTS. ASSUMED TO INCREASE AT 1% ANNUALLY
FROM ITS 1979 ACTUAL LEVEL

CASE TAP.XXX
MOVED 0 YEARS

SCEN_TAP.XXX_COMMENT -

TRANS-ALASKA PIPELINE EMPLOYMENT
CONSTRUCTION AND OPERATION EMPLOYMENT
ASSOCIATED WITH THE TAPS PIPELINE
FROM:
GOLDSMITH AND PORTER, ALASKA ECONOMIC PROJECTIONS
FOR THE RAILBELT, ISER, 10/81,
P. A-6.

CASE TCF.001
MOVED 0 YEARS

SCEN_TCF.001_COMMENT -

TRADITIONAL COMMERCIAL FISHING
INCLUDES NON-BOTTOMFISHING EXISTING COMMERCIAL
FISHING AND PROCESSING EMPLOYMENT HELD AT 1979
LEVELS FOR PERIOD THROUGH 2000.
1979 LEVEL ESTIMATED FROM PROJECTION OF ESTIMATES
PROVIDED IN : ROGERS, MEASURING THE SOCIOECONOMIC
IMPACTS OF ALASKAS FISHERIES, ISER, APRIL, 1980.

CASE TRS.MOD
MOVED 0 YEARS

SCEN_TRS.MOD_COMMENT -

TOURISM
NUMBER OF TOURISTS ENTERING ALASKA. ASSUMED
TO GROW AT 4% ANNUALLY FROM ACTUAL VALUE IN 1979
FROM:
GOLDSMITH AND PORTER, ALASKA ECONOMIC PROJECTIONS
FOR THE RAILBELT, ISER, 10/81,
P. A-102

CASE NWG.MG1
MOVED -1 YEARS

SCEN_NWG.MG1_COMMENT -

ALASKA NATURAL GAS TRANSPORTATION SYSTEM
FROM:
MOGFORD AND GOLDSMITH, THE RELATIONSHIP BETWEEN THE ALASKA
NATURAL GAS PIPELINE AND STATE AND LOCAL GOVERNMENT
EXPENDITURES, ISER, 1980

After processing all of the requested cases, the computer indicates that processing has terminated and requests a scenario description from the user.

The user types in a description, followed by a semicolon and a file command.

```
SCENARIO S.TEST1 FILED IN SCENARIO ARCHIVE
NEW COMMENT: .THIS IS A TEST CASE TO TRY OUT THE NEW SCENARIO GENERATOR
NEW COMMENT: .;FILE;
TROLL COMMAND: .
```

To generate scenarios for use with the regionalization model A83.CD or the municipality model BIGMOD, the user would follow the same procedure, except that the response to the prompt "TYPE OF SCENARIO:" would be C or A, as appropriate, and the user would have to take care that the list of cases used are appropriate for use with the C or A model. (Currently, all cases in the SCEN_ library are usable for constructing type S or C scenarios but need to be disaggregated for use in type A scenarios.)

A-3. Creating, Manipulating, and Examining Library Files

A variety of macros have been developed to perform several common operations on the library files. This section describes the functions and use of these macros.

The macros currently available are:

&SETUP
&MUNICASE
&DELCASE
&DELSCN
&LKCASE
&OLKCASE
&LKSCN
&OLKSCN
&ADCASE
&SUBCASE
&LISTLIB
&DESCLIB
&DESCASE
&COPYCASE
&CASECHEK
&SCENCHEK

This section provides a short description and examples of each of these macros.

a. &SETUP

In order to establish a "case," it would be possible to use a series of DEDIT commands in TROLL to input each of the affected data series. However, insofar as the scenario generator requires data files extending over the 1960-2030 range, this process would normally involve inputting a large number of zero values. Macro &SETUP is designed to make this input task simpler by setting up the affected series with zero values over the 1960-2030 range and permitting the user to replace the nonzero values of the series.

Example: [A 100,000 BPD refinery project in Valdez requires construction employment of 752 persons for three years beginning in 1983. Thereafter, it employs 386 persons for ten years.]

We will name this case ALP.1ØØ, indicating a 100,000 BPD version of the Alpetco proposal.

This project affects two variables in the statewide model, namely EMCNX2 and EMMX1. To prepare a case for use in constructing an "S" type scenario for use with the statewide model, the following commands would suffice.

TROLL COMMAND: &SETUP
CASE NAME: ALP.100
VARIABLE NAME: EMCNX2
YEAR: 1983
1983 .752 .752 .752 ;FILE;

TROLL COMMAND: &SETUP
CASE NAME: ALP.100
VARIABLE NAME: EMMX1
YEAR: 1986
1986 .386 .386 .386 .386 .386 .386 .386 .386 .386 .386 ;
FILE;

To upgrade the case for use with the regionalization model, notice that the project is located entirely in Valdez and, consequently, affects only the variable B26. The case may be upgraded by the following commands.

TROLL COMMAND: &SETUP
CASE NAME: ALP.100
VARIABLE NAME: B26
YEAR: 1983
1983 .752 .752 .752 .386 .386 .386 .386 .386
1991 .386 .386 .386 .386 .386 ;FILE;

To further upgrade the case for use with the municipality model, notice that the project affects only the variable C.MP.B1 in BIGMOD. Consequently, the case may be further upgraded by the following sequence:

TROLL COMMAND: &SETUP
CASE NAME: ALP.100
VARIABLE NAME: C.MP.B1
YEAR: 1983
1983 .752 .752 .752 .386 .386 .386 .386 .386
1991 .386 .386 .386 .386 .386 ;FILE;

Finally, the user should add a comment to archive SCEN_ALP.100 in the form of a file named COMMENT whose "comment" contains a description of the case just input, as follows:

TROLL COMMAND: &SETUP
CASE NAME: ALP.100
VARIABLE NAME: COMMENT
NEW COMMENT: CASE IS A 100,000 BPD VERSION OF THE ALPETCO PROPOSAL,
SUITED FOR USE IN TYPE S, C, OR A SCENARIOS ;FILE;

b. &MUNICASE

The &MUNICASE macro takes a case which contains variables for type S and C scenarios and adds to it non-Anchorage data files for type A scenarios (any files containing data for Anchorage should be added using the &SETUP macro).

Example: The user wants to make case ABC.001, which is currently suited only for type S and C scenarios, suitable for type A scenarios.

```
&MUNICASE

SCEN CASE NAME: ABC.001
DATA_   SCEN_   ABC.001_   COMMENT
                           EMCNX1
                           BO4

FIRST BASIC, SECOND BASIC, OR COMBINED CASE (F, S, OR C)?1  F
```

---

[1] A first basic case is one that contains any of the variables in column A (right), but none in column B. A second basic case is one that contains variables in column B, but none in A. A combined case is one that contains variables from both columns.

A	B
EMCNX1	EMMX1
EMCNX2	EMMX2
EMP9	EMAGRI
EMT9X	EMFISH

c. &DELCASE

The &DELCASE macro deletes all files associated with the particular case specified by the user.

Example: Case ABC.001 is found to be in error or of no further value. To delete it, say:

```
&DELCASE

CASE TO BE DELETED:  ABC.001
```

d. &DELSCN

The &DELSCN macro deletes all files associated with the particular SCENARIO_ archive specified by the user.

Example: Scenario S.TEST1 is found to be of no further value. To delete it, say:

&DELSCN

SCENARIO TO BE DELETED: S.TEST1

e. &LKCASE and &OLKCASE

In order to examine all of the variables in each case archive, two macros are available. Macro &LKCASE prints out all variables at the terminal. Macro &OLKCASE prints out the same tables offline at MIT.

Example: To print out case ABC.001 offline.

&OLKCASE

CASE NAME: ABC.001

f. &LKSCN and &OLKSCN

In order to examine all of the variables in a SCENARIO archive, two macros are available. Macro &LKSCN prints out all variables at the terminal. Macro &OLKSCN prints out all variables offline at MIT.

Example: To print out scenario S.TEST1 at the terminal,

&LKSCN

NAME OF SCENARIO: S.TEST1

g. &ADCASE

If the user wishes to add a single case to a scenario without rerunning the entire scenario generator, he or she may do so using macro &ADCASE.

It requests the name of the SCENARIO archive to which the case will be added, the name of the incrementing case, the number of years the case is to be moved, the type of scenario, and a name for the new scenario. Upon completing the processing, it will request a description of the new scenario from the user. The user types in the new description, followed by a semicolon and a file command.

Example: You want to add case ABC.001 to scenario S.TEST1 and call the new scenario TEST2.

```
&ADCASE

OLD SCENARIO ARCHIVE:  S.TEST1
INCREMENTING SCEN ARCHIVE:   ABC.001
START:  0
TYPE OF SCENARIO (S, C, or A):  S
NEW SCENARIO ARCHIVE:   S.TEST2
SCENARIO S.TEST1 INCREMENTED BY
CASE ABC.001
MOVED 0 YEARS


SCEN_ABC.001_COMMENT

     SAMPLE CASE TO TEST THE SCENARIO GENERATOR

SCENARIO S.TEST2 FILED IN SCENARIO ARCHIVE
NEW COMMENT:   SCENARIO S.TEST1 INCREMENTED
NEW COMMENT:   BY CASE ABC.001
NEW COMMENT:   ;FILE;
```

h. &SUBCASE

If the user wishes to subtract a single case from a scenario without rerunning the scenario generator, he or she may do so using macro &SUBCASE, which operates in a manner analogous to &ADCASE above.

Example: You want to take case ABC.001 out of scenario S.TEST2 and call the new scenario TEST1.

```
&SUBCASE

OLD SCENARIO ARCHIVE:  S.TEST2
DECREMENTING SCEN ARCHIVE:   ABC.001
START: 0
TYPE OF SCENARIO (S, C, or A):   S
NEW SCENARIO ARCHIVE:  S.TEST1
SCENARIO S.TEST2 DECREMENTED BY
CASE ABC.001
MOVED 0 YEARS

SCEN_ABC.001_COMMENT

     SAMPLE CASE TO TEST THE SCENARIO GENERATOR

SCENARIO S.TEST1 FILED IN SCENARIO ARCHIVE
NEW COMMENT:   SCENARIO S.TEST2 DECREMENTED
NEW COMMENT:   BY CASE ABC.001
NEW COMMENT:   ;FILE;
```

i. &LISTLIB

Lists the currently available cases for use by the scenario generator. Require no arguments.

j. &DESCLIB

Lists the comments associated with all available cases in the SCEN_ library. Requires no arguments.

k. &DESCASE

Lists the comments associated with a particular case in the SCEN_ library.

Example: The user is unfamiliar with case ABC.001 and wants a description of its contents.

&DESCASE

CASE NAME: ABC.001

l. &COPYCASE

Copies all or part of a user-specified case.

Example: The user wants to copy one of the three files in case ABC.001.

&COPYCASE

OLD CASE NAME: ABC.001

THE VARIABLES IN CASE ABC.001 ARE:

```
DATA_  SCEN_  ABC.001_  COMMENT
                        EMCNX1
                        BØ4
```

NEW CASE NAME: ABC.002
VARIABLES TO BE COPIED, SEPARATED BY SPACES,
FOLLOWED BY SEMICOLON EMCNX1;

m. &CASECHEK

The &CASECHEK macro verifies that the type S, C, and A components of a case are all consistent. The macro prints a table showing the total non-Anchorage employment assumptions for each type.

Example: The user wants to check that case ABC.001 is consistent for use in all three models--A83.2, A83.CD, and BIGMOD.

&CASECHEK

CASE NAMES, SEPARATED BY SPACES, FOLLOWED BY SEMICOLON ABC.001;

n. &SCENCHEK

The &SCENCHEK macro verifies that a type C and a type A scenario which contain identical case files are consistent. The macro prints a table showing the total non-Anchorage employment assumptions for each type.

Example: The user wants to verify that C type scenario C.TEST1 and A type scenario A.TEST1, which contain the same cases, are consistent.

&SCENCHEK

REGIONAL MODEL SCENARIO ARCHIVE: C.TEST1
MUNI MODEL SCENARIO ARCHIVE: A.TEST1

Institute of Social
and Economic Research
MAP Documentation
May 1983

APPENDIX B
ISER MAP ALASKA ECONOMIC MODEL: ECONOMIC AND FISCAL MODULES

Institute of Social
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MAP Documentation
May 1983

B.1. Introduction

This section describes the core of the Institute for Social and Economic Research (ISER) Man-in-the-Arctic Program (MAP) Alaska Economic Model. It consists of modules representing the economic and fiscal structure of the state. The model also includes two demographic components--population and household formation modules--described in separate appendices. A scenario generator model provides input for running the model. The ISER MAP Alaska Economic Model was developed at the University of Alaska in the early 1970s under a grant from the National Science Foundation. Since its original use to demonstrate the economic, demographic, and fiscal impacts on Alaska of different schedules of federally imposed petroleum development scenarios, it has been used in a variety of types of analyses. These range from analyzing the economic and fiscal effects of specific private sector projects, to the analysis of the implications of different aggregate state wealth management strategies, to the projection of likely economic futures for the state to assist in electricity load forecasting.

These uses reflect the fact that the MAP model is designed for and primarily used for long-run policy analyses, impact analyses, and projections. The analyses are not predictions, but rather "what if" experiments. As such, the model has a different structure from one designed specifically for prediction. Whereas a model designed for prediction may not place a priority on describing how an economy works, a policy analysis model such as the MAP model will trade off some predictive ability for the more useful attribute of accurately reflecting within its structure how the economy works.

Because it is a long-run model, furthermore, the MAP model is not concerned with capturing all the short-run fluctuations which affect the economy over the course of the business cycle (or the seasons). Rather, the model attempts to capture the underlying structural changes affecting the longer-run growth trajectory of the state. For this purpose, the other types of regional models in common use--economic base models and input-output models--are inadequate.

The economic base model is the easiest type of model to construct and use, requiring in its simplest formulation only that the basic and nonbasic sectors of the economy be identified by one of several established techniques. The ratio of nonbasic to basic activity becomes the estimate of activity which would be generated by an increase in basic activity. The simplicity of the model means that it can be widely used, but only for a narrow range of state analyses. All variations of economic activity are assumed to originate in changes in basic sector activity and the ratio of nonbasic to basic activity is assumed constant. Neither assumption makes sense for the analysis of economic growth in Alaska.

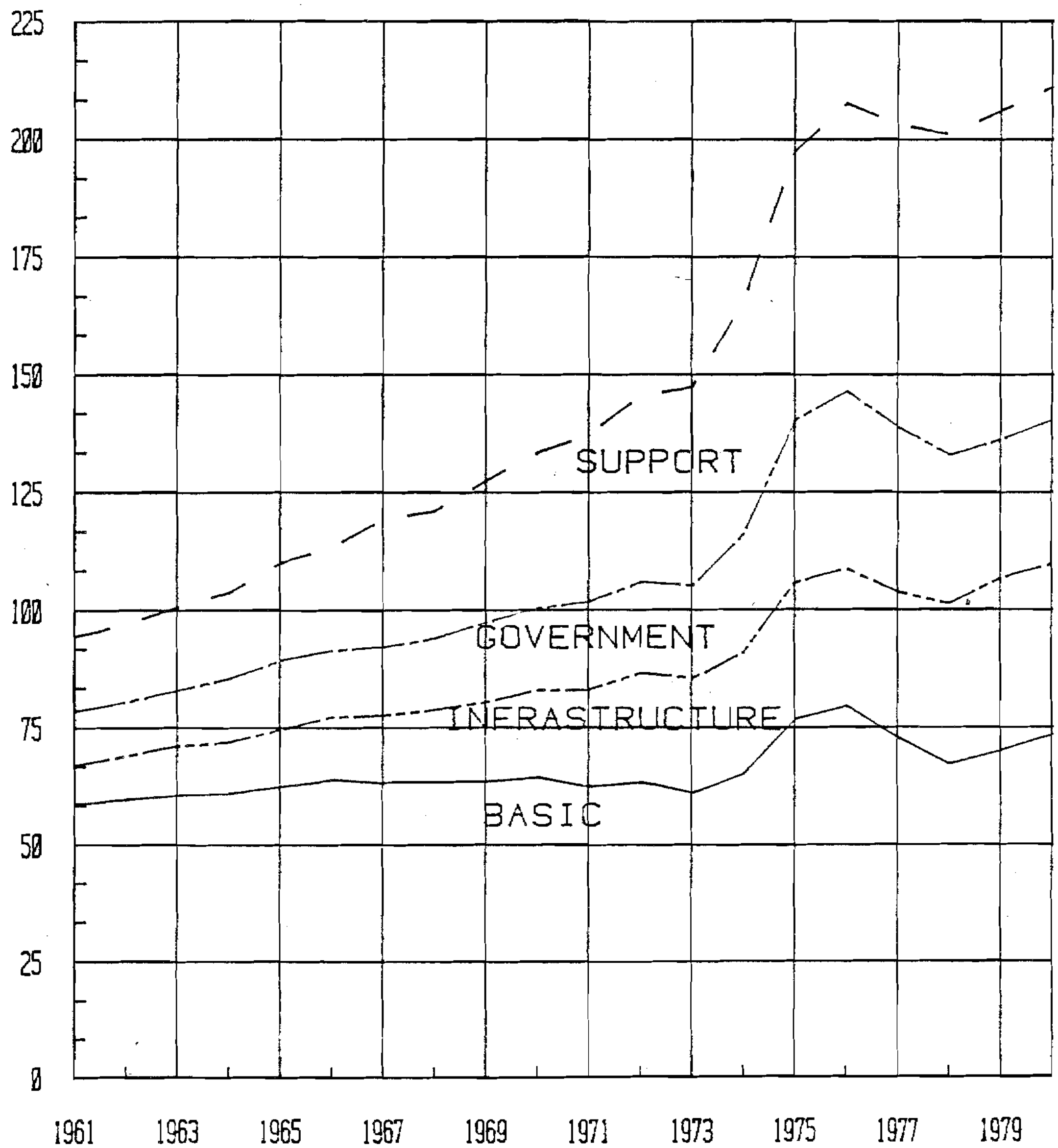
The input-output model provides much more detail on the interrelationships among industries within a regional economy and can trace the impact of a change in basic sector activity in much greater detail than an economic base model. Differential impacts from changes in different sectors of the economy can be traced. Data requirements are the largest problem in model implementation, although techniques have been developed to regionalize input-output models and make them transferable from region to region. The basic conceptual problems with input-output models are the assumption of constant coefficients over time and the fact that all economic change originates in the export sector. Constant coefficients for interindustry flows and interregional trade flows assume away economies of scale, other types of agglomeration economies such as urbanization, technological change, and import substitution. Input-output analysis is better suited for economies more mature than Alaska which have significant interindustry flows in manufacturing. Most Alaskan industry involves the extraction and exporting of natural resources or support activities such as trade and services. Neither is amenable to input-output analysis.

Econometric models offer much more flexibility in modeling regions than either economic base or input-output-type models in the sense that they can incorporate other facets of growth into the analysis. They can include the ideas from economic base and input-output models, but in addition they can treat other sources of growth and the evolution of the regional economy over time as it changes form. Some of these capabilities include the ability to handle a changing ratio of basic-to-nonbasic employment, to incorporate a fiscal sector into the model of the economy, to include relative regional prices in the model, and to handle the determination of personal income and popuation based on activity within the region. The more comprehensive modeling approach also forces consistency and independent checks into any analysis.

To illustrate the importance of the evolution of the economy over time, Figure B.1 shows the growth since 1960 of the economy as measured by four categories of employment. One may disagree over the proper classification of an industry as basic or nonbasic, but it is clear that the relationship between basic and support sector employment has changed dramatically over the years. Any long-run analysis done in 1960 using an economic base or input-output model projecting into the future would have vastly underestimated actual growth. In the same manner, it would underestimate the level of impacts in a growing economy. This type of misunderstanding was definitely a factor in the underestimation of impacts for all a priori analyses of the Alyeska pipeline.

FIG. 2: ALASKA EMPLOYMENT GROWTH

(THOUSANDS)



The choice of model type is based upon uses anticipated for the model. The choice of actual structure depends upon this factor as well as the data which is available and the perceptions of economic interrelationships by the model builder. Both of these factors change over time, and, consequently, the model structure is constantly evolving in a way which maintains and improves its ability to analyze regional economic issues for a rapidly changing economy. The fact that the Alaskan economy is relatively underdeveloped by national standards makes analysis more subject to error than in a larger, more mature economy where the size and stability of the sectors provide not only a more stable track record of past change against which to analyze the future but also the confidence that change will continue to be gradual.

In Alaska, economic change has been and will continue to be dramatic and abrupt. Analysis of past events and relationships do not always provide clear guides to future relationships. Consequently, policy analyses using any Alaskan economic model must recognize and accept a larger degree of uncertainty than elsewhere as well as the fact that different interpretations can be placed upon past events which have different future implications. Three particular areas where this is true are (1) the relationship between employment and population, (2) the growth of support relative to basic sector activity, and (3) the impact of state and local government on the economy.

B.2. Description of the Economic Module of the MAP Economic Model

Summary

The level of economic activity is a function of both export and support-oriented production. The output in the export sectors is determined exogenously while that of the support sectors is a function of local demand, reflected by disposable personal income and wealth. Export and support production generate wages and salaries which form the major portion, after personal taxes are deducted, of disposable personal income. Thus, demand and supply are simultaneously determined each year.

The export sectors are portions of the following two-digit SIC categories: agriculture-forestry-fisheries, manufacturing, federal government, petroleum and other mining, transportation, and construction related to these activities. Tourism crosses sectoral boundaries and is also exogenous. All other sectors are classified as support. State and local government output is an important component of economic activity, which is determined by policy choice.

The Alaskan economy is linked to the national economy through the average U.S. weekly wage, the U.S. consumer price index, the unemployment rate, and real disposable personal income per capita. The Alaskan versions of these variables are related to their national counterparts but are strongly affected by local conditions such as excess labor demand.

The close transport link to the contiguous United States means that the supplies of most inputs are infinitely elastic. Thus, a change in demand does not directly affect the price level of these inputs which are not locally supplied. Labor and natural resources are locally supplied and thus changes in demand do affect price, particularly for labor in the short run. In the long run the supply of labor is also infinitely elastic.

Data for model construction comes primarily from the Alaska Department of Labor employment statistics, the U.S. Department of Commerce Bureau of Economic Analysis personal income statistics, and the gross-product-by-industry series developed by the Institute of Social and Economic Research.

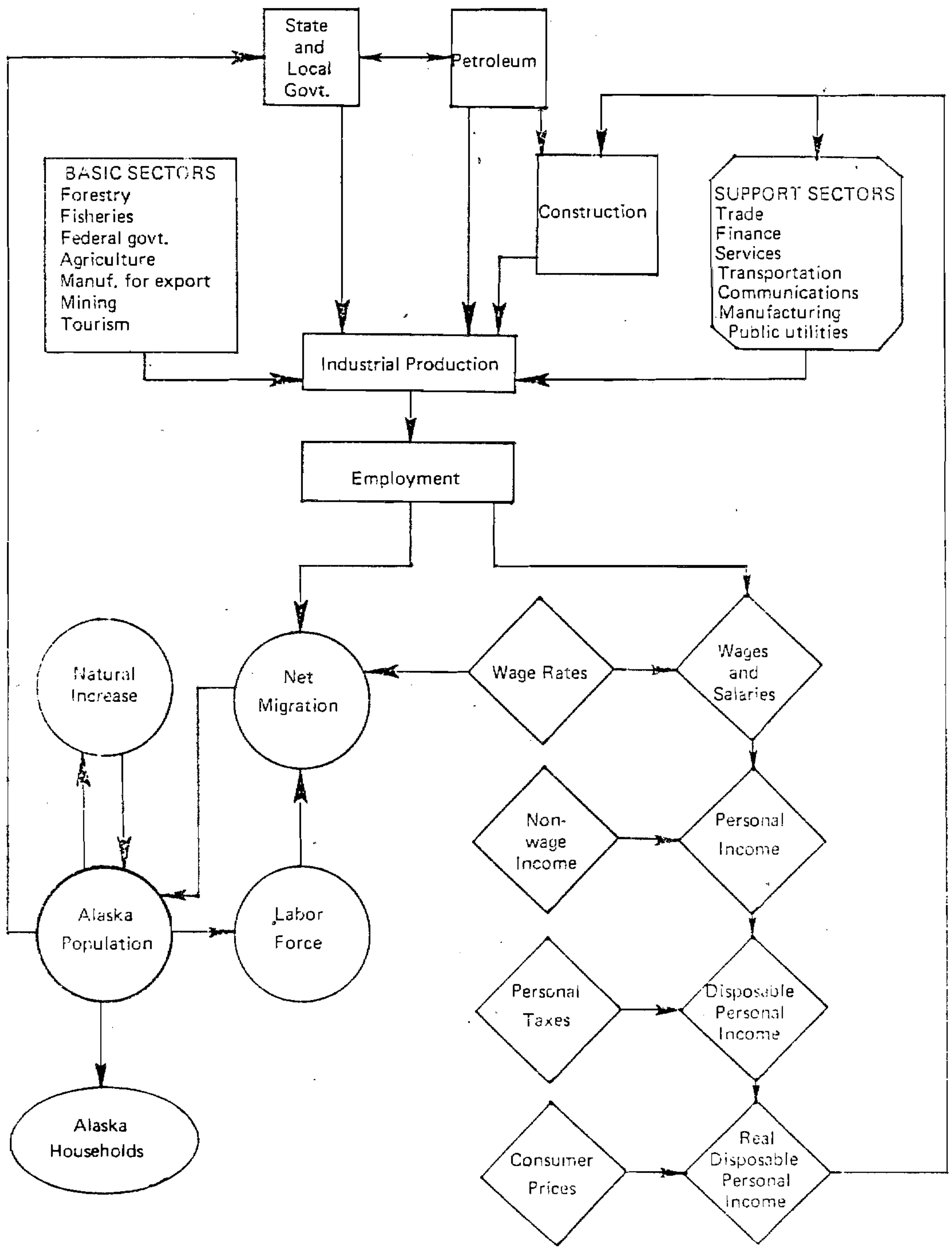
Introduction

The structure of the economic module of the MAP model (as well as the population and household modules) is illustrated in highly simplified form in Figure B.2. In general terms, the model proceeds sequentially to estimate industrial output, industry employment, wages and salaries, and finally real disposable personal income. However, the outputs of certain industries are themselves dependent on the level of personal income. Because of this interrelationship, total output and income are simultaneously determined in the model. For example, an increase in personal income, by increasing the demand for services, leads to increased output of the service sector. The extra output will, in turn, require additional workers, and the wages and salaries paid to these workers will add further to personal income. Thus, the process has come full circle, demonstrating that industrial output and personal income are indeed simultaneously interdependent.

The model uses several different approaches in determining the level of production in each industrial sector.. This reflects the fact that the relevant causal mechanisms vary significantly from one industrial sector to another. In determining production levels, the model classifies industrial sectors into three broad categories: (1) those industries whose output is determined primarily by outside factors, (2) those industries whose output is determined by policy decisions, and (3) those industries whose output responds to changes in the level of economic activity within Alaska. These categories are, however, not mutually exclusive. Several of Alaska's important industries have their outputs determined by combinations of the above factors.

The principal industries whose output is determined by outside forces are forestry, fisheries, agriculture, tourism, and the federal government. Production levels in forestry and fisheries, Alaska's traditional resource-based industries, are determined by factors such as prices on world markets, supplies of natural resources, and policy decisions made by the federal and state governments concerning the appropriate utilization rates for Alaska's natural resources. Agriculture, now and in the future, is severely constrained by Alaska's harsh climate. Within the limits imposed by the climate, agricultural output in Alaska is determined by factors such as the availability of suitable land, prices of agricultural products, and government transportation policies. Tourism is constrained by the demand created by tourists from the United States and abroad, a demand which, nonetheless, can be stimulated by an improvement in the quantity and quality of tourist facilities. In addition to its regulatory and general policy-making role, the federal government sector has been, and undoubtedly will continue to be, a major direct element in the Alaska economy. The level of federal activity is determined primarily by national needs, with decisions concerning national defense playing a particularly important role. Clearly, the decisions affecting federal activity

FIGURE B.2. MAP ECONOMIC MODEL STRUCTURE



in Alaska are influenced to only a minor extent by economic conditions within Alaska.

The petroleum industry is also largely controlled by forces outside the Alaska economy; but because of its importance, it is given special and much more detailed treatment. Petroleum employment and output are projected in accordance with detailed petroleum development scenarios. On the basis of present information, Alaska's petroleum resources appear to be potentially so vast and so widespread that there are countless alternative ways in which these resources might be developed.

In contrast to the industries influenced primarily by outside forces or policy decisions, the output of the support sector industries (consisting of trade, finance, services, transportation, communication, public utilities, local-serving manufacturing, and proprietors) is produced to meet local demands and thus responds to changes in the level of economic activity in Alaska. It is clear that there has been a close link between personal income and support sector output in the past, and this relationship has remained stable over time.

The cause of this relationship is the fact that a major portion of the demand for support sector output comes from the household or consumer sector. The trade, finance (including real estate), and service industries are very closely linked to the spending decisions of Alaska households. Thus, there is a clear causal mechanism producing an increase in support sector output in response to an increase in real personal income. Any action, public or private, which adds to personal income will induce an expansion in support sector output. To reflect this, support sector output in the model is generally made a function of Alaska real disposable personal income and real wealth.

Analyses indicate that in most instances the output of the support sector industries increases more than in proportion to the increase in personal income. That is, if personal income rises 1 percent, the output of the typical support sector industry increases by somewhat more than 1 percent. There are two separate factors which operate to produce this result. First, other studies show that in the postwar years, the service sector in the U.S. economy has tended to expand relative to other industries. Consumers have been devoting an increasing share of their total expenditures to the purchase of various kinds of services. It is not surprising to observe this same phenomenon in the Alaska economy.

The second factor causing the relatively rapid rise in support sector output is more specific to the Alaska situation. As the Alaska economy expands, it becomes feasible to have more of the support sector output produced locally rather than imported from the Lower 48. The trade, finance, and service industries in particular benefit from the general expansion in the size of the Alaska economy. The share of output produced locally tends to increase relative to the share supplied from the outside. As a result, the rate of growth in the output of these industries is greater than the rate of growth in total consumer expenditures or total personal income.

The output of the construction industry is determined by a combination of internal and external factors. Part of construction activity is designed to supply the needs of the expanding Alaska economy. As in the support sector, this portion of construction output is made a function of real disposable personal income. An increase in personal income and the associated rise in general economic activity produce an increase in the demand for the construction of both residential and commercial structures. A second part of construction supplies the needs of state government capital spending. In addition to the construction required by the general expansion in economic activity, there is likely to be considerable construction activity involved in the building of pipelines, terminals, and other facilities required for petroleum production and other industrial development. This portion of construction output is exogenously determined in accordance with the relevant development scenario.

Proceeding sequentially, after output has been determined in each of the major industrial sectors, the next step in the model is to calculate industry employment. A statistical relationship derived from the Alaska data is used in most industries to project industry employment as a function of industry output. This relationship can be interpreted as a demand-for-labor equation; it specifies the number of workers required to produce a given level of industry output. The supply of labor in Alaska is effectively brought into balance with the demand through the process of migration. When an expansion in economic activity raises the demand for labor, new workers migrate into the state to take advantage of the additional job opportunities. Past experience, most recently in connection with the construction of the trans-Alaska oil pipeline, indicates that the supply of labor adjusts quite quickly. With the supply of labor being so flexible, it is the demand for labor which deterines the actual levels of employment in most industries in the Alaska economy. Table B.1 shows in detail the industry classifications currently in use in the model.

There are, however, a few industries for which a different procedure is used to project industry employment. This occurs where there is no discernible systematic relationship between output and employment such as in petroleum and fish harvesting. It seems apparent, for example, that the number of persons who choose to engage in commercial fishing is determined primarily by factors such as culture, tradition, and personal preference, rather than by purely economic factors.

TABLE B.1. EMPLOYMENT VARIABLES USED IN MAP ECONOMIC MODEL

	Variable Name			
CONSTRUCTION				EMCN
Endogenous			EMCN1	
Exogenous			EMCNX	
exogenous high wage (enclave)		EMCNX1		
exogenous low wage		EMCNX2		
MINING (including petroleum)				EMP9
MANUFACTURING				EMM9
Endogenous			EMMO	
Exogenous			EMMX	
exogenous high wage		EMMX1		
exogenous low wage		EMMX2		
fish processing	EMMF			
lumber	EMML			
pulp	EMMP			
TRANSPORTATION				EMT9
Endogenous			EMT91	
nontourism related		EMTNT		
tourism related		EMTTOUR		
Exogenous			EMT9X	
COMMUNICATION				EMCM
PUBLIC UTILITIES				EMPU
TRADE				EMD9
Wholesale			EMDW	
Retail			EMDR	
retail, nontourism related		EMDRNT		
retail, tourism related		EMDTOUR		
FINANCE-INSURANCE-REAL ESTATE				EMFI
SERVICES				EMS9
Non-Native Corp.-Related Services			EMS91	
business services		EMSB		
nonbusiness & nontourism-related services		EMS8NT		
tourism-related services		EMSTOUR		
Native Corp.-Related Services		EMNC		

TABLE B.1. (continued)

	Variable Name	
FEDERAL GOVERNMENT		EMGF
Civilian	EMGC	
Military[a]	EMGM	
STATE-LOCAL GOVERNMENT		EMGA
State	EMGS	
Local	EMGL	
AGRICULTURE-FORESTRY-FISHERY (and Unclassified)		EMA9
Fishing	EMAFISH	
Agriculture	EMAGRI	
Unclassified	PC39A	
Forestry	(PC39B * EMMX2)	
PROPRIETOR[a]		EMPRO
Nonfish Harvesting	EMPRO1	
Fish Harvesting	EMPROFIS	
TOTAL CIVILIAN		EM96
TOTAL NON-AGRICULTURAL WAGE & SALARY		EM97
TOTAL NON-AGRICULTURAL WAGE & SALARY PLUS MILITARY		EM98
GRAND TOTAL		EM99
SPECIAL CATEGORIES		
FISH HARVESTING		EMFISH
Proprietor fish harvesting	EMPROFIS	
Salaried fish harvesting	EMAFISH	
TOURISM		EMTOUR
Transporation	EMTTOUR	
Trade	EMDTOUR	
Services	EMSTOUR	

[a]These are categories not covered in employment data of state Department of Labor.

Economic activity in the state and local government sector is determined ultimately by government policies. Although economic conditions in Alaska certainly influence the decision process, the process itself is essentially political rather than economic in nature. Since the art of modeling is not nearly so advanced as to enable adequate simulation of the political decision process, the decisions are specified outside the model by a set of "fiscal rules." What is included in the model is a set of relationships that trace out the economic implications of the alternative political decisions. Indeed, one of the principal functions of the MAP model is to project the outcomes associated with alternative social choices. The relationships in the model are, therefore, designed so that they can be readily altered to reflect alternative policy choices at each step in the decision process.

Following the determination of industry output and employment, the next major element in the model is the calculation of industry wage rates. Average wages in each industry are made a function of average earnings in the United States, the cost of living in Alaska, and the "tightness" of the Alaska labor market. Since the cost of living in Alaska is linked to U.S. prices, the net effect is that wage rates in Alaska are very closely related to wages and prices in the United States as a whole. It would be impossible for it to be otherwise so long as Alaska is open to migration to and from the Lower 48. If wages in Alaska became excessively high relative to the rest of the United States, large numbers of workers would migrate into the state, thus tending to force wages down. Conversely, if wages in Alaska were too low, there would be a shortage of labor, tending to force wages up. Thus, over the long run, Alaska wages have to maintain some sort of reasonable relationship with wages in the United States as a whole.

The final piece of industry information generated by the model is total wage and salary payments. Total earnings in each industry are computed by multiplying the industry wage rate times industry employment. To review, this makes four pieces of information that are provided on an annual basis for each industry in the model: (1) real output, (2) employment, (3) wage rates, and (4) wage and salary payments.

After wages and salaries are calculated for each industry, the figures are combined to estimate total wage earnings in the Alaska economy as a whole. This forms the basis for estimating the personal income available to Alaska residents. Although wages and salaries are by far the largest single component, personal income also includes interest, dividends, rental income, proprietors' income, and miscellaneous other labor income. For the United States, these nonwage components make up about a third of total personal income. The elements of personal income are shown in Table B.2. In Alaska, the nonwage components are less significant and make up less than 20 percent of personal income, although they are growing.

TABLE B.2. PERSONAL INCOME VARIABLES USED IN MAP ECONOMIC MODEL

			Variable Name
	Wage and salary disbursements		WS98
Plus:	Other labor income		PIOLI
	Proprietors' income		PIPRO
	fishery proprietor income	PIPROF	
	nonfishery proprietor income	PIPRO1	
Equals:	Total labor and proprietor income by place of work (total earnings)		PITE
Minus:	Personal contributions to Social Security		PISSC
Equals:	Net labor and proprietors income by place of work (net earnings)		PINE
Plus:	Residence adjustment		PIRADJ
Equals:	Net labor and proprietors' income by place of residence (net earnings)		PINERADJ
Plus:	Dividends, interest, and rent		PIDIR
	Transfers		PITRAN
Equals:	Personal income by place of residence		PI
	net of enclave employee (EMCNX1) income	PI3	
	plus residence adjustment	PI8	
Minus:	Federal income-related taxes		RTPIF
	State income-related taxes		RTISCP
	Local income-related taxes		DPIRES
Equals:	Disposable personal income		DPI

Disposable personal income is derived from the estimate of personal income--the difference between the two measures being personal tax and nontax payments. Personal taxes in the United States amount to about 15 percent of personal income. This ratio is somewhat higher for Alaska because of the progressive nature of the federal income tax structure; that is, individuals with large incomes pay higher tax rates than individuals with low incomes. Because of the high cost of living in Alaska, the typical Alaska taxpayer receives a higher income than the U.S. average. This means that the typical Alaska taxpayer also pays a higher-than-average effective tax rate.

The final element in the personal income component of the MAP economic model is an adjustment for the effects of inflation. Disposable personal income measured in current dollars is deflated by the Alaska relative price index to produce an estimate of real disposable personal income in terms of constant 1967 prices. Since virtually all consumer goods are imported from the Lower 48 and since wage rates in Alaska are closely tied to wages in the United States, relative prices in Alaska are projected as a function of the U.S. consumer price index. The empirical studies used to derive this relationship indicate that, over the long run, prices in Alaska may be expected to increase somewhat less rapidly than prices in the United States. This is consistent with the expectation that as the Alaska economy expands, there will be a certain amount of import substitution and economies of scale that will tend to lower costs in some Alaska industries.

Real disposable personal income provides a measure of the effective purchasing power of Alaska consumers after taking into account tax payments and after making allowance for the effects of inflation. This is, of course, the income measure that was used previously in determining the demand for the output of the support sector industries. At this point, the circle is closed: personal income depends on industry output and industry output depends on personal income.

STATE ECONOMIC MODULE DETAIL

Economic activity is measured by four variables in each industry: employment (EM**), wages and salaries (WS**), the wage rate (WR**), and gross product (XX**). The equations describing activity in each industry differ.

Each industry is identified by a suffix. Coefficients for the stochastic equations are identified by a prefix C followed by a number and a suffix letter. In this section, the equations used for each industry are described.

Finance, Insurance, Real Estate (**FI)
Public Utilities (**PU)
Communications (**CM)

These three support industries are modeled in a similar manner which reflects the underlying structure of all the support sector industries in the model. In each, the level of output of the industry, measured as real gross product (XX**), is determined by available real disposable personal income. Different combinations of current and lagged values of both regular disposable personal income (R.DPI8N) and the disposable personal income generated directly by premium wage rate enclave construction projects (such as construction of the Alyeska pipeline) (R.DPI8X) as well as the average level of wealth in the economy (WEALTH) work best to explain output in each case.

Average annual employment (EM**) in each case is determined by the output of the industry. This equation represents the production function. A pipeline dummy (PIPE) improves the fit of the equation for the public utilities industry.

The real annual average wage rate (WR**/PDRPI) for each industry (PDRPI is an Alaskan price index) is a function of both national and regional economic factors. The change in the real average U.S. wage rate (WEUS/PDUSCPI) is the major determinant of local wage rates because of the direct link between the Alaska and national labor markets. When the local demand for labor is growing rapidly, there may be upward pressure on wage rates because of temporary supply constraints or because of a temporary increase in premium wage rate employment opportunities. The ratio of premium wage construction employment to total employment (EMCNRT) measures this local labor market tightness. Premium wage construction employment is enclave construction employment at high wages. The oil pipeline is an example of a project which generated premium wage construction employment. A dummy variable (D.80DEC6) reflects the fact that wage rates have proved to be "sticky" in the downward direction since 1980 in the presence of a declining differential between Alaskan and lower 48 price levels.

Finance-Insurance-Real Estate (**FI)

316: XXFI = C80A+C80C*D71.73+C80B*WEALTH(-1)*POP(-1)

317: LOG(EMFI) = C81A+C81B*LOG(XXFI)

318: LOG(WRFI/PDRPI) = C82A+C82F*D.80DEC6+C82B*LOG(WEUS/
PDUSCPI)+C82D*LOG(1+EMCNRT)+C82C*LOG(1+EMCNRT(-1))

319: WSFI == EMFI*WRFI/1000.

Public Utilities (**PU)

299: XXPU = C72A+C72B*R.DPI8N(-1)+C72C*R.DPI8X+
C72D*R.DPI8N(-2)

300: LOG(EMPU) = C73A+C73C*PIPE(-1)+C73B*LOG(XXPU)

301: LOG(WRPU/PDRPI) = C74A+C74F*D.80DEC6+C74B*LOG(WEUS/
PDUSCPI)+C74C*LOG(1+EMCNRT(-2))+C74D*LOG(1+EMCNRT(-1))

302: WSPU == EMPU*WRPU/1000.

Communications (**CM)

295: XXCM = C68A+C68B*R.DPI8N(-1)+C68C*D61.74+C68D*
WEALTH(-1)*POP(-1)

296 LOG(EMCM) = C69A+C69B*LOG(XXCM)

297: LOG(WRCM/PDRPI) = C70A+C70F*D.80DEC6+C70B*LOG(WEUS/
PDUSCPI)+C70C*LOG(1+EMCNRT(-2))+C70D*LOG(1+EMCNRT(-1))

298: WSCM == EMCM*WRCM/1000.

Mining (Including Petroleum) (**P9)

Mining industry employment (EMP9), which consists primarily of petroleum exploration and development, is determined outside the model as part of a growth "scenario." Output (XXP9) is calculated from employment. The wage rate and total wages and salaries are calculated in a manner similar to all other industries.

273: LOG(XXP9) = C52A+C52B*LOG(EMP9)

274: LOG(WRP9/PDRPI) = C53A+C53F*D.80DEC6+C53D*D61.76+C53B*
LOG(WEUS/PDUSCPI)+C53C*LOG(1+EMCNRT)

275: WSP9 == EMP9*WRP9/1000

Agriculture, Forestry, Fisheries, Unclassified (**A9)

Wage and salary employment in this sector (EMA9) consists of that small portion of the fish harvesting industry employing workers covered by unemployment insurance programs (EMAFISH), agricultural workers (EMAGRI), unclassified workers, and foresters. The part of fish harvesting employment is a constant proportion of the total (EMFISH). All of agricultural employment (determined in a "scenario") is within this sector. Unclassified employment is a constant level calibrated to 1980. Forestry employment is a constant proportion of manufacturing employment in the lumber, pulp, and paper industry (EMMX2).

Output, the wage rate, and wages and salaries are determined in the same way as in the mining industry. Output in this sector consists of the gross product of all fish harvesting, not only that of those workers who work for a wage.

349: EMA9 = EMAFISH+EMAGRI+PC39A*D77.00+PC39B*EMMX2

350: XXA9 = C90A+C90B*(EMA9+EMPROFIS)

351: LOG(WRA9/PDRPI) = C95A+C95F*D.80DEC6+C95B*LOG(WEUS/
PDUSCPI)+C95C*LOG(1+EMCNRT)+C95D*LOG(1+EMCNRT(-1))

352: WSA9 == EMA9*WRA9/1000.

Transportation (**T9)

Transportation industry employment has three components: a support component (EMTNT) and two basic sector components--tourist-related employment (EMTTOUR) and large pipeline employment (EMT9X). Gross product in the support component of the industry (XXTNT) is determined by real disposable personal income (R.DPI8N and R.DPI8X). This, in turn, determines support employment in transportation. Tourist-related employment is a constant portion of total tourist-related employment in the economy (EMTOUR). Large pipeline activity is determined outside the model as part of the growth "scenario."

Total industry gross product (XXT9) is the ratio of total to support employment multiplied by support gross product.

There is one wage rate for the whole industry which is calculated in the usual way. Total wages and salaries is also calculated in the usual way.

```
287:  XXTNT = C64A+C64B*R.DPI8X+C64D*R.DPI8X*R.DPI8X(-1)+
      C64C*R.DPI8N+C64E*D71.73

288:  LOG(EMTNT) = C65A+C65B*LOG(XXTNT)

289:  EMTTOUR = PTOURT*EMTOUR

290:  EMT91 = EMTNT+EMTTOUR

291:  EMT9 = EMT91+EMT9X

292:  XXT9 = XXTNT*(EMT9/EMTNT)

293:  LOG(WRT9/PDRPI) = C66A+C66F*D.80DEC6+C66D*D61.76+C66B*
      LOG(WEUS/PDUSCPI)+C66C*LOG(1+EMCNRT)+C66E*
      LOG(1+EMCNRT(-1))

294:  WST9 == EMT9*WRT9/1000.
```

Manufacturing (**M9)

Manufacturing employment consists of a small support component (EMMO) as well as a basic sector component (EMMX), itself consisting of two elements--one which commands a premium wage rate (EMMX1) and another with the same wage as the support component (EMMX2). As in the mining industry, output is a function of employment. Support sector employment is determined by disposable income (R.DPI8N), and basic sector employment is determined outside the model as part of the growth "scenario."

The manufacturing industry wage rate (WRM9) consists of two separate wage rates. One is for support sector manufacturing and all the current basic manufacturing activity consisting primarily of fish processing, pulp and paper, and timber (WRM91). The other is a premium wage (WRM9P) associated with certain prospective manufacturing activities (EMMX1) such as a petrochemical plant or aluminum smelter. The premium wage is a simple multiple (PADJ) of the regular wage. Wages and salaries in total and for premium wage employment are calculated in the usual way.

```
276:  EMMO = C60A+C60B*R.DPI8N+C60C*D61.77

277:  EMM91 = EMMO+EMMX2

278:  LOG(XXM91) = C61A+C61B*LOG(EMM91)

279:  XXM9 == XXM91+XXMX2

280:  EMMX == EMMX1+EMMX2

281:  EMM9 = EMMO+EMMX

282:  LOG(WRM91/PDRPI) = C62A+C62F*D.80DEC6+C62B*LOG(WEUS/
      PDUSCPI)+C62C*LOG(1+EMCNRT)+C62D*LOG(1+EMCNRT(-1))

283:  WRM9P == WRM91*PADJ

284:  WSM9 == (EMMO+EMMX2)*WRM91/1000+EMMX1*WRM9P/1000

285:  WSM9P == EMMX1*WRM9P/1000

286:  WRM9 == WSM9/EMM9*1000
```

Trade (**D9)

Employment in wholesale (EMDW) and retail (EMDR) trade are handled as separate industries. In addition, retail trade contains a tourist-related component (EMDTOUR).

Output in wholesale (XXDW) and retail trade (net of tourist-related employment) (XXDRNT) is determined as functions of real disposable personal income (R.DPI8N and R.DPI8X) and average wealth (WEALTH). Employment, in turn, is a function of output. Tourist-related employment in trade is a constant proportion of total tourist employment (EMTOUR), which is added to other retail employment to get total retail trade employment. Wage rates and wages and salaries are calculated in the usual way. Total output (XXD9) includes a tourist-related component calculated at the same ratio to employment as the rest of the industry.

```
303:  XXDW = C71A+C71B*R.DPI8N+C71C*R.DPI8X+C71D*R.DPI8X(-1)*
      R.DPI8X+C71E*WEALTH(-1)*POP(-1)

304:  XXDRNT = C76A+C76B*R.DPI8N+C76C*R.DPI8X+C76D*
      R.DPI8N(-1)+C76E*R.DPI8X(-1)

305:  LOG(EMDW) = C77A+C77B*LOG(XXDW)

306:  LOG(EMDRNT) = C75A+C75B*LOG(XXDRNT)

307:  EMDR = EMDRNT+EMDTOUR

308:  LOG(WRDW/PDRPI) = C78A+C78F*D.80DEC6+C78B*LOG(WEUS/
      PDUSCPI)+C78C*LOG(1+EMCNRT)+C78D*LOG(1+EMCNRT(-1))+
      C78E*LOG(1+EMCNRT(-2))

309:  LOG(WRDR/PDRPI) = C79A+C79F*D.80DEC6+C79B*LOG(WEUS/
      PDUSCPI)+(+C79D)*LOG(1+EMCNRT(-1))+C79E*
      LOG(1+EMCNRT(-2))

310:  EMDTOUR = PTOURD*EMTOUR

311:  EMD9 = EMDRNT+EMDW+EMDTOUR

312:  WSD9 == (EMDRNT+EMDTOUR)*WRDR/1000+EMDW*WRDW/1000

313:  WRD9 = WSD9/EMD9*1000

314:  XXD9 = (XXDW+XXDRNT)/(EMDW+EMDRNT)*EMD9

315:  XXDR = XXD9-XXDW
```

Services (**S9)

Services employment consists of four components: support sector (EMS8NT), tourism (EMTOUR), business services (EMSB), and Native corporations (not explicit). Output of support sector services (XXS8NT) and business-related services (XXSB) is determined by functions of disposable personal income (R.DPI8N and R.DPI8X) and average wealth (WEALTH). Employment in each of these sectors is a function of output.

Tourism-related employment (EMSTOUR) is a constant portion of total tourist employment (EMTOUR). Separate wage rates are calculated for business services (WRSB) and other services net of business services (WRSNB).

Native corporation-related employment equals Native corporation wages and salaries (NCWS) divided by the average wage rate for the whole industry (WRS9).

Industry wages and salaries are calculated in the usual way.

Total output is the same ratio to total employment as is output in the support and business service components of the industry.

```
320:  XXS8NT = C84A+C84B*R.DPI8N+C84C*R.DPI8X(-1)+C84D*
      WEALTH(-1)*POP(-1)

321:  XXSB = C83A+(+C83C)*R.DPI8X+C83D*R.DPI8X(-1)+C83E*
      WEALTH(-1)*POP(-1)

322:  LOG(EMS8NT) = C85A+C85B*LOG(XXS8NT)

323:  LOG(EMSB) = C87A+C87B*LOG(XXSB)

324:  LOG(WRSNB/PDRPI) = C86A+C86F*D.80DEC6+C86B*LOG(WEUS/
      PDUSCPI)+C86C*LOG(1+EMCNRT)+C86D*LOG(1+EMCNRT(-1))+
      C86E*LOG(1+EMCNRT(-2))

325:  LOG(WRSB/PDRPI) = C88A+C88F*D.80DEC6+C88E*D61.70+C88B*
      LOG(WEUS/PDUSCPI)+C88C*LOG(1+EMCNRT)+C88D*
      LOG(1+EMCNRT(-1))+C88G*LOG(1+EMCNRT(-2))

326:  EMSTOUR = PTOURS*EMTOUR

327:  EMS91 = EMSB+EMS8NT+EMSTOUR

328:  WSS91 == (EMS8NT+EMSTOUR)*WRSNB/1000+EMSB*WRSB/1000
```

329: WSS9 == WSS91+NCWS

330: EMS9 = EMS91+NCWS/(WRS9*1000)

331: WRS9 = WSS91/EMS91*1000

332: XXS9 = (XXS8NT+XXSB)/(EMS8NT+EMSB)*EMS9

Federal Government (**GF)

Federal government employment (EMGF) is the sum of civilian (EMGC) and military (EMGM) employment, both of which are determined in the growth "scenario." Output (XXGF) is a function of employment. A wage rate for civilian employment is calculated (which is not responsive to local market conditions), and the military wage rate is a fixed proportion of the civilian wage (PCIVPY). Wages and salaries are calculated in the usual way.

333: EMGF = EMGM+EMGC

334: LOG(XXGF) = C101A+C101B*LOG(EMGF)

335: LOG(WRGC/PDRPI) = C89A+LOG(WEUS/PDUSCPI)

336: WRGM = WRGC*PCIVPY

337: WSGC = WRGC*EMGC/1000

338: WSGM = WRGM*EMGM/1000

339: WSGF == WSGC+WSGM

340: WRGF = WSGF/EMGF*1000

Construction (**CN)

Employment in the construction industry is in four categories: two endogenous cateogries (EMCN1)--support and government expenditure related--and two types of basic employment (EMCNX). Support sector output (XXCN8) is a function of disposable personal income (R.DPI8N and R.DPI8X). To this is added the value of capital expenditures made by state government (XXVACAP) to get total endogenous output (XXCN1). Endogenous employment (EMCN1) is a function of this output.

Basic employment consists of normal wage basic employment (EMCNX2) which receives the same wage as support sector and government-related construction employment (WRCNNP) and premium wage construction employment (EMCNX1) which is defined as remote site, specialized employment commanding a high annual wage (WRCNP). This wage is a multiple of the regular wage (PIPADJ). Wages and salaries for the industry are calculated in the usual way.

Premium wage employment interacts with several other model components. First, it directly affects wage rates and the price level in most other industries through the variable EMCNRT, which is a measure of excess demand in the labor market. Second, it forms the basis for the special component of disposable personal income, R.DPI8X, which is a variable in some of the equations explaining support sector output. Third, it is the determinant of whether the proxy variable PIPE, which measures large exogenous shocks to the economy, takes on a value of one.

```
260:  EMCNRT = IF EMCNX1*3 LT EMCN1(-1) THEN 0 ELSE
      EMCNX1/(EM98-EMCNX1)

261:  PIPE == IF EMCNX1-EMCNX1(-1) GT 5 THEN 1 ELSE 0

262:  XXCN8 = C54A+C54B*R.DPI8N+C54C*R.DPI8X+C54D*
      R.DPI8X(-1)+C54E*D64.65

263:  XXCN1 = XXCN8+XXVACAP

264:  LOG(EMCN1) = C56A+C56B*LOG(XXCN1)

265:  EMCNX = EMCNX1+EMCNX2

266:  EMCN = EMCN1+EMCNX

267:  XXCN = EMCN/EMCN1*XXCN1
```

268: LOG(WRCNNP/PDRPI) = C59A+C59F*D.80DEC6+C59B*LOG(WEUS/PDUSCPI)+C59C*LOG(1+EMCNRT)+C59D*LOG(1+EMCNRT(-1))+C59E*LOG(1+EMCNRT(-2))

269: WRCNP = WRCNNP*PIPADJ

270: WSCN = (EMCN1+EMCNX2)*WRCNNP/1000+EMCNX1*WRCNP/1000

271: WRCN = WSCN/EMCN*1000

272: WSCNP = EMCNX1*WRCNP/1000

State and Local Government (**GA)

Government expenditures on wages and salaries at the state (WSGS) and local (WSGL) levels are determined by the operating budgets of state and local government, respectively. Wage rates are calculated for state government (WRGS) and local government (WRGL) in the usual way. Employment is calculated as total wages and salaries divided by the wage rate for state (EMGS) and local government (EMGL). Output in the combined state and local government sector (XXGA) is a function of combined employment (EMGA).

341: LOG(WRGS/PDRPI) = C92A+C92F*D.80DEC6+C92B*LOG(WEUS/PDUSCPI)+C92C*D61.73

342: EMGS = WSGS/WRGS*1000

343: LOG(WRGL/PDRPI) = C102A+C102F*D.80DEC6+C102D*D61.69+C102C*LOG(1+EMCNRT)+C102B*LOG(WEUS/PDUSCPI)

344: EMGL = WSGL/WRGL*1000

345: EMGA = EMGS+EMGL

346: WSGA = WSGS+WSGL

347: WRGA = WSGA/EMGA*1000

348: LOG(XXGA) = C104A+C104B*LOG(EMGA)

Tourism

The number of tourists (TOURIST) is determined in the growth "scenario." Total employment in tourism (EMTOUR), consisting of portions of the trade, services, and transportation industries, grows as a function of the number of tourists.

376: LOG(EMTOUR) = PTOURB+PTOURE*LOG(TOURIST)

Fish Harvesting

Employment in fish harvesting (EMFISH) is determined in the growth "scenario." It is allocated by a proportion (PFISH1) into a wage and salary component (EMAFISH) and a proprietor component which consists of all fishermen who do not work for a wage (EMPROFIS).

Wages and salaries paid to those fishermen who earn a wage is calculated as part of the Agricultural-Forestry-Fishery-Unclassified (**A9) industry. Other fishermen earn proprietor income (PIPROF), which is constant in real per fisherman terms at the present level.

238: PIPROF = EMPROFIS*(4.523*(PDRPI/340))

360: EMPROFIS = PFISH1*EMFISH

361: EMAFISH = (1-PFISH1)*EMFISH

Proprietor Activity

Proprietor activity (all non-wage and -salary activity) consists of fish harvesting and all other proprietor activity. Fish harvesting employment (EMPROFIS) and income (PIPROF) are determined by total fish harvesting activity.

Other employment (EMPRO1) is a function of all wages and salary employment (EM98). Personal income associated with this employment (PIPRO1) grows with the level of employment in nonfish processing proprietor activity.

Total proprietor employment (EMPRO) and income (PIPRO) are each the sum of their component parts.

237: PIPRO1*100/PDRPI = C45A+C45B*EMPRO1+C45C*D61.66+C45D*D79

239: PIPRO == PIPRO1+PIPROF

359: LOG(EMPRO1) = C100A+C100C*D61.66+C100B*LOG(EM98)

362: EMPRO = EMPRO1+EMPROFIS

Total Employment

Total wage and salary employment (EM98) is defined as the sum of civilian employment covered by unemployment insurance in all industries (EM97) plus military employment (EMGM). Total employment (EM99) includes, in addition to employment covered by unemployment insurance and the military, proprietor employment (EMPRO). Total civilian employment (EM96) is net of military employment.

Note that tourism employment (EMTOUR) is all subsumed within the transportation, trade, and service sectors. Also, fish harvesting employment (EMFISH) is divided into wage and salary and proprietor components.

353: EM98 = EMP9+EMCN+EMM9+EMT9+EMCM+EMPU+EMD9+EMFI+
EMS9+EMGF+EMGA+EMA9

354: EM97 = EM98-EMGM

363: EM99 == EM98+EMPRO

364: EM96 = EM99-EMGM

Total Output

Total output (XX98) includes all industries except nonfish harvesting-related proprietor activity.

377: XX98 = XXP9+XXCN+XXM9+XXT9+XXCM+XXPU+XXD9+XXFI+
XXS9+XXGF+XXGA+XXA9

Total Wages and Salaries

Total wages and salaries (WS98) is the sum of the wages and salaries paid in all industries and is thus net of proprietor income. Nonagricultural wage and salary employment (WS97) excludes military wages and salaries. The average wage rate for total (WR98) and nonagricultural (WR97) wages and salaries are calculated.

355: WS98 = (WRP9*EMP9+WRCN*EMCN+WRM9*EMM9+WRT9*EMT9+WRCM*
EMCM+WRPU*EMPU+WRD9*EMD9+WRFI*EMFI+WRS9*EMS9+WRGF*
EMGF+WRGA*EMGA+WRA9*EMA9)/1000.

356: WS97 = WS98-WSGM

357: WR98 = WS98*1000/EM98

358: WR97 == WS97*1000/EM97

Personal Income

Personal income by place of residence (PI) is built up from wages and salaries. It includes, in addition to wages and salaries (WS98), other labor income (PIOLI); proprietor income (PIPRO); dividends, interest, and rents (PIDIR); and transfers (PITRAN); it is net of both social security contributions (PISSC) and a residency adjustment (PIRADJ). Other labor income is a function of wages and salaries, as are social security contributions. Dividends, interest, and rents are a function of disposable income. Transfers consist of an exogenous state government component (EXTRNS) and all others (PITRAN1). Endogenous transfers grow with the growth in the population over 65 (POPGER).

Personal income prior to netting out the residence adjustment is calculated (PI8). The residency adjustment is a function of employment.

```
232:  PIDIR = C51A+C51B*(DPI+DPI(-1)+DPI(-2)+DPI(-3)+DPI(-4))

233:  PITRAN1 = IF YR EQ 1981 THEN 500.245 ELSE
      PITRAN1(-1)/POPGER(-1)*(1+GRUSCPI)*POPGER

234:  PITRAN/PDRPI = IF YR GT 1980 THEN PITRAN1/PDRPI+EXTRNS/
      PDRPI ELSE C34A+C34B*POP+C34C*D61.72+EXTRNS/PDRPI

235:  PIOLI = C44A+C44D*D61.75+C44B*(WS98-WSCNP)+C44C*WSCNP(-1)

236:  PISSC = C106A+C106B*(WS98-WSCNP)

240:  PI8 = WS98+PIOLI+PIPRO-PISSC+PIDIR+PITRAN

246:  PIRADJ*100/PDRPI = C103A+C103B*EMCNX1+C103C*EM97

247:  PI = PI8-PIRADJ
```

Components of Real Disposable Personal Income

Disposable personal income (DPI) is personal income net of federal (RTPIF), state (RTISCP), and local (DPIRES) income-related taxes paid by Alaskan residents. Disposable personal income before the residency adjustment is also calculated (DPI8). This definition of disposable income is used to construct two real disposable income measures. One (R.DPI8X) is the real disposable personal income associated with premium wage construction employment. The other (R.DPI8N) includes all other real disposable personal income.

254: DPI = PI-RTPIF-RTISCP-DPIRES+RTISXX

255: DPI8 = DPI+PIRADJ

258: R.DPI8N = DPI8*100/PDRPI-R.DPI8X

259: R.DPI8X = DPI8/PI8*WRCNP*EMCNX1/10/PDRPI

Price Indexes

There are three price indexes used in the model. The most important, PDRPI, is an index for deflating consumer prices to the 1967 U.S. level. At each point in time, this index is equal to the U.S. consumer price index, PDUSCPI, multiplied by the ratio of prices in Anchorage and the United States as measured by the Bureau of Labor Statistics moderate-family budget, PDRATIO. This ratio is a negative function of the growth in the size of the support sector of the economy as reflected by employment in trade, finance, and services as well as transportation, communication, and public utilities, EMSP. It is a positive function of tightness in the local labor market as reflected in the variable EMCNRT, which is the proportion of total employment accounted for by high wage, exogenous construction.

A price deflator for state government operating expenditures, PDEXOPS, is a weighted average of government wage rates, WRGA, and the nonpersonnel expenditure price level using PDRPI as a proxy. A price deflator for capital expenditures is based upon the wage rate in construction (nonpipeline), WRCNNP.

Many variables are deflated to a 1982 Alaska base using the 1982 level of PDRPI. All such variables have the prefix DF.

4: PDRATIO = IF YR EQ 1980 THEN 1.296 ELSE (IF YR EQ 1981 THEN 1.266 ELSE (IF YR EQ 1982 THEN 1.262 ELSE (IF RTIS(-2)-RTIS(-1) NE 0 AND RTIS(-2) EQ 0 THEN PDRATIO(-1)+C67A*(EMSP-EMSP(-1))/EMSP(-1)+C67B*(EMCNRT/(EM98(-1)/(EM98-EMCNX1)))-C67C ELSE PDRATIO(-1)+C67A*(EMSP-EMSP(-1))/EMSP(-1)+C67B*(EMCNRT/(EM98(-1)/(EM98-EMCNX1))))))

5: PDRPI = PDRATIO*PDUSCPI

6: PDEXOPS = WSGSFY(-1)/EXOPS(-1)*(WRGA*100/PWRBASE)+(EXOPS(-1)- WSGSFY(-1))/EXOPS(-1)*PDRPI

7: PDCON = C107A+C107B*WRCNNP

National Variables

Real per capita disposable personal income in the United States (PR.DPIUS), the USCPI (PDUSCPI), and the average weekly wage in the United States (WEUS) each grow at exogenous rates. These are as follows: GRDIRPU, GRUSCPI, and GRRWEUS.

1: PR.DPIUS = IF YR LT 1982 THEN PR.DPIU1 ELSE PR.DPIUS(-1)* (1+GRDIRPU)

2: PDUSCPI = IF YR LT 1982 THEN PDUSCPI1 ELSE PDUSCPI(-1)* (1+GRUSCPI)

3: WEUS = IF YR LT 1982 THEN WEUS1 ELSE WEUS(-1)*(1+GRUSCPI+GRRWEUS)

B.3. Description of the Fiscal Module of the MAP Economic Model

There are four categories of state government revenues. Petroleum-related revenues are exogenously provided from information on production, wellhead price, and other characteristics. Endogenous revenues are functionally related directly to the level of economic activity in the economy. Federal transfers are a function of prices, and fund earnings are determined by the balances in the general and Permanent Funds.

Total state government operating expenditures, operating expenditures by program, and capital expenditures can be determined by a variety of rules specified by the model user. These include the choice of the spending limit, historical relationships, simple growth rates, or relating spending to specific variables like population or the size of the general fund balance.

Local government revenues consist of state-local transfers, federal-local transfers, and endogenously generated revenues. Expenditures are determined by income and population.

Government expenditures affect the private economy primarily through wage and salary payments and purchases of capital. In addition, government personal income taxes and transfers determine what proportion of income is retained by individuals as disposable personal income.

Data sources for the fiscal model are primarily the Executive Budget and Annual Financial Report of the Department of Administration, Revenue Sources of the Department of Revenue, and the various state and local government fiscal summaries of the U.S. Department of Commerce, Bureau of the Census.

State fiscal activity can be analyzed in terms of revenues and expenditures moving through the various state funds. The general structure of these accounts are shown in Tables B.3 and B.4. The most important of these funds are the general fund and the Permanent Fund, although there are a number of smaller funds which affect the level of economic activity stimulated by government spending. These include the Enterprise Funds, Capital Projects Funds, Special Revenue Funds, and Loan Funds.

TABLE B.3. STATE REVENUES

Unrestricted General Fund Revenues		RSGFBM
GENERAL FUND EARNINGS	RSIG	
PERMANENT FUND EARNINGS DISTRIBUTED TO GENERAL FUND	RSIPGF	
PETROLEUM REVENUES	RP9SGF	
severance taxes	RPTS	
property taxes	RPPS	
corporate income taxes	RTCSPX	
unclassified petroleum	RP9X	
petroleum revenues net of Permanent Fund contribution		
bonuses	RPBSGF	
rents and royalties	RPRYGF	
federal shared royalties	RSFDNPXG	
ENDOGENOUS REVENUES	RSENGF	
Nonpetroleum Taxes		
corporate income tax	RTCS1	
personal income tax	RTIS	
business license tax	RTBS	
motor fuel tax	RTMF	
alcohol tax	RTAS	
ad valorem tax	RTVS	
cigarette tax (net of special fund allocation)	RTCIS	
school tax	RTSS	
miscellaneous	RTOTS	
Other		
fees and licenses	ROFTS	
ferry receipts	ROFERS	
miscellaneous	RMIS	
STATE ANCSA PAYMENTS*	(SANCSA)	
Restricted General Fund Revenues		RSGFRS
FEDERAL GRANTS-IN-AID TO GENERAL FUND	RSFDN	
MISCELLANEOUS RESTRICTED GENERAL FUND REVENUES	RMISRES	

*Net out this item before calculation of General Fund revenues.

Note: In this formulation, all Permanent Fund earnings not retained pass through the general fund.

TABLE B.3. (continued)

Total General Fund Revenues (Restricted + Unrestricted)		RSGF
Total General Fund Revenues Including Inter-agency Receipts (Restricted and Unrestricted)		RSGF + EXINREC
Permanent Fund Revenues (not including special appropriations)		EXPFCON1
statutorally required contributions	EXPFNEW	
reinvestment of earnings	EXPFREIN	
Total Revenues (General Fund [restricted and unrestricted] + Permanent Fund)		R99S
petroleum	RP9S	
fund earnings	RSIN	
federal transfers	RSFDN	
endogenous	RSEN	
Enterprise Fund Revenues		RSIAS
Special Fund Revenues		RSFS
Total Petroleum Revenues (General Fund + Permanent Fund)		RP9S
severance taxes	RPTS	
property tax	RPPS	
corporate income tax	RTCSPX	
unclassified taxes	RP9X	
bonuses	RPBS	
rents and royalties	RPRY	
federal shared royalties	RSFDNPX	

TABLE B.4. STATE EXPENDITURES

<u>Expenditure Limit</u>				EXLIM
	Operations (net of debt service)		EXGFOPER-EXDSS	
	Nonoperations			
	capital	EXGFCAP		
	subsidy	EXSUBS		
Add:	Debt Service			EXDSS
	Permanent Fund Dividends			EXTRNS
	Special Capital Appropriations			EXSPCAP
	Special Permanent Fund Contributions			EXPFCONX
Equals:	<u>General Fund Unrestricted Expenditures</u>			EXGFBM
	Operations		EXGFOPER	
	Capital		EXGFCAP	
	Subsidy		EXSUBS	
	Permanent Fund Dividends		EXTRNS	
Minus:	Special Permanent Fund Contributions			EXPFCONX
Add:	Federal Grants-in-Aid to General Fund			RSFDN
	Miscellaneous Restricted General Fund Revenues			RMISRES
Equals:	<u>Total General Fund Expenditures</u>			EXGF
Minus:	Subsidy			EXSUBS
	Special Capital Appropriations			EXSPCAP
	General Fund Capital			EXGFCAP
	Permanent Fund Dividend			EXTRNS
Add:	Interagency Receipts			EXINREC
	Special Fund Receipts			RSFS
	Enterprise Fund Receipts			RSIAS
	Non-General Fund University of Alaska Receipts			PARNONGF * EXUA
Equals:	<u>Total Operating Budget</u>			EXBUD
	Operations		EXOPS	
	Debt Service		EXDSS	
	Non-General Fund U of A Receipts		PARNONGF * EXUA	

TABLE B.4. (continued)

Add:	Capital Expenditures		EXCAP
	general fund	EXGFCAP	
	capital projects fund (bond sales and federal grants)	EXCPS	
	Special Capital Expenditures		EXSPCAP
	Subsidy		EXSUBS
	Permanent Fund Dividends		EXTRNS
Equals:	<u>Total State Spending</u>		EX99S

Note: In this formulation, all Permanent Fund earnings not retained, pass through general fund.

Two constant difficulties in modeling state fiscal behavior are the lack of consistency in the data among the primary sources utilized and the evolution over time in programs, organizational structure, and methods and formats for the presentation of data. This evolution is often rapid and radical.

In order to obtain a complete picture of state government fiscal activities, three major sources of data--the Department of Revenue Revenue Sources and Petroleum Production Revenue Forecast, the Department of Administration Annual Financial Report, and the Office of the Governor Budget Document--as well as a number of other data sources are used. Different accounting conventions as well as different definitions of such items as the general fund balance, general fund revenues, etc., among these sources and also between these sources and other sources of information on government fiscal activity such as the legislature make it impossible, particularly during periods of rapid growth in government activity reflected in the appearance of new programs, to model state fiscal activity consistently from the perspective of all data sources. The guiding principle in the development and evolution of the fiscal model is that it be the best consistent representation of all fiscal aspects of state government and clearly incorporate into its structure the most important linking mechanisms between state spending, fund balances, and the size and composition of the private economy.

The general fund is the main state government fund into which the majority of state revenues flow and from which general appropriations for government operations, including capital expenditures, and transfers to local governments originate. Unappropriated funds accumulate in the general fund until they are appropriated and spent. These funds are, in general, available for any purpose, with two exceptions. First, a large portion of general fund appropriations fund entitlement programs which are budgeted on the basis of formulas linked to population, price level, and other economic and demographic variables. The formulas may be altered by law, but absent such changes, these program budgets will vary automatically with economic and demographic change. Second, a portion of general fund revenues termed "restricted" consists of federal grants-in-aid, interagency receipts, and other minor sources of income that are restricted in use to certain programs. These restricted revenues form a part of the overall budget but are not a source of discretionary state spending.

The Permanent Fund is the other major fund of the state. A constitutionally specified portion of state royalties and bonuses from the sale and production of natural resources, principally petroleum, is deposited in the Permanent Fund. These deposits can be supplemented by special contributions and the reinvestment of earnings. Fund earnings can also be transferred to the general fund or also directly into a cash distribution program.

State government activity affects the private economy in several ways which are listed and described in Table B.5.

TABLE B.5. LINKS BETWEEN FISCAL AND ECONOMIC ACTIVITY

WSGS	State government wages and salaries combine with a state government wage rate to determine employment. The level of wages and salaries is a function of both the size and composition of the state operating budget.
XXVACAP	The value added by state-funded capital construction contributes to the total value added of the construction industry. Value added is a function of the size and composition of the state capital budget.
EXTRNS	Permanent Fund dividends increase individual disposable personal income.
RTIS	State personal income tax payments reduce individual disposable personal income.
RLT99	Transfers from state to local government increase local spending and reduce state spending. State spending is reduced by education transfers, tax sharing, revenue sharing, and miscellaneous transfers. Local spending is increased by education transfers, exogenous transfers, and municipal assistance payments.
EXSUBS	State subsidy programs have no economic impact because this is essentially a long-run model. Subsidies increase discretionary income and stimulate the activity being subsidized only in the short run.
WSGL	Local government wages and salaries combine with a local government wage rate to determine employment. This is a function of the size of the local government budget.

Modeling of local fiscal activity is subject to the same problems of historical consistency and data availability as state fiscal activity modeling. The main data source is the annual reports on local government fiscal activity from the U.S. Department of Commerce. The data in these documents is based upon survey rather than census, and the definitions are not always consistent with either the state of Alaska or the various local governments in the state. The major problem area is linking of the state and local fiscal sectors through the modeling of state-local transfers. Not only have the programs themselves changed forms on an almost annual basis in recent years, but the local response to increased state assistance has varied by program. Local government can, and does, both increase its programs and reduce local taxes when state aid increases. These links consequently are modeled in a very general way.

The level of local government activity is essentially determined by state transfers and the demand for non-education goods and services.

Fiscal Rule

The state fiscal model is guided by a "fiscal rule" which is a set of user-specified parameters which control the level and composition of state spending (and thus indirectly influence the level of local government spending). The "fiscal rule" is necessary because the size and composition of state appropriations is the result of a political process which in years past has displayed no stability or consistency. Consequently, the past cannot serve as an adequate basis for modeling future spending.

In addition, the various functions of the model require that alternative specifications of future state spending patterns be available for particular analyses. Because of the large relative size and economic importance of state spending in the Alaska economy, it is important to be able to vary the pattern of state spending when performing different analyses with the model.

Specifically, the model has been used for the following types of analyses, each requiring a different formulation of the "fiscal rule":

1. Projections of most likely levels of economic activity. In these analyses, the most likely fiscal behavior is assumed.

2. Fiscal policy analysis. In these analyses, the fiscal and economic effects of particular fiscal policies are examined, for example, the effects of the Permanent Fund dividend distribution program.

3. Aggregate spending analyses. In these analyses, the fiscal and economic effects of different aggregate state spending strategies are analyzed.

4. Public service demand analyses. In these analyses, demand for public services determines the level of spending. Demand can be in the form of population, price level, personal income, exogenous growth rates, or other variables.

5. Impact analyses. In these analyses, the fiscal and economic effects of specific private sector economic activities are examined. The state fiscal response to a change in private sector activity can be specified in a variety of ways.

Because of the constantly changing modeling requirements mandated by different analyses as well as changing state fiscal behavior, the "fiscal rules" are constantly changing, and although this would appear to be a model weakness, it is actually a reflection of the continuing instability and volatility within the state fiscal sector.

At present, the "fiscal rule" is controlled by the spending limit when revenues and fund balances are sufficient to spend the amount allowed by the limit and by available revenues otherwise. Table B.6 shows the primary parameters (each is actually a vector of values) which the user must select in choosing a "fiscal rule" within the framework of the spending limit.

TABLE B.6. PRIMARY PARAMETERS OF CHOICE
STATE "FISCAL RULE" FOR
SPENDING LIMIT CASE

EXBOND	proportion of total capital spending financed by general obligation bonds and federal grants
EXPFBAK	percent of Permanent Fund earnings plowed back into the Permanent Fund
EXPFCONX	Permanent Fund contributions appropriated from the general fund
EXPFDIST	percent of Permanent Fund earnings transferred to general fund which are distributed to individuals
EXRL5	policy switch for determination of state expenditure growth based upon constitutionally imposed spending limit
EXSPCAP	special capital appropriations over the limit
EXSPLITX	the target allocation to operations when state spending falls below the authorized spending limit
EXSUBS	the level of state subsidies under programs initiated since 1980
RLTMS	state-local revenue transfers net of education, revenue sharing, and tax sharing
RTIS	personal income tax

State Fiscal Module Detail

Petroleum Revenues

Petroleum revenues (RP9S) are divided between the general fund (RP9SGF) and the Permanent Fund which receives a portion (EXPF1) of bonuses (RPBS), royalties (RPRY), and federal-shared royalties (RSFDNPX). In addition to those sources of petroleum revenues split between the general and Permanent Funds (RP7S), other petroleum revenues consist of property taxes (RPPS), severance taxes (RPTS), corporate income taxes (RTCSPX), and miscellaneous (RP9X). All are exogenous. The cumulative discounted value of petroleum revenues from 1982 is calculated (DF.RSVP).

```
 8:  RP7S == RPBS+RPRY+RSFDNPX

 9:  RP9S == RP7S+RPPS+RPTS+RTCSPX+RP9X

10:  RP9SGF == RP9S-EXPF1*RP7S

11:  RPBSGF == (1-EXPF1)*RPBS

12:  RPRYGF == (1-EXPF1)*RPRY

13:  RSFDNPXG == (1-EXPF1)*RSFDNPX

14:  DF.RSVP = IF YR LT 1982 THEN 0 ELSE DF.RSVP(-1)+RP9S*
     (PDRPIBAS/PDRPI)*(1/(1+RORDISK)**(YR-1981))
```

Personal Income Taxes (Including Federal and Local for Purposes of Calculating Disposable Personal Income)

Although Alaska does not presently impose an income tax on individuals, the personal income tax equations remain in the model from the time when the tax was in force for several reasons. It is possible to calculate what the tax receipts would be if reimposed, the model structure is ready if it is reimposed, and the similar structure of the federal and state personal income taxes means it is easier to calculate the federal tax receipts with some information about the structure of the state tax.

Personal taxes netted out of income to arrive at disposable income include state income taxes paid by residents on a calendar-year basis (RTISCP), federal income taxes (RTPIF), and local taxes (DPIRES). Total calendar-year state income taxes (RTISC) and fiscal year taxes (RTIS) are also calculated.

The state income tax is calculated on a per-taxpayer basis (RTISCA) using Alaska taxable income (ATI) and the number of taxpayers (ATT). Alaska taxable income is derived from federal adjusted gross income earned in Alaska (FAGI) by first netting out nontaxable military pay (WSGM) and Native claims payments (ANCSA) and adding in the taxable federal cost-of-living allowance (COLA) to derive Alaskan adjusted gross income (AGI). This is next reduced by exemptions (AEX) each of which has a value (VAEX) and deductions (ATD).

Several policy variables allow for examination of changes in the tax structure (TXBASE, TXRT, TXCRPC, TCRED). Finally, the difference between tax receipts using the historical (pre-1978 schedule) and the structure under examination is calculated (RTISLOS).

Federal adjusted gross income reported in Alaska (FAGII), smaller than federal adjusted gross income earned in the state because of transient workers, forms the base for federal personal income tax collections.

```
15:  LOG(FAGI) = C21A+C21B*LOG(PI8)+C21C*LOG(EMCNX1+EMP9)

16:  LOG(FAGII) = C22A+C22B*LOG(PI)

17:  COLA = (1-1/(1+PCOLART))*WSGC

18:  AGI = FAGI+COLA-WSGM-PC12N*PC12RN*ANCSA*PCNC1

19:  AEX*1000 = C10A+C10B*POPC+C10C*(EMCNX1+EMP9)

20:  ATT = C28A+C28B*(EM99-EMGM)+C28C*EMCNX1

21:  LOG(ATD/ATT) = C23A+C23B*LOG(AGI/ATT)+C23C*D69+C23D*D72

22:  VAEX = IF YR LT 1980 THEN VAEX1 ELSE VAEX(-1)*
     (1+GRUSCPI)

23:  ATI = AGI-AEX*VAEX-ATD

24:  ATI.TT = ATI/ATT

25:  LOG(RTISCA1) = C24A-TXBASE+C24B*(1-TXRT)*LOG(ATI.TT)

26:  LOG(RTISCA2) = C24A+C24B*LOG(ATI.TT)

27:  RTISCA == IF YR GT 1984 THEN (IF EXTRNS+EXTRNS(-1) EQ 0
     THEN EXRL5*(RTISCA1-TXCRPC*RTISCA1-TCRED/1000) ELSE 0)
     ELSE (IF YR LT 1979 THEN RTISCA1-TXCRPC*RTISCA1-TCRED/
     1000 ELSE 0)
```

28: RTISLOS == (RTISCA2-RTISCA)*ATT

29: RTISC = RTISCA*ATT

30: RTIS = IF YR EQ 1980 THEN 0 ELSE C25A*RTISC(-1)+C25B*RTISC

31: RTISCP = C105A+C105B*PI8+C105C*RTISC

32: LOG(RTPIF/ATT) = C26A+C26B*LOG(FAGII/ATT+TCRED/1000/ATT+RTISLOS/ATT)+C26C*D61.68*LOG(FAGII/ATT+TCRED/1000/ATT+RTISLOS/ATT)

33: DPIRES = C27A+C27B*PI3+C27C*WSCNP

Other Taxes

A number of other small taxes complete the modeling of state taxes. Of these, the most important is the corporate income tax composed of petroleum industry taxes (RTCSPX), endogenous taxes (RTCS1), and exogenous taxes associated with some future large activities (RTCSX).

The gross receipts tax (RTBS) has been largely eliminated since 1979, but its structure is still modeled using business licenses (BL) and gross receipts (GR) as the tax base. From the latter, gross taxable receipts (GTR) are calculated. Only a fraction (PBLTBL) of revenues which would have been received prior to 1980 are now collected.

The motor fuel tax (RTMF) is next in order of importance. It is a function of the volume of fuel oil sales (THG) which, in turn, is a product of the number of vehicles on the road (TPTV) and average consumption per vehicle (AHG).

Other endogenous taxes are ad valorem taxes, which are similar to a gross receipts tax but levied only on insurance companies and public utilities (RTVS), alcohol (RTAS) and cigarette (RTCIS) sales taxes, and the school tax (RTSS) which was eliminated in 1981. Finally, there is a residual category of other taxes (RTOTS) consisting of fish processing taxes and miscellaneous small revenue producers.

Total taxes (RT99) includes revenues to both the general and Permanent Funds but excludes a portion of cigarette taxes (PECIG) earmarked for a special revenue fund.

```
40:  LOG(RTCS1*100/PDRPI) = C43A+C43C*D64.65+C43B*LOG(EMP9
     (-1)+EMCN(-1)+EMM9(-1)+EMT9(-1)+EMCM(-1)+EMPU(-1))

41:  RTCS == RTCS1+RTCSPX+RTCSX


34:  LOG(BL) = C39A+C39B*LOG(XX98-XXP9)

35:  LOG(GR) = C40A+C40B*LOG(XX98)

36:  RTBS1 == (BL+BL(-1))*1000/2*BTRATE

37:  GTR = GR-BL(-1)*PNTGR*1000

38:  LOG(RTBS2*10**3/BL(-1)) = C29A+C29B*LOG(GTR(-1)*
     10**3/BL(-1))

39:  RTBS == IF YR GE 1979 THEN RTBS1+RTBS2*PBLTBL ELSE
     RTBS1+RTBS2


42:  TPTV = C38A+C38B*POP

43:  LOG(AHG) = C37A+C37B*LOG(PR.PI)

44:  THG == AHG*TPTV

45:  LOG(RTMF) = C46A+C46B*LOG(THG)


46:  LOG(RTVS) = C47A+C47B*LOG(R.DPI8N(-1))

47:  LOG(RTAS) = C48A+C48B*LOG(R.DPI(-1))

48:  LOG(RTCIS) = C49A+C49B*LOG(R.DPI(-1))

49:  RTSS = IF YR GT 1980 THEN 0 ELSE C50A+C50B*(EM99-EMGM)

50:  RTOTS = RTOTS(-1)*(1+GRUSCPI+GRDIRPU)

51:  RT99 == RTIS+RTCS+RPPS+RPTS+RP9X+RTBS+RTMF+RTAS+
     (1-PECIG)*RTCIS+RTVS+RTSS+RTOTS
```

State Investment Earnings

State investment earnings from all state funds (RSIN), the general fund (RSIG), Permanent Fund (RSIP), and a (hypothetical) development fund (RSID) are calculated based upon the balance in each fund in the previous year and a real rate of return specific to each fund. They are as follows: general fund--ROR, Permanent Fund--ROR+RORPPF, development fund--ROR-RORPDF.

Net earnings of each fund, after accounting for Alaskan inflation, is also calculated for each fund (RSIPNET, RSIDNET, RSIGNET, RSINNET).

A portion (EXPFBAK) of the earnings of the Permanent Fund remain in that fund while the remainder (RSIPGF) is transferred to the general fund either for the dividend program or general appropriations.

57: RSIP == (ROR+GRUSCPI+RORPPF)*BALPF(-1)

58: RSIPGF == (1-EXPFBAK)*RSIP

59: RSID == (ROR+GRUSCPI-RORPDF)*BALDF(-1)

60: RSIG == (ROR+GRUSCPI)*BALGF(-1)

61: RSIN == (ROR+GRUSCPI)*BAL99(-1)+RORPPF*BALPF(-1)-
RORPDF*BALDF(-1)

62: RSIPNET == (ROR+GRUSCPI-(PDRPI/PDRPI(-1)-1)+RORPPF)*
BALPF(-1)

63: RSIDNET == (ROR+GRUSCPI-(PDRPI/PDRPI(-1)-1)-RORPDF)*
BALDF(-1)

64: RSIGNET == (ROR+GRUSCPI-(PDRPI/PDRPI(-1)-1))*BALGF(-1)

65: RSINNET == (ROR+GRUSCPI-(PDRPI/PDRPI(-1)-1))*BAL99+
RORPPF*BALPF(-1)-RORPDF*BALDF(-1)

Other State General Fund Unrestricted Revenues

Licenses and fees (ROFTS) consist of auto licenses and fees (ROFAS) and business and some nonbusiness licenses and fees (ROFOS). State ferry income (RFERS) is a component of general fund revenues. The final element is miscellaneous nontax revenues consisting of such things as nonpetroleum royalties and user fees.

Total unrestricted general fund revenues (RSGFBM) is the sum of taxes and other revenues defined to include any Permanent Fund earnings not retained in the fund as well as any withdrawals from the (hypothetical) development fund (EXDFWITH).

Total general fund unrestricted revenues can be divided into four categories: petroleum (RP9SGF), general fund earnings (RSIG), Permanent Fund earnings transferred to the general fund (RSIPGF), and endogenous revenues (RSENGF).

```
52:  LOG(ROFAS) = C30A+C30B*LOG(TPTV(-1))

53:  LOG(ROFOS) = C33A+C33B*LOG(PI3(-1))

54:  ROFTS == ROFAS+ROFOS

55:  ROFERS = ROFERS(-1)*(1+GRUSCPI+GRDIRPU)

56:  LOG(RMIS) = C35A+C35B*LOG(PI3(-1))

66:  RSGFBM = RT99+(1-EXPF1)*RP7S+ROFTS+ROFERS+RSIG+(1-
     EXPFBAK)*RSIP+RMIS+EXDFWITH

81:  RSENGF == RSGFBM-RP9SGF-RSIPGF-RSIG
```

Revenues Outside the Unrestricted General Fund and Revenue Totals

Total general fund revenues (RSGF) consist of restricted (RSGFRS) and unrestricted (RSGFBM) funds. Restricted funds include federal program augmentation (RSFDN) and state program augmentation as well as miscellaneous restricted receipts (RMISRES). These are both categories for funds earmarked for specific purposes.

Total revenues (R99S) is defined to include general fund revenues, Permanent Fund revenues, (hypothetical) development fund earnings, all net of state required ANCSA payments (SANCSA), which were completed in 1981. Since deposits and withdrawals can occur between these funds, double counting must be avoided.

Revenues into two other small families of funds are calculated. Special revenue funds (RSFS) consist of some special fees and licenses (RSFFS), a portion (PECIG) of cigarette taxes, and some miscellaneous items like federal revenue sharing. The international airport enterprise fund (RSIAS) is the final category.

From total revenues (R99S), a number of subtotals can be calculated. These include total net of all Permanent Fund contributions (R99SNT), total net of federal transfers (R99SON), total net of all fund earnings and petroleum (NONPET), total net of petroleum (NONRP9S), and endogenous (RSEN).

```
67:  RSFDN = IF YR EQ 1982 THEN 187.968 ELSE RSFDNX+RSFDN
     (-1)*(1+GRUSCPI+GRDIRPU)

68:  RMISRES = IF YR EQ 1982 THEN 16.739 ELSE RMISRES(-1)*
     (1+GRUSCPI+GRDIRPU)

69:  RSGFRS == RSFDN+RMISRES

70:  RSGF = RSGFBM+RSGFRS

71:  R99S = RSGF+EXPF1*RP7S+EXPFBAK*RSIP+(RSID-EXDFWITH)-
     SANCSA

72:  LOG(RSFFS) = C58A+C58B*LOG(POP(-1))

73:  RSFS1 = RSFS1(-1)*(1+GRUSCPI+GRDIRPU)

74:  RSFS == PECIG*RTCIS+RSFFS+RSFS1

75:  RSIAS = IF YR EQ 1982 THEN 31.12 ELSE RSIAS(-1)*(1+
     GRUSCPI+GRDIRPU)
```

76: R99SNT == R99S-EXPFCON

77: R99SON == R99S-RSFDN

78: NONPET == R99S-RP9S-RSIN

79: NONRP9S == R99S-RP9S

80: RSEN == R99S-(RP9S-SANCSA)-RSIN-RSFDN

Permanent Fund and Development Fund (hypothetical)

Permanent fund contributions consist of three elements: statutorially required contributions (EXPFNEW), reinvestment of earnings (EXPFREIN), and general fund appropriations (EXPFCONX).

A development fund does not currently exist but has periodically been suggested for the specific purpose of investing in Alaskan infrastructure development. If it did, a certain portion of excess current account revenues plus annual investment earnings net of withdrawals might form the annual contributions (EXDFCON). Withdrawals might be a percentage of net earnings (EXDFPCNT).

82: EXPFCON = EXPFBAK*RSIP+EXPF1*RP7S+EXPFCONX

83: EXPFNEW == EXPF1*RP7S

84: EXPFREIN == EXPFBAK*RSIP

85: EXPFCON1 == EXPFCON-EXPFCONX

86: EXDFCON = IF RSGFBM GT EXGFBM THEN EXDF1*(RSGFBM-EXGFBM)+(RSID-EXDFWITH) ELSE RSID-EXDFWITH

87: EXDFWITH = EXDFPCNT*RSIDNET

State Expenditures--Major Categories

The constitutional amendment establishing the expenditure limit (EXLIM) places a ceiling on state expenditures except for debt service, voter-approved capital expenditures, and supplementary Permanent Fund contributions. The ceiling has been set at $2.5 billion for 1982, and is annually adjusted for inflation and population change. The allowable limit (EXLIMOK) may be less than this if current revenues plus the balance in the general fund are less than the spending limit ceiling. The difference between these amounts is defined as the revenue gap (RSGFGAP).

The spending limit also requires that no more than two-thirds of expenditures be allocated toward operations, with at least one-third for capital (EXSPLIT). If the limit is not in effect, this rule may be inoperative, depending upon interpretation of the amendment.

Total operating expenditures (net of debt service) funded from all sources (EXOPS) is consequently the operating portion of the spending limit (EXLIMOK*EXSPLIT) plus operating expenditures funded from sources not constrained by the limit. These sources are interagency receipts (EXINREC), restricted general fund revenues (RSFDN and RMISRES), special revenue fund receipts (RSFS), and the international airport enterprise fund (RSIAS).

A number of other rules for determining state operating expenditures are possible but are currenty not utilized. These involve linking spending to demand factors such as income and population, allowing spending to grow at some fixed rate, allowing spending to grow as some function of a base case (BASEXOPS), or spending some annuity amount (EXANSAV or EXSAVS).

Total capital expenditures (EXCAP) is similarly determined in the current version of the model as capital expenditures allowed under the limit (recognizing that a portion of what is categorized as capital expenditures is more properly designated subsidies [EXSUBS]), augmented by capital expenditures, funded not out of the general fund but rather out of capital projects funds (EXCPS). The proportion of capital projects thus funded (EXBOND) is set exogenously. Special capital expenditures (EXSPCAP) are in addition to this definition of capital expenditures.

As with the operating budget, several other options are available, but not currently in use, for formulating state government capital expenditure behavior. These alternatives parallel those for the operating budget but include, in addition, the alternative of programming capital spending to maintain a specified level of real per capita state capital stock (PR.BALCP).

The other main elements of state spending currently are the Permanent Fund dividend program (EXTRNS) and state subsidy programs under the capital budget (EXSUBS). The dividends are determined as a proportion (EXPFDIST) of Permanent Fund earnings not reinvested (RSIP*(1-EXPFBAK)). Subsidies are set exogenously to 1987 and then equal half of the spending limit capital allotment or zero, depending upon whether the current account balance of the general fund is running negative. Interagency receipts (EXINREC) are a function of the operating budget.

```
 88:  EXLIM = IF YR EQ 1982 THEN EXLIM82 ELSE EXLIM82*(PDRPI/
      PDRPIBAS)*(POP/430)

 89:  EXLIMOK = IF YR LT 1985 THEN EXLIM ELSE IF RSGFBM-EXDSS
      -EXTRNS + BALGF(-1) GT EXLIM THEN EXLIM ELSE
      RSGFBM-EXDSS-EXTRNS

 90:  RSGFGAP == EXLIM-EXLIMOK

 91:  EXSPLIT == IF YR LT 1985 THEN 0.67 ELSE (IF RSGFGAP
      GT 0 AND RSGFGAP(-1) GT 0 THEN EXSPLITX ELSE (IF
      RSGFGAP GT 0 THEN 0.67+(EXSPLITX-0.67)/2 ELSE 0.67))

 92:  EXOPS = IF YR LE 1983 THEN EXOPS1 ELSE EXRL5*(EXLIMOK*
      EXSPLIT+EXINREC+RSFDN+RMISRES+RSFS+RSIAS)+EXRL1*(EXOPS
      (-1)*(1+(EXEL1*(POP(-1)/POP(-2)-1)+EXEL2*(PDEXOPS(-1)/
      PDEXOPS(-2)-1)+EXEL3*(PR.PI3(-1)/PR.PI3(-2)-1)+EXEL4*
      (PI(-1)/PI(-2)-1)+EXEL5*(PI3(-1)/PI3(-2)-1)+EXEL6*
      ((POP(-1)-EMCNX1(-1))/(POP(-2)-EMCNX1(-2))-1)))+
      EXRLOP6*BALGFCP(-1)*(BALGFP(-1)/EXGF(-1)))+EXRLOP7*
      (R99S(-1)-EXNOPS(-1)-EXSAVS)+EXRLOP8*(R99S(-1)-
      EXNOPS(-1)-EXANSAV)+EXRL3*(1+GRRPCEX)*(EXOPS(-1)/
      POP(-1)/PDEXOPS(-1)*POP*PDEXOPS)+EXRL2*EXOPS(-1)*
      (1+GREXOPS)+EXRL4*(BASEXOPS+EXOPSIMP*(PDEXOPS*
      (POP-BASEPOP-EXRL4OP*(EMCNX1-BASEMCNX))))

 93:  EXANSAV = RP9S+RSIN-EXANNU*(1+RORANGRO)**(YR-1980)

 94:  EXSAVS = EXSAVX+EXPFCON+TXPTXX*RTISLOS

136:  EXCAP = IF YR LT 1984 THEN EXCAP1 ELSE EXRL5*(EXLIMOK*
      (1-EXSPLIT)-EXSUBS)/(1-EXBOND)+EXRL3*((1+GRSSCP)*
      PR.BALCP(-1)*POP/1000-R.BALCAP(-1)*(1/(1+RORCPDEP)))/
      (100/PDCON)+EXRL2*(EXCAP(-1)*(1+GREXCAP))+EXRL4*
      (BASEXCAP+EXCAPIMP*(PDCON*(POP-BASEPOP-EXRL4OP*
      (EMCNX1-BASEMCNX))))+EXRL1*(EXCAP(-1)*(1+EXEL1*
      (POP(-1)/POP(-2)-1)+EXEL2*(PDCON(-1)/PDCON(-2)-1)+
      EXEL3*(PR.PI3(-1)/PR.PI3(-2)-1)+EXEL4*(PI(-1)/PI(-2)-
      1)+EXEL5*(PI3(-1)/PI3(-2)-1)+EXEL6*((POP(-1)-EMCNX1
      (-1))/(POP(-2)-EMCNX1(-2))-1)))
```

```
133:  EXTRNS = IF YR LT 1981 THEN 0 ELSE (IF YR EQ 1982 THEN
      425 ELSE RSIP*(1-EXPFBAK)*EXPFDIST)

134:  EXINREC = C17A+C17B*(EXOPS-RLT99)

135:  EXSUBS = IF YR LT 1988 THEN EXSUBS1 ELSE (IF EXRL5 EQ 1
      THEN (IF RSGFBM(-1)+RSGFBM(-2) LT EXGFBM(-1)+EXGFBM(-2)
      OR EXSUBS(-1) EQ 0 THEN 0 ELSE EXLIMOK*(0.5*
      (1-EXSPLIT))) ELSE EXSUBS(-1)*(1+GRUSCPI))
```

State Expenditure Totals

Total general fund expenditures, including from restricted and unrestricted accounts (EXGF), consists of operations including debt service (but net of special revenue fund and international airport fund revenues as well as interagency receipts) (EXOPS+EXDSS-RSFS-RSIAS-EXINREC), general fund capital expenditures (EXGFCAP) as well as special capital expenditures (EXSPCAP), and subsidies (EXSUBS) and Permanent Fund dividends (EXTRNS). Unrestricted general fund expenditures (EXGFBM) further nets out restricted revenues (RSFDN and RMISRES) but includes special Permanent Fund contributions.

General fund operating expenditures (EXGFOPER) is total unrestricted expenditures net of capital expenditures, subsidies, dividends, and special Permanent Fund contributions. Operating expenditures defined by the state budget (EXBUD) includes debt service expenditures and nongeneral fund University of Alaska receipts.

Two other variables calculated are nonoperating expenditures (EXNOPS) and operating expenditures net of transfers to local government (EXONTR).

```
155:  EXGF = EXOPS+EXTRNS+EXSUBS+EXSPCAP+EXDSS-EXINREC+
      EXGFCAP-RSFS-RSIAS

156:  EX99S = EXOPS+EXTRNS+EXSUBS+EXSPCAP+EXDSS+EXCAP+
      PARNONGF*EXUA

157:  EXGFBM = EXGF+EXPFCONX-RSFDN-RMISRES

158:  EXNOPS = EX99S-EXOPS

159:  EXBUD == EXOPS+EXDSS+PARNONGF*EXUA

160:  EXGFOPER == EXGFBM-EXTRNS-EXGFCAP-EXSUBS-EXSPCAP-
      EXPFCONX

161:  EXONTR == EXOPS+EXDSS-RLTE99-RLTT9-RLTRS-RLTMS-RLTX
```

State Operating Expenditure Detail

An initial estimate of state operating expenditures net of debt service in each of nine functional categories (EXaaa4) is calculated as a function of total operating expenditures. From these, the ratio RATIO1 is formed with total operating expenditures, and the initial estimates are ratioed down or up so that the final values (EXaaa) sum exactly to total operating expenditures. In the commerce and economic development program (EXCDS), exogenous state local transfers (RLTX) are added in before the adjustment occurs.

University of Alaska expenditures (EXUA) are a large part of the total education budget and are thus calculated separately.

Personnel expenditures by program category (EXPRaaa) is a function of expenditures. For two program categories, education and commerce, this is net of transfers to local government. Preliminary estimates of total education transfers (RLTE994), tax sharing (RLTT94), and revenue sharing (RLTRS4) come from the local government model. These are adjusted for consistency with total operating expenditures by RATIO1 and then netted out of their respective categories.

Total personnel expenditures (EXPR99) and state government wages and salaries fiscal-year (WSGSFY) and calendar-year basis (WSGS) follow. A variable, EXPRPER, allows an exogenous adjustment to the ratio of total personnel expenditures and the sum of the components.

95-103: LOG(EXaaa4) = CbbA+CbbB*LOG(EXOPS)

104: RATIO1 == EXOPS/(EXEDS4+EXSSS4+EXHES4+EXNRS4+EXPPS4+EXJUS4+EXCDS4+RLTX+EXTRS4+EXGGS4)

105: EXUA = IF YR EQ 1982 THEN 197.7 ELSE EXUA(-1)*(EXOPS/EXOPS(-1))

106-113: EXaaa = RATIO1*EXaaa4

114: EXCDS = RATIO1*(EXCDS4+RLTX)

115: RLTE99 = RLTE994*RATIO1

116: EXEDSNT == EXEDS-RLTE99

117: RLTT9 = RLTT94*RATIO1

118: RLTRS = RLTRS4*RATIO1

119: EXCDSNT = EXCDS-RLTT9-RLTRS-RLTX

120: EXPRCDS = C7A+C7B*EXCDSNT

121: EXPREDS1 = C1A+C1B*EXEDSNT+C1C*D61.75*EXEDSNT

122-129: EXPRaaa = C2A+C2B*EXaaa

130: EXPR99 = EXPRPER*(EXPREDS1+EXPRSSS+EXPRHES+EXPRNRS+
EXPRPPS+EXPRJUS+EXPRCDS+EXPRGGS+EXPRTRS+EXPRUA)

131: WSGSFY = PCWS1*EXPR99

132: LOG(WSGS) = C55A+C55B*LOG(WSGSFY)+C55C*D75

State Capital Expenditure Detail

Capital expenditures are divided into four categories according to funding source and expenditure type. Highway and nonhighway capital expenditures may be funded out of the general fund (EXGFCHY and EXGFCNH) or from the capital projects fund which receives its revenues from general obligation bond sales and federal capital grants (EXCPSHY and EXCPSNH).

Each is a fixed portion of either general fund capital expenditures (EXGFCAP) or capital project fund capital expenditures (EXCPS). Total highway (EXHYCAP) and nonhighway (EXNHYCP) capital expenditures are also calculated. Ferry capital expenditures (EXCAPFR) are calculated separately since they represent purchases outside the state.

The sources of revenues for the capital projects funds are federal capital grants (EXCPSFED) and general obligation bonds of the state (EXCPSGOB). This latter funding source determines the ongoing debt service requirement of the state (EXDSS) based upon the schedule of debt outstanding from previous bond sales (EXDSSX) plus debt service on debt newly incurred after 1982 (DEBTP82). This new debt is paid off at a constant rate over a twenty-year period, like a mortgage, according to the capital recovery factor (RORCRF).

The measure of newly incurred debt represents the principal of all debt incurred in the last twenty years. After that time, the debt is subtracted from this total using EXCPSM lagged twenty years. The proper measure of the current bonded debt of the state is GODT, consisting of the schedule of debt outstanding from previous bond sales (GODTX) and the remaining debt from bond sales made after 1982. This debt is assumed paid off at the rate of 5 percent annually for twenty years.

The value added to the construction industry from state government capital expenditures (XXVACAP) consists of the nominal value of highway (XXVHY) and nonhighway (XXVNHY) value added, deflated by the price deflator for construction (PDCON). Special capital spending (EXSPCAP) contributes to nonhighway construction value added.

137: EXGFCHY = IF YR LT 1984 THEN EXGFCHY1 ELSE 0.6*EXCAP*(1-EXBOND)

138: EXGFCNH = IF YR LT 1984 THEN EXGFCNH1 ELSE 0.4*EXCAP*(1-EXBOND)

139: EXCPSHY = IF YR LT 1984 THEN EXCPSHY1 ELSE 0.25*EXCAP*EXBOND

140: EXCPSNH = IF YR LT 1984 THEN EXCPSNH1 ELSE 0.75*EXCAP*EXBOND

141: EXHYCAP == EXGFCHY+EXCPSHY

142: EXNHYCP == EXGFCNH+EXCPSNH

143: EXGFCAP == EXGFCHY+EXGFCNH

144: EXCAPFR = EXCAPFR(-1)*(EXCAP/EXCAP(-1))

145: EXCPS = EXCPSHY+EXCPSNH

149: EXDSS = IF YR LT 1983 THEN EXDSSX ELSE EXDSSX+RORCRF*
DEBTP82(-1)

150: EXCPSFED = IF YR EQ 1982 THEN 105.021 ELSE EXCPSFED
(-1)*(1+GRUSCPI)

151: EXCPSGOB == EXCPS-EXCPSFED

152: EXCPSM = IF YR LT 1983 THEN 0 ELSE EXCPSGOB

153: DEBTP82 = IF YR LT 1983 THEN 0 ELSE DEBTP82(-1)+
EXCPSGOB-EXCPSM(-20)

154: GODT = IF YR LT 1983 THEN GODTX ELSE GODTX+EXCPSM(-19)*
0.05+EXCPSM(-18)*0.1+EXCPSM(-17)*0.15+EXCPSM(-16)*0.2+
EXCPSM(-15)*0.25+EXCPSM(-14)*0.3+EXCPSM(-13)*0.35+
EXCPSM(-12)*0.4+EXCPSM(-11)*0.45+EXCPSM(-10)*0.5+
EXCPSM(-9)*0.55+EXCPSM(-8)*0.6+EXCPSM(-7)*0.65+
EXCPSM(-6)*0.7+EXCPSM(-5)*0.75+EXCPSM(-4)*0.8+EXCPSM
(-3)*0.85+EXCPSM(-2)*0.9+EXCPSM(-1)*0.95+EXCPSGOB

146: XXVHY = C41A+C41B*(EXHYCAP+EXHYCAP(-1))

147: XXVNHY = C42A+C42B*(EXNHYCP(-1)+EXSPCAP(-1)-
EXCAPFR(-2)+EXNHYCP+EXSPCAP-EXCAPFR(-1))

148: XXVACAP == (XXVHY+XXVNHY)/(PDCON/100)

State Fund Balances

The model calculates balances in the general fund (BALGF), the Permanent Fund (BALPF), and the development fund (currently non-existent) (BALDF) as well as the sum of the three (BAL99).

Two measures of current account balance are also calculated. The first is the current account balance for the unrestricted general fund account, defined to include Permanent Fund dividends (BALCABBM), and the second is the current account balance for the general plus Permanent Fund accounts (BALCAB).

Two special indicators of the general fund balance are calculated. The first shows only positive fund values (BALGFP). The second shows positive changes in the balance (BALGFCP).

```
162:  BALCAB == R99S-EXGF

163:  BALCABBM == RSGFBM-EXGFBM

164:  BAL99 = IF YR LT 1982 THEN BAL991 ELSE (IF YR EQ 1982
      THEN 3612 ELSE BAL99(-1)+R99S-EXGF)

165:  BALGF = IF YR LT 1982 THEN BALGF1 ELSE BAL99-BALPF-
      BALDF

166:  BALDF = IF YR LT 1983 THEN BALDF1 ELSE BALDF(-1)+
      EXDFCON

167:  BALPF = IF YR LT 1983 THEN BALPF1 ELSE BALPF(-1)+
      EXPFCON

168:  BALGFP = IF BALGF LT 0 THEN 0 ELSE BALGF

169:  BALGFCP = IF BALGF-BALGF(-1) GT 0 THEN BALGF-BALGF(-1)
      ELSE 0
```

State Capital Stock and Operations, Maintenance, and Replacement Costs

The real value (R.BALCAP) and real per capita value of the capital stock (PR.BALCP) are calculated on the basis of the depreciation rate (RORCPDEP).

A set of equations calculates the cost of operations and maintenance (EXOM84) and replacement (EXRP84) of the state capital stock put in place beginning in 1984 (BALCAP84). Operations and maintenance is a constant proportion of the capital stock (EXOMCOST) while replacement is the rate necessary to offset depreciation (RORCPDEP). The running total for the capital stock put in place beginning in 1984 is augmented annually by new additions to the capital stock (EXCAPNEW). These annual new additions are net of replacement capital, consisting of the replacement of the depreciated pre-1984 capital stock in the annual amount of EXCAPOLD and replacement of the new stock (EXRP84).

```
170:  R.BALCAP = R.BALCAP(-1)*(1/(1+RORCPDEP))+
      EXCAP*100/PDCON

171:  PR.BALCP = R.BALCAP*1000/POP

172:  EXCAPREP == IF YR LT 1984 THEN 0 ELSE RORCPDEP*BALCAP84
      (-1)+EXCAPOLD*(PDRPI/PDRPIBAS)

173:  EXCAPNEW == IF YR LT 1984 THEN 0 ELSE EXCAP-EXCAPREP

174:  BALCAP84 = IF YR LT 1984 THEN 0 ELSE BALCAP84(-1)*
      PDRPI/PDRPI(-1)+EXCAPNEW

175:  EXOM84 == BALCAP84(-1)*EXOMCOST

176:  EXRP84 == RORCPDEP*BALCAP84(-1)
```

Local Fiscal Module Detail

Local Revenues

The primary sources of local government revenues (RL99) are the local property tax (RLPT) and transfers from the state government (RLT99).

Local Tax Revenues

The local property tax base has one component (LPTB1) which is related to the level of personal income net of "enclave" employment income. This component of the value of real property in the state is based upon local assessments. A "full-value" assessment (LPTB1FV) is calculated by the state for revenue sharing purposes and is higher by the ratio of full value to local value (PARLVFV).

The second component of the local property tax base is the value of petroleum-related capital equipment subject to the state property tax (PTBP9). This value is calculated by multiplying the tax (RPPS) by the inverse of the tax rate (PTRTS). Only a small portion (P9PTPER) of petroleum property actually lies within the boundaries of local government, and it is this amount which is the actual base for local taxes (LPTBP9). The complete local property tax base (LPTB) is the sum of the endogenous component (LPTB1) and the proportion (LPTRAT) of petroleum property within local boundaries which is actually taxable because of the per capita maximum valuation restriction. Local property tax receipts (RLPT1) is then a function of the value of property. If there is exogenous activity which generates additional property taxes, this is added (RLPTX) to get a grand total (RLPT). In addition, the model generates the "full value" of local property (LPTBFV) which is the sum of endogenous "full value" property and petroleum property within local boundaries. Finally, the full value of personal property in the state (PPVAL) is calculated as the full value of the local endogenous base and the value of petroleum property. Other taxes (RLOT) consist primarily of sales taxes.

177: LOG(LPTB1) = C57A+C57B*LOG(PI3(-1))+C57C*D71.00

178: LPTB1FV == LPTB1*1/PARLVFV

179: PTBP9 == RPPS*(1/PTRTS)

180: LPTBP9 == P9PTPER*PTBP9

181: LPTB = LPTB1+LPTBP9*LPTRAT

182: LPTBFV == LPTB1FV+LPTBP9

183: PPVAL == LPTB1FV+PTBP9

184: RLPT1 = C18A+C18B*LPTB

185: RLPT == RLPT1+RLPTX

186: LOG(RLOT*1000/POP(-1)) = C31A+C31B*LOG(PI(-1)*1000/POP(-1))

Local Transfers

The programs and formulas used to provide local government assistance have changed considerably in recent years, making modeling of these programs difficult. Preliminary values for all types of local transfers are calculated based upon the formulas currently used to determine transfer amounts (suffix 4). These are subsequently adjusted using RATIO1 for consistency with total state operating expenditures.

Total transfers (RLT99) consist of five categories as follows: tax sharing (RLTT9), revenue sharing (RLTRS), education (RLTE99), miscellaneous (RLTMS), and exogenous (RLTX).

The most important shared tax is a portion (PESLTC) of the corporate tax before 1982. After 1981, this program was replaced by the municipal assistance program (RLTMA). Other shared taxes are portions of ad valorem taxes (RLTVS) and other taxes (RLTOT), primarily the fish processing taxes.

State local revenue sharing (RLTRS) is a separate category of assistance, and miscellaneous transfers (RLTMS) is another.

Educational transfers is the largest category (RLTE99), consisting of primary and secondary education transfers (RLTEA) and other (nonprimary and nonsecondary) education transfers (RLTEB). Primary and secondary education transfers are further divided into the following categories: cigarette tax transfers (RLTEC), Foundation program transfers (RLTEF), transportation transfers (RLTET), and other education transfers (RLTEO). The Foundation program is the basic program in support of education, and it is based upon the number of students (ADMSD) and the basic instructional unit allotment (BIU) which is a basic funding level. The number of students is calculated for district schools (ADMDIS) and for the rural educational attendance area schools (ADMREA).

187: RLTCS4 = IF YR GT 1981 THEN 0 ELSE PESLTC*RTCS1

188: RLTVS4 = C63A+C63B*RTVS

```
189:  RLTOT4 == PESLT*RTOTS

190:  RLTMA4 = IF YR LT 1982 THEN 0 ELSE
      RLTMA(-1)/PDRPI(-1)/POP(-1)*POP*PDRPI

191:  RLTT94 = RLTVS4+RLTOT4+RLTCS4+RLTMA4

192:  RLTRS4 = RLTRS(-1)*(1+GRUSCPI+GRDIRPU)

193:  RLTMS = IF YR EQ 1981 THEN 50.887 ELSE (IF EXSUBS EQ 0
      THEN 0 ELSE RLTMS(-1)*(1+GRUSCPI+GRDIRPU))

194:  RLTEC4 == PECIG*RTCIS

195:  ADMDIS == PAD1*POPSKUL(-1)

196:  ADMREA == PAD2*POPSKUL(-1)

197:  ADMSD = ADMDIS+ADMREA

198:  BIU = IF YR LT 1980 THEN BIU1 ELSE BIU(-1)*(1+GRUSCPI)

199:  RLTEF4 = C36A+C36F*D81.00+D71.00*C36B+BIU*C36C+C36D*ADMSD

200:  RLTET4 = (POP/POP(-1)+PDRPI/PDRPI(-1)-1)*RLTET(-1)

201:  RLTEO4 = RLTEO(-1)*(1+GRUSCPI+GRDIRPU)

202:  RLTEA4 == RLTEC4+RLTEF4+RLTET4+RLTEO4

203:  RLTEB4 = IF YR EQ 1980 THEN 7.5 ELSE RLTEB(-1)*
      (1+GRUSCPI+GRDIRPU)

204:  RLTE994 = RLTEA4+RLTEB4

205:  RLTCS = RLTCS4*RATIO1

206:  RLTVS == RLTVS4*RATIO1

207:  RLTOT == RLTOT4*RATIO1

208:  RLTMA = RLTMA4*RATIO1

209:  RLTEC == RLTEC4*RATIO1

210:  RLTEF == RLTEF4*RATIO1

211:  RLTET = RLTET4*RATIO1

212:  RLTEO = RLTEO4*RATIO1
```

213: RLTEA == RLTEA4*RATIO1

214: RLTEB = RLTEB4*RATIO1

215: RLT99 = RLTT9+RLTRS+RLTE99+RLTMS+RLTX

Other Local Revenues

Other local revenues consist of federal transfers (RLTF), special petroleum-related federal transfers (RLTFPX), and miscellaneous fees and charges (RLMC). The level of miscellaneous fees and charges is set to maintain a zero balance on current account for local government accounts.

221: RLTF = RLTF(-1)*(1+GRUSCPI+GRDIRPU)

222: RL991 == RLPT+RLOT+RLT99+RLTF+RLTFPX

223: RLMC = EL99-RL991-(GOBONDL-GOBONDL(-1))

224: RL99 == RL991+RLMC

Local Government Expenditures

Total local government expenditures (EL99) consist of several components--education expenditures (ELED), non-education expenditures (ELNED1), and debt service expenditures (not including those provided by state government) (ELBD) as well as exogenous state-local transfers (RLTX), federal-local petroleum-related transfers (RLTFPX), and miscellaneous state-local transfers (RLTMS). Education expenditures are the sum of revenues from state-local transfers (RLTE99) and those from local sources (ELED1). Local education expenditures from own sources is a function of personal income net of "enclave" employment income. Non-education expenditures are determined in real terms as a function of real disposable personal income. Debt service is a function of the level of outstanding general obligation bonds (GOBONDL).

The capital portion of the education component of the budget (ELEDCP) is a function of education expenditures in total (ELED). The amount of capital expenditures financed by general obligation bonds grows with prices and per capita income.

Local government personnel expenditures (ELPERS) is calculated from total local expenditures net of education capital expenditures and debt service expenditures. From this, local government wages and salaries (WSGL) is calculated.

Total state and local government expenditures (SLGEXP) are the sum of state and local expenditures net of state-local transfers. Local (BALOCAL) and combined state and local (BALLANDS) current account balances are calculated.

```
216:  ELED1 = C11A+C11B*PI3(-1)

217:  ELED = RLTE99+ELED1

218:  ELBD = C14A+C14C*D61.77*GOBONDL(-1)+C14B*GOBONDL(-1)

219:  ELNED1/PDRPI = C16A+C16E*D81.00+C16D*R.DPI8N(-1)+
      C16B*D71.00*R.DPI8N(-1)+C16C*WEALTH(-1)*POP(-1)

220:  EL99 = ELED+ELNED1+ELBD+RLTX+RLTFPX+RLTMS


225:  ELEDCP = C15A+C15B*ELED

226:  ELPERS = C12A+C12B*(EL99-ELEDCP-ELBD)

227:  WSGL = C13A+PC13C*D81.00+C13B*(ELPERS+ELPERS(-1))

228:  GOBONDL = GOBONDL(-1)*(1+GRUSCPI+GRDIRPU)

229:  SLGEXP == EX99S+EL99-RLT99

230:  BALOCAL == RL99-(EL99-ELBD)

231:  BALLANDS == BALOCAL+BALCAB
```

B.4. Input Variables

A value for each of these variables for each year of simulation must be entered by the user.

POLICY INPUTS

Values for these variables are likely to change from one simulation to the next.

Employment

*EMAGRI	agriculture
*EMCNX1	high wage (enclave) exogenous construction
*EMCNX2	normal wage exogenous construction
*EMFISH	fish harvesting
*EMGC	civilian federal government
*EMGM	military active duty
*EMMX1	high wage exogenous manufacturing
*EMMX2	sectoral average wage exogenous manufacturing
*EMP9	mining (including petroleum)
*EMT9X	exogenous part of transportation

State Expenditures

EXBOND	proportion of capital expenditures financed by bonds
EXDFPCNT	development fund withdrawal rate
EXDF1	development fund contribution rate
EXPFBAK	Permanent Fund reinvestment rate
EXPFCONX	extraordinary Permanent Fund contribution
EXPFDIST	Permanent Fund distribution rate
EXPF1	Permanent Fund contribution rate
EXPRPER	percent adjustment to state personnel expenditures in expansionary years
EXSAVX	savings out of current revenues
EXSPCAP	special capital expenditures
EXSPLITX	operation expenditures as a proportion of total
EXSUBS1	subsidies

*May be provided by scenario generator model if desired.

Growth Rates[a]

GRDIRPU	U.S. disposable income per capita
GRRWEUS	U.S. real average weekly earnings
GRUSCPI	U.S. consumer price index

Local Revenues

RLPTX	exogenous property taxes
RLTFPX	petroleum-related federal transfers
RLTX	unspecified state-local transfers

State Petroleum Revenues

*RPBS	bonus payments
*RPPS	property taxes
*RPRY	rents and royalties
*RPTS	severance taxes
RP9X	unspecified revenues
RSFDNPX	petroleum-related federal-shared revenues
*RTCSPX	petroleum corporate income tax

State Nonpetroleum Revenues

RSFDNX	exogenous federal-state transfers
RTCSX	exogenous corporate income tax

Miscellaneous

*TOURIST	tourist visitors
UUS	U.S. unemployment rate
XXMX2	gross product in low-wage exogenous manufacturing

---

*May be provided by scenario generator model if desired.

[a]Used only with certain fiscal rule options:
GREXCAP - state capital expenditures
GREXOPS - state operating expenditures
GRRPCEX - real per capita state expenditures
GRSSCP - state per capita capital stock

OTHER EXOGENOUS INPUTS

Values for these variables are less likely to vary across simulations.

Dummy Variables

D.gg	A dummy variable with a value of unity in the year gg only
D.gg.hh.	A dummy variable with a value of unity from year gg to year hh
D.ggDECj	A dummy variable with a value of unity in year gg and declining to zero in j years

Initial Values

BALgg1	Known historical values for the balance in the state fund gg
BIU1	Known historical values for basic instructional unit for allocating state education funds to districts
EXaaa1	Known historical values for state expenditure category aaa
PDUSCPI1	Known historical values for USCPI
PR.DPIU1	Known historical values for real per capita disposable income in U.S.
VAEX1	Known historical values for exemption value on federal income tax
WEUS1	Known historical values for U.S. average weekly earnings

Impact Variables

BASaaaa or BASEaaaa	Values from a previously run "base case" used in certain impact study calculations

State Personal Income Tax Variables

RTISXX	Adjustment of disposable income to cover lag in refund of state personal income taxes after repeal
TCRED	Individual tax credit beginning after 12/31/77
TXBASE	Change in the floor of personal income tax rate schedule
TXCRPC	State personal income tax credit adjustment
TXPTXX	Allows model user to withold from state expenditures a portion of any personal income tax reduction
TXRT	Percentage change in state personal income tax rate

Native Income Variables

ANCSA	Payment to Alaska Natives by federal and state government under Alaska Native Claims Settlement Act (ANCSA)
EMNATX	Native employment rate obtained from the income distribution model
NCBP	Bonus income to Natives from lease sales on Native lands
NCRP	Native recurrent income from petroleum development on Native lands
PCNC1	Proportion of ANCSA payments paid directly to individuals
PCNC2	Proportion of recurring income from petroleum development on Native lands paid directly to individuals
PCNC3	Proportion of earnings on Native Corporation accumulated capital paid directly to individuals
RNATX	Native personal income calculated using the income distribution model
SANCSA	Payment to Alaska Natives by state government under ANCSA

Miscellaneous Exogenous Variables

BADD	Adjustment factor to account for birth of Native children to non-Native women

EXDSSX	Annual debt service payment to service general obligation bonds outstanding at beginning of simulation period
GODTX	General obligation bonded indebtedness of the state from debt incurred before 1983
LPTRAT	Percentage of pipeline property within local jurisdictions actually subject to local tax because of limitations imposed by state statutes
PCOLART	The cost of living differential for federal employees
PIPADJ	Ratio of "enclave" to regular construction wage rate
P9PTPER	Percentage of petroleum property which is taxable by state which falls within local taxing jurisdiction
YR	Year

B.5. Variable and Parameter Name Conventions

Prefixes

A prefix not followed by a period indicates a variable within a general category.

BALaaa	State government fund balance
BASaaaa	Base level for a variable (used only in certain impact analyses)
CEaaN	Proportion of Native employment in industry aa
DPIaaa	Disposable personal income
ELaaa	Local government expenditure
EMaaa	Employment
EXaaa	State government expenditure variable
EXPRaaa	State government personnel expenditures
GRaaa	Growth rate
NCaaa	Native claims variable
NEMaaN	Native employment
NWSaaN	Native wages and salaries
PDaaa	Price index
PIaaa	Personal income
POPaaa	Population aggregate
Raaa	State government revenue (except RLaaa)
RLaaa	Local government revenue
UNaaa	Unemployment
WRaaa	Average annual wage rate
WRGaa	Average annual wage rate growth rate
WSaaa	Wages and salaries
XXaaa	Gross product

A prefix followed by a period and a variable name indicates the variable is operated on in the manner dictated by the prefix.

D.aa.aa	Dummy variable with a value of unity for the indicated range of years

DF.aaaa	Variable deflated to 1982 base-year dollars (PDRPIBAS is base-year index)
EM.aaaa	Variable is a proportion of total employment (EM99)
EX.aaaa	Variable is a proportion of total state general fund expenditures (restricted and unrestricted) including Permanent Fund dividends (EXGF) but excluding special Permanent Fund contributions
EXBM.aaa	Variable is a proportion of total state general fund expenditures (unrestricted) including Permanent Fund dividends plus special Permanent Fund contributions (EXGFBM)
G.aaa	Change in the level of the variable from the previous year
IM.aaa	Variable is difference calculated from a previously run simulation with outputs specified by exogenous variables with prefix BAS
INDEX.aa	A specially constructed variable for monitoring model simulation behavior
P.aaa	Variable in per capita terms (POP)
PI.aaaa	Variable is a proportion of personal income (PI)
POP.aaa	Variable is a proportion of population (POP)
PR.aaa	Variable in real per capita terms (deflated using PDRPI where 1967 US = 100)
R.aaa	Variable is deflated to 1967 US price level (PDRPI)
RL99.aaa	Variable is a proportion of total local revenues
RN.aaa	Variable is proportion of total state general and Permanent Fund revenues net of regular and special Permanent Fund contributions as well as reinvested Permanent Fund earnings (R99SNT)
RS.aaaa	Variable is a proportion of total state general and Permanent Fund revenues (R99S)
RSBM.aaa	Variable is a proportion of unrestricted state general fund revenues net of regular Permanent Fund contributions (RSGFBM)

Suffixes

a. Industries: used with employment (EMaa), wage rate (WRaa), wages and salaries (WSaa), and gross state product (XXaa).

AGRI	Agriculture
A9	Agriculture-Forestry-Fishery
CM	Communications
CN	Construction
CNNP	Nonpipeline Construction
CNP	Pipeline Construction (Premium Wage, Enclave)
CU	Communications
DR	Retail Trade
DW	Wholesale Trade
D9	Total Trade
FI	Finance-Insurance-Real Estate
FISH	Fish Harvesting
AFISH	Fish Harvesting-Wages and Salary Component
GA	State and Local Government
GC	Federal Civilian Government
GF	Federal Government (Military plus Civilian)
GL	Local Government
GM	Military
GS	State Government
GSFY	State Government (Fiscal Year)
M9	Manufacturing
M9P	Exogenous Premium Wage Manufacturing
MO	Endogenous Manufacturing
PRO	Proprietor
PROFIS	Proprietor-Fish Harvesting Component
PU	Public Utilities
P9	Mining
S9	Total Services
SB	Business Services
SP	SUP + TCU
SUP	Trade, Finance, Service
TCU	Transport, Communication, Public Utilities
T9	Transportation
TOUR	Tourism
DTOUR	Tourism-Retail Trade
STOUR	Tourism-Services
TTOUR	Tourism-Transportation

00	Unclassified
96	Total Civilian (Non-Ag. Wage & Salary plus Proprietors)
97	Total Non-Ag. Wage and Salary
98	Total Non-Ag. Wage & Salary Plus Military
99	Grand Total
NT	Non-Tourism

b. Components of Income: used with personal income (PIaa)

DIR	Dividends, Interest, Rent
OLI	Other Labor Income
PRO	Proprietor Income
PRO1	Nonfishing Proprietor Income
PROF	Fishery Proprietor Income
RADJ	Residence Adjustment
SSC	Personal Contributions to Social Security
TRAN	Transfers
WS	Wages and Salaries
3	Personal Income Net of Enclave Employment Income
8	Personal Income plus Residence Adjustment

c. State Expenditures by major program categories: used with expenditures (EXaa) and personnel expenditures (EXPRaa)

CDS	Development
EDS	Education
GGS	General Government
HES	Health and Social Services
GF	General Fund
GFBM	Unrestricted General Fund
DF	Development Fund (hypothetical)
PF	Permanent Fund
JUS	Justice
NRS	Natural Resources
PPS	Public Protection
SSS	Social Services
TRS	Transportation
UA	University of Alaska

d. Special Suffixes

99 or 9	A grand total
1	A component of the total variable, or an exogenous initial value
8	A component of the total variable
4	A preliminary estimate of the value for a variable prior to application of a ratio
X	An exogenous variable

B.6. Parameter Definitions, Values, and Sources

Caab	-	a stochastic coefficient, where aa is a number associated with a particular equation and b is a letter associated with the position within the equation	-
EXANNU	800	if EXRLOP8 is in effect, the amount of the annual annuity which contributes to funding state operating expenditures; million $	set by model user at level consistent with continued positive state treasury balance and maximum expenditure levels
EXCAPIMP	.1432	per capital impact state capital expenditure used with fiscal rule EXRL4	Goldsmith and Mogford, The Relationship Between the Alaska Natural Gas Pipeline & State & Local Government Expenditures
EXCAPOLD	100	state spending to replace capital stock put in place prior to 1984	Department of Administration, Annual Financial Report
EXEL1	1	elasticity of state expenditures with respect to population	set by model user; default value consistent with idea that expenditures rise with population
EXEL2	1	elasticity of state expenditures with respect to prices	set by model user; default value consistent with idea that expenditures rise with prices
EXEL3	1	elasticity of state expenditures with respect to real per capita personal income	set by model user; default value assumes state operating expenditures neither inferior or superior good
EXEL4	0	elasticity of state expenditures with respect to personal income	set by model user; default value assumes state expenditures are inferior goods
EXEL5	0	elasticity of state expenditures to personal income net of "enclave" employment-related income (PI3)	set by model user; default value assumes state expenditures are inferior goods
EXEL6	0	elasticity of state expenditures to population net of "enclave" construction employment	set by model user; default value assumes state expenditures are inferior goods
EXLIM82	2500	constitutionally mandated 1982 spending limit; million $	current law
EXOMCOST	.15	annual operations and maintenance cost of incremental state capital stock as a percentage of original cost	author's estimate

EXOPSIMP	7.678	per capita impact state operation expenditure used with fiscal rule EXRL4	Goldsmith and Mogford, The Relationship Between the Alaska Natural Gas Pipeline and State and Local Government Expenditures
EXRL1	0	policy switch for determination of state expenditure growth based primarily upon aggregate demand variables, including prices, population, and income	set by model user; default value zero
EXRL2	0	policy switch for determination of state expenditure growth based upon a specified exogenous growth rate	set by model user; default value zero
EXRL3	0	policy switch for determination of state expenditure growth based upon a specified growth rate in real per capita operating expenditures and real per capita level of capital stock	set by model user; default value zero
EXRL4	0	policy switch for determination of state expenditure growth based upon a specified expenditure level per impact individual (for use in impact analysis)	set by model user; default value zero
EXRL4OP	0	policy switch used with EXRL4 with value of one if enclave construction employment not counted in impact population	set by model user; default value zero
EXRL5	1	policy switch for determination of state expenditure growth based upon constitutionally imposed spending limit	set by model user; default value one
EXRLOP6	0	policy switch for determination of state operating expenditure growth based upon annual change in level of general fund balance	set by model user; default value zero
EXRLOP7	0	policy switch for determination of state expenditure growth based upon saving a specified amount (EXSAVS)	set by model user; default value zero

EXRLOP8	0	policy switch for determination of state operating expenditure growth based upon spending an annuity (EXANSAV)	set by model user; default value zero
P1-P6	0,0,0,1,1,1	variables to facilitate printing population distribution model results; units	values internal to model to allow income distribution model to work
PAD1	.7	proportion of population aged 5 to 19 attending district schools; percent	Department of Education, Annual Financial Report, and population model
PAD2	.082	proportion of population aged 5 to 19 attending REAA schools; percent	Department of Education, Annual Financial Report, and population model
PADJ	1.5	ratio of premium (WRM9P) to low wage (WRM91) in manufacturing sector	Department of Labor (DOL), Statistical Quarterly
PARLVFV	.919	ratio of local value to full value of local property according to state appraiser; percent	average of past values from Alaska Dept. of Community and Regional Affairs, Alaska Taxable
PARNONGF	.2	proportion of University of Alaska revenues not from the general fund; percent	Department of Administration, Executive Budget
PBLTBL	.13	proportion of gross business receipts taxable after 1978 tax law change; percent	ratio of predicted receipts under new law and old law using information from Alaska Dept. of Revenue, Commissioner's Newsletter (under new law, only banks, trusts, and savings & loans taxed)
PBTRATE	.000025	state business license tax rate; million $ per business	existing state tax law
PC12N	.922	proportion of ANCSA payments made to 12 regional Native corporations in Alaska; percent	2(c) Report: Federal Programs and Alaska Natives by Robert Nathan Assoc. for U.S. Department of Interior
PC12RN	.833	proportion of members of 12 regional Native corporations residing in Alaska; percent	2(c) Report: Federal Programs and Alaska Natives by Robert Nathan Assoc. for U.S. Department of Interior

PC13C	-55	exogenous adjustment to force consistency between local government personnel expenditures and wages and salaries	DOL Statistical Quarterly and Alaska Economic Trends and U.S. Department of Commerce Governmental Finances
PC39A	.5	miscellaneous employment within agriculture-forestry-fisheries industrial category; thousand	DOL Statistical Quarterly
PC39B	.003	forestry employment in agriculture-forestry-fisheries as proportion of manufacturing employment	DOL Statistical Quarterly
PCINDA	.1	proportion of gap between average industry employment share and Native industry employment share that is closed within one time period; percent	author's estimate
PCIVPY	.65	ratio of military to federal civilian wage rate	Alaska Department of Labor, Statistical Quarterly, and U.S. Dept. of Commerce, Bureau of Economic Analysis personal income data
PCNC4	0	proportion of bonus income from lease sales on Native lands paid directly to individuals	author's estimate
PCNCSV	.5	proportion of Native corporation income used for investment	author's estimate
PCNCSV1	1	proportion of bonus income from lease sales on Native corporation lands and retained by Native corporations which is used for investment	author's estimate
PCNCWS	.25	proportion of current expenditures of Native Corporations paid in wages and salaries	author's estimate
PCWS1	.9	ratio of state government wage and salary payments to personnel expenditures	Alaska Department of Labor, Statistical Quarterly, and Alaska Dept. of Administration, Executive Budget
PCYNA1	1.01545	proportion by which the ratio of personal income to wages and salaries for Natives exceeds that of the total population	1970 U.S. Census, public use samples
PDRPIBAS	364.23	1982 Alaskan price level using 1967 U.S. as base; index	variable PDRPI in database

PECIG	.625	proportion of cigarette tax receipts paid to special fund; percent	existing state tax law
PERNA1	0	proportion of change in state employment rate reflected in change in Native employment rate; percent	author's estimate
PERNA2	.005	proportion of gap between Native and state employment rates that is closed in one year; percent	author's estimate
PERNA3	1	percentage of Native corporation jobs held by Natives; percent	author's estimate
PESLT	.4	proportion of "other" state taxes shared with local government; percent	existing state tax law
PESLTC	.1	proportion of state corporate income tax shared with local government; percent	existing state tax law
PFISH1	.97	percentage of fish harvesting employment reported as proprietors	DOL Statistical Quarterly, BEA employment data, and G. Rogers, Measuring the Socioeconomic Impact of Alaska's Fisheries
PIDIST	0	model switch which results in retrieval of Native employment and wages and salaries from income distribution model if value of one is chosen	-
PNTGR	.02	gross receipts per business exempt from state gross receipts tax; million $	existing state tax law
PRINT2	0	variable from income distribution model which allows results to be printed if value of one is chosen	-
PTOURB	-4.75	intercept term on tourist industry employment equation	Improvements to Specification of the MAP Model, ISER, January 1982
PTOURD	.4	proportion of tourist industry employment in trade	Improvements to Specification of the MAP Model, ISER, January 1982
PTOURE	1	elasticity of tourism employment to growth in number of tourists	Improvements to Specification of the MAP Model, ISER, January 1982

PTOURS	.4	proportion of tourist industry employment in services	Improvements to Specification of the MAP Model, ISER, January 1982
PTOURT	.2	proportion of tourist industry employment in transportation	Improvements to Specification of the MAP Model, ISER, January 1982
PTRTS	.02	tax rate on state petroleum-related property; percent	existing state tax law
PWRBASE	5473	1967 U.S. average wage paid in government	1967 state government and employment data from U.S. Department of Commerce, Bureau of Economic Analysis
ROR	.02	real rate of return on general fund balance; percent	author's estimate
RORANGRO	.08	rate at which state operating expenditure annuity grows; percent	set by model user in conjunction with EXANNU
RORCPDEP	.03	real rate of depreciation of state capital; percent	author's estimate
RORCRF	.08	capital recovery factor for calculating annual servicing of state general obligation bonded debt; percent	with r=.05 and n=20 years, the formula for capital recovery factor is $(r(1+r)^n/((1+r)^n-1))$. Assuming r=.05 and n=20, this yields .08.
RORDISK	.02	discount rate applied to future petroleum revenues to calculate present value in 1982 dollars (DF.RSVP)	author's estimate
RORNC	.07	nominal rate of return on accumulated capital of Native Corporations	author's estimate
RORPDF	0	real rate of return premium applied to development fund over general fund; percent	author's estimate
RORPPF	.01	real rate of return premium applied to Permanent Fund over general fund; percent	author's estimate

B.7. Model Validation and Properties

Several types of analyses are done to test the validity of the MAP model.

Statistical Tests

Statistical tests are normally applied to the stochastic equations of the model. All stochastic equations in the MAP model are estimated using ordinary least squares regression. Two-staged least squares estimations have been found in the past not to change significantly the results of simulations. In general, specifications for these equations are chosen which have good predictive qualities (R^2, standard error of regression) and structural properties (t tests, F test). Sometimes, however, it is necessary to compromise on the quality of the statistical tests of the model to obtain an equation specification which does well in simulation. This is because when simulating with all the equations together in a model, equations that appear correct may not always interact to produce reasonable results.

Individual equation statistical tests are applied during estimation. At the same time, the stability of the structure of the individual equations can be reviewed. As might be expected in the rapidly evolving Alaskan economy, the structures of some equations may need to be altered over time.

Historical Simulation

Second, the model is tested by seeing how accurately it can predict the actual historical data upon which it is based (ex post forecast). There are no formal statistical tests of this capability except that a model that comes closer to the actual historical values is better. One value of this test is that it indicates variables or sections of the model which may require additional attention.

The results of historical simulation of the current version of the MAP model are presented in Table B.7 for the most important endogenous variables of the model: personal income, wages and salaries, and employment.

The results are presented for each variable in terms of a MAPE value, which is the mean-absolute percent error of the predicted value from the actual value. The results for the MAP Alaska model fall within the range reported for other regional econometric models, and the pattern of forecast errors and percent errors shows that the model has been successful in tracking a historical period during which significant growth and structural change occurred.

TABLE B.7. HISTORICAL SIMULATION OF ECONOMIC MODULE

Personal Income (million $)

	Historical Data	Simulated Value	Error	Percent Error
1965	827.373	861.26	33.887	4.096
1966	894.177	923.523	29.345	3.282
1967	987.882	1000.51	12.624	1.278
1968	1068.36	1093.87	25.509	2.388
1969	1215.8	1214.67	-1.125	-0.093
1970	1388.01	1309.01	-78.999	-5.692
1971	1519.28	1459.68	-59.595	-3.923
1972	1677.57	1660.58	-16.991	-1.013
1973	1958.88	1939.59	-19.287	-0.985
1974	2391.46	2292.36	-99.098	-4.144
1975	3454.69	3372.21	-82.486	-2.388
1976	4128.95	4450.14	321.195	7.779
1977	4260.16	4439.79	179.625	4.216
1978	4324.	4358.82	34.816	0.805
1979	4554.4	4797.93	243.535	5.347
1980	5030.13	4972.16	-57.977	-1.153
1981	NA	5455.23	NA	NA
Mean	2480.07	2682.43	29.061	0.613
Root Mean Squared	2889.19	3146.19	119.69	3.678*
Standard Deviation	1530.72	1694.7	119.917	3.745

*Root mean squared error.

TABLE B.7. HISTORICAL SIMULATION OF ECONOMIC MODULE

Wages and Salaries (million $)

	Historical Data	Simulated Value	Error	Percent Error
1965	721.2	756.722	35.523	4.926
1966	770.5	809.511	39.011	5.063
1967	851.7	874.314	22.614	2.655
1968	929.5	952.832	23.332	2.51
1969	1072.4	1058.19	-14.214	-1.325
1970	1203.2	1134.05	-69.15	-5.747
1971	1308.4	1268.82	-39.576	-3.025
1972	1444.	1450.06	6.058	0.42
1973	1566.9	1590.61	23.712	1.513
1974	2110.8	2003.72	-107.08	-5.073
1975	3412.9	3407.91	-4.992	-0.146
1976	4236.	4450.74	214.742	5.069
1977	3787.61	3935.48	147.877	3.904
1978	3600.07	3553.85	-46.22	-1.284
1979	3802.52	3977.59	175.064	4.604
1980	4219.91	4037.99	-181.923	-4.311
1981	NA	4444.2	NA	NA
Mean	2189.85	2335.68	14.049	0.61
Root Mean Squared	2563.85	2733.04	98.85	3.689*
Standard Deviation	1377.11	1462.87	101.055	3.758

*Root mean squared error.

TABLE B.7. HISTORICAL SIMULATION OF ECONOMIC MODULE

Nonagriculture Wage and Salary Employment
(thousands)

	Historical Data	Simulated Value	Error	Percent Error
1965	70.529	70.406	-0.123	-0.174
1966	73.195	73.975	0.78	1.066
1967	76.784	78.03	1.246	1.622
1968	79.803	81.068	1.265	1.585
1969	86.563	84.817	-1.746	-2.017
1970	92.465	88.837	-3.628	-3.924
1971	97.584	94.048	-3.536	-3.624
1972	104.243	100.943	-3.3	-3.165
1973	109.849	106.885	-2.964	-2.698
1974	128.164	121.019	-7.144	-5.574
1975	161.315	154.893	-6.422	-3.981
1976	171.185	169.594	-1.591	-0.929
1977	164.063	159.556	-4.507	-2.747
1978	163.293	157.095	-6.198	-3.796
1979	166.406	160.898	-5.508	-3.31
1980	169.609	166.281	-3.328	-1.962
1981	177.	173.503	-3.497	-1.976
Mean	123.062	120.109	-2.953	-2.094
Root Mean Squared	129.3	125.981	3.906	2.917*
Standard Deviation	40.9	39.186	2.635	2.093

*Root mean squared error.

Sensitivity Analysis

The sensitivity of simulation results to changes in parameter and exogenous variable values has been investigated. The model is sensitive to the elasticity of the support sector, government spending levels, the labor force participation rate, and the real wage rate growth as well as to the exogenous employment variables.

Simulation Tests

After these foregoing tests have been made, the model is run under different conditions to assess its reasonableness and stability in as many types of situations as possible as well as its ability to identify turning points. These tests include straight simulation, impact analyses, simulation under conditions of no growth, and simulation under conditions of decline. Certain variables are monitored to make sure that their values remain within a reasonable range.

Several ratios which are closely monitored are shown in Table B.8 for a typical simulation. The civilian employment rate (EMRATE) holds fairly constant and jumps during boom periods. The ratio of disposable-to-total personal income (PI.DPI) trends downward except during boom periods. The Alaskan price index relative to the United States (PDRATIO) trends downward but ratchets up during boom periods. The ratio of price-adjusted personal income per capita in Alaska to the United States (INDEX.DI) jumps during booms but eventually falls below one as it has been historically. The ratio of the real wage in Alaska to the United States trends upward slightly (INDEX.WG). The ratio of wage and salary to total income falls (PI.WS98). The ratios of support (EM.EMSUP) and infrastructure (EM.EMTCU) employment to total employment show continued growth. The ratios of support (INDEX.S1) and infrastructure (INDEX.S2) employment to Alaskan real disposable personal income are relatively stable.

TABLE B.8. VARIABLES USED TO MONITOR SIMULATION

	EMRATE	PI.DPI	PDRATIO	INDEX.DI	INDEX.WG	PI.WS98
1982	0.504	0.823	1.262	1.05	1.521	0.8
1983	0.506	0.822	1.244	1.014	1.535	0.837
1984	0.497	0.821	1.232	0.983	1.472	0.814
1985	0.499	0.82	1.219	0.962	1.431	0.808
1986	0.502	0.819	1.209	0.941	1.391	0.803
1987	0.501	0.818	1.204	0.917	1.353	0.798
1988	0.502	0.817	1.2	0.892	1.362	0.82
1989	0.498	0.796	1.199	0.863	1.369	0.819
1990	0.499	0.794	1.253	0.85	1.382	0.834
1991	0.49	0.793	1.254	0.844	1.363	0.81
1992	0.501	0.791	1.238	0.845	1.404	0.843
1993	0.494	0.79	1.234	0.834	1.391	0.828
1994	0.489	0.79	1.229	0.832	1.368	0.804
1995	0.487	0.789	1.224	0.828	1.361	0.797
1996	0.487	0.788	1.217	0.825	1.359	0.793
1997	0.487	0.786	1.21	0.822	1.362	0.791
1998	0.486	0.785	1.204	0.819	1.362	0.787
1999	0.486	0.784	1.197	0.816	1.364	0.785
2000	0.485	0.783	1.19	0.813	1.366	0.782
2001	0.485	0.782	1.183	0.811	1.369	0.78
2002	0.485	0.781	1.176	0.809	1.373	0.779
2003	0.485	0.78	1.169	0.808	1.379	0.778
2004	0.486	0.778	1.161	0.807	1.384	0.776
2005	0.487	0.777	1.153	0.806	1.388	0.775
2006	0.487	0.776	1.145	0.805	1.392	0.774
2007	0.488	0.775	1.136	0.803	1.396	0.773
2008	0.488	0.774	1.128	0.801	1.4	0.773
2009	0.489	0.772	1.12	0.798	1.403	0.772
2010	0.489	0.771	1.111	0.796	1.407	0.771

SOURCE: HE.9

KEY: See text.

TABLE B.8. VARIABLES USED TO MONITOR SIMULATION
(continued)

	INDEX.S1	INDEX.S2	EM.EMTCU	EM.EMSUP
1982	0.046	0.012	0.083	0.315
1983	0.048	0.012	0.081	0.322
1984	0.05	0.012	0.082	0.33
1985	0.051	0.013	0.083	0.334
1986	0.052	0.013	0.083	0.336
1987	0.052	0.013	0.084	0.335
1988	0.053	0.013	0.084	0.334
1989	0.053	0.013	0.083	0.334
1990	0.053	0.013	0.084	0.334
1991	0.053	0.013	0.082	0.339
1992	0.053	0.013	0.084	0.339
1993	0.053	0.013	0.083	0.346
1994	0.053	0.013	0.087	0.352
1995	0.053	0.013	0.087	0.358
1996	0.053	0.013	0.088	0.362
1997	0.053	0.013	0.089	0.367
1998	0.053	0.013	0.09	0.373
1999	0.053	0.013	0.09	0.378
2000	0.053	0.013	0.091	0.384
2001	0.054	0.013	0.091	0.389
2002	0.054	0.012	0.092	0.395
2003	0.054	0.012	0.092	0.4
2004	0.054	0.012	0.092	0.406
2005	0.054	0.012	0.093	0.411
2006	0.054	0.012	0.093	0.417
2007	0.054	0.012	0.093	0.422
2008	0.054	0.012	0.093	0.428
2009	0.054	0.012	0.093	0.434
2010	0.054	0.012	0.094	0.439

SOURCE: HE.9

KEY: See text.

Table B.9 shows the results of a no-growth, or flat projection done to test the stability of the model. In this projection, the values for all exogenous variables associated with basic sectors of the economy are set at constant levels. State government growth is also assumed to be zero. Any growth in economic activity in the absence of changes in these variables comes about as a result of one of two things. First, real wage rate increases necessary to maintain parity with real wage rate growth elsewhere in the United States will lead to some increase in disposable personal income in the absence of employment growth. Second, some activities which have not bee explicitly identified as basic sector in the economic scenario will continue to trend upward.

This case is unrealistic, both in its assumptions of no growth and of a continuation of wage rate parity with the rest of the United States in a no-growth regional economy. Nevertheless, the simulation is important because it allows us to investigate what the simulation properties of the model are independent of and underlying any particular economic scenario.

In general, in such a simulation, one would expect some growth, but not a large amount. This is, in fact, what we observe. After about 1984, when government spending finally flattens out, employment holds fairly constant. In fact, private sector employment is growing; while public sector employment is falling as rising costs squeeze employment out of a constant-level budget. Population grows slowly, but the dependency ratio increases significantly. Thus, a rising real wage rate is offset to yield a fairly constant level of real per capita disposable personal income. There is no formal standard against which to measure this case except reasonableness, economic theory, and the experience of other regions. By these criteria, the simulation appears satisfactory.

TABLE B.9. NO-GROWTH PROJECTION RESULTS

	POP	EM99	POPMIG	POPNI9	DP13R
1980	401.362	203.217	-7.4	6.482	1359.48
1981	411.889	209.592	4.398	6.111	1402.16
1982	424.128	217.695	6.031	6.209	1459.44
1983	430.574	219.62	0.093	6.356	1479.34
1984	436.014	220.637	-0.829	6.261	1494.63
1985	440.699	221.032	-1.474	6.15	1506.18
1986	444.81	221.009	-1.926	6.026	1515.18
1987	448.634	220.876	-2.086	5.898	1523.73
1988	452.308	220.763	-2.116	5.777	1532.67
1989	455.854	220.68	-2.136	5.669	1542.04
1990	459.328	220.667	-2.112	5.572	1552.06
1991	462.745	220.728	-2.085	5.488	1562.83
1992	466.104	220.849	-2.069	5.414	1574.21
1993	469.43	221.045	-2.037	5.349	1586.31
1994	472.719	221.303	-2.017	5.292	1599.04
1995	475.981	221.626	-1.993	5.241	1612.41
1996	479.22	222.01	-1.971	5.195	1626.41
1997	482.439	222.459	-1.949	5.153	1641.09
1998	485.635	222.96	-1.933	5.113	1656.32
1999	488.818	223.523	-1.909	5.075	1672.18
2000	491.974	224.131	-1.899	5.038	1688.55

KEY: POP Population
EM99 Employment
POPMIG Net migration
POPNI9 Natural Increase
DP13R Real disposable income

Model run: January 1982 using an earlier version of economic model.

TABLE B.9. NO-GROWTH PROJECTION RESULTS
(continued)

	DPIXR	EMGA	DPIRPC	EMRATE	PDRATIO
1980	0.	37.282	3388.3	0.476	1.296
1981	0	41.522	3404.12	0.48	1.293
1982	0.	45.884	3441.18	0.485	1.289
1983	0.	46.072	3435.74	0.482	1.289
1984	0.	45.931	3427.97	0.479	1.288
1985	0.	45.732	3417.75	0.474	1.288
1986	0.	45.307	3406.28	0.469	1.288
1987	0.	44.841	3396.31	0.465	1.288
1988	0.	44.391	3388.48	0.461	1.288
1989	0.	43.936	3382.67	0.457	1.288
1990	0.	43.497	3379.04	0.453	1.288
1991	0.	43.073	3377.36	0.45	1.288
1992	0.	42.655	3377.44	0.447	1.288
1993	0.	42.255	3379.29	0.444	1.288
1994	0.	41.864	3382.7	0.441	1.288
1995	0.	41.486	3387.62	0.438	1.288
1996	0.	41.118	3393.95	0.436	1.288
1997	0.	40.763	3401.6	0.434	1.287
1998	0.	40.417	3410.58	0.432	1.287
1999	0.	40.084	3420.8	0.43	1.287
2000	0.	39.756	3432.14	0.429	1.287

KEY: DPIXR Real disposable income associated with premium wage construction employment
EMGA State and local government
DPIRPC Real disposable income per capita
EMRATE Civilian employment rate
PDRATIO Alaskan relative price index

Model run: January 1982 using an earlier version of economic model.

Some Properties of the New Model

Important properties of the model can be observed by examining select impact experiments. Table B.10 shows the results of a one-time increase in construction employment of 1,000 in 1984. The upper portion of the table is premium wage, remote site, and enclave employment (EMCNX1), while the lower is regular construction (EMCNX2). This exercise, although unlikely to be encountered in any actual situation, demonstrates several model features.

First, the size of the employment impact multiplier is demonstrated to be 1.48 for regular construction and 2.33 for special construction. It can be shown by further impact tests that the impact multiplier for other basic sectors is smaller. For example, for federal government employment, it is approximately 1.4. Thus, the size of the impact multiplier varies with the type of basic (or exogenous) change which occurs, and its value is within a reasonable range. The total employment effect includes, in addition to the direct employment, the indirect employment (which an I-O analysis would measure), the induced employment (which an augmented I-O model that included consumer spending would measure), the investment effect (which is endogenous to the MAP model but treated as exogenous in most models including I-O models), and the structural change effect. This last effect consists of new types of activities stimulated by changing economic opportunities produced by the direct employment. A static model would capture only the first or the first and second components of nondirect employment, and a growth model is necessary to capture all effects. The MAP model does this.

Second, if the exogenous change is not sustained, the employment impact will not be sustained but will diminish over time and eventually disappear. The total effect is felt over a period of several years rather than instantaneously. Population impact is dissipated more slowly than employment.

Table B.11 presents a more likely time pattern for exogenous impact--that of the construction of the natural gas pipeline.

In contrast to these impact multipliers, a final impact analysis, reported in Table B.12, shows the effect of an increase in construction employment of 1,000 sustained in all future years. This clearly puts the economy onto a new long-run growth trajectory after about four years. The employment and population responses are larger than in the case of an impulse-type impact because the higher level of activity is permanent and causes a permanent response in other sectors of the economy.

TABLE B-10. IMPACTS OF A ONE TIME INCREASE
IN CONSTRUCTION EMPLOYMENT
(thousands)

Premium Wage, Remote Site, Enclave Employment (EMCNX1)

	EMCNX	EMCN	EMTCU	EMSUP	EMGA	EM99	POP
1984	1.	1.302	0.164	0.602	0.112	2.332	2.23
1985	0.	0.143	0.011	0.163	0.023	0.366	1.374
1986	0.	0.013	0.029	0.2	0.065	0.329	0.836
1987	0.	0.007	0.016	0.125	0.062	0.227	0.69
1988	0.	0.006	0.013	0.096	0.041	0.167	0.597
1989	0.	0.002	0.005	0.046	0.02	0.08	0.471
1990	0.	0.001	0.004	0.03	0.008	0.046	0.392
1991	0.	0.001	0.002	0.018	0.006	0.029	0.326
1992	0	0.	0.001	0.011	0.002	0.016	0.279
1993	0.	0.	0.001	0.006	-0.001	0.006	0.219

Regular Construction Employment (EMCNX2)

	EMCNX	EMCN	EMTCU	EMSUP	EMGA	EM99	POP
1984	1.	1.066	0.061	0.191	0.06	1.482	1.415
1985	0.	0.026	0.017	0.326	0.046	0.444	0.947
1986	0.	0.012	0.029	0.186	0.056	0.304	0.654
1987	0.	0.009	0.02	0.147	0.071	0.264	0.625
1988	0.	0.008	0.019	0.139	0.063	0.246	0.598
1989	0.	0.004	0.007	0.066	0.035	0.12	0.464
1990	0.	0.002	0.006	0.043	0.014	0.07	0.386
1991	0.	0.001	0.004	0.028	0.011	0.048	0.327
1992	0.	0.001	0.002	0.018	0.006	0.03	0.281
1993	0.	0.	0.001	0.01	0.002	0.014	0.223

KEY:
- EMCNX Exogenous construction employment
- EMCN Endogenous construction employment
- EMTCU Transportation/communication/public utility employment
- EMSUP Trade/finance/service employment
- EMGA State/local government employment
- EM99 Total employment
- POP Population

TABLE B.11. GAS PIPELINE CONSTRUCTION IMPACT

	EMCNX	EMCN	EMTCU	EMSUP	EMGA	EM99
1986	0.217	0.273	0.032	0.116	0.013	0.465
1987	0.217	0.296	0.032	0.137	0.017	0.515
1988	0.563	0.731	0.085	0.345	0.046	1.293
1989	2.435	3.113	0.344	1.351	0.184	5.347
1990	7.103	9.195	0.926	4.001	0.538	15.713
1991	10.589	14.162	1.12	6.442	0.942	24.302
1992	6.074	9.09	0.76	5.252	1.513	17.84
1993	0.468	1.661	0.438	3.05	1.453	7.101
1994	0.	0.383	0.439	2.396	1.329	4.89
1995	0.	0.263	0.35	1.77	1.088	3.736
1996	0.	0.226	0.298	1.375	0.882	2.993
1997	0.	0.2	0.264	1.104	0.732	2.477
1998	0.	0.182	0.243	0.93	0.624	2.131
1999	0.	0.168	0.227	0.807	0.541	1.878
2000	0.	0.157	0.216	0.721	0.472	1.689

	POP	R.WR98	PR.PI	HH	WS98
1986	0.446	9.793	0.383	0.154	21.582
1987	0.679	9.094	-0.871	0.235	23.191
1988	1.501	23.039	-0.868	0.52	62.965
1989	5.718	99.77	0.055	1.975	289.434
1990	17.205	279.762	3.57	5.939	959.137
1991	30.176	430.496	-3.852	10.428	1583.71
1992	28.865	243.789	-21.512	10.025	1116.76
1993	19.079	20.273	-37.527	6.703	288.535
1994	15.158	-6.676	-41.664	5.376	156.395
1995	13.52	-4.645	-44.16	4.831	130.207
1996	12.368	-2.711	-46.242	4.454	114.992
1997	11.356	-1.324	-46.492	4.128	105.055
1998	10.465	-0.238	-44.387	3.843	99.582
1999	9.672	0.445	-41.465	3.592	96.094
2000	8.948	0.883	-38.152	3.364	93.887

KEY:
- EMCNX Exogenous construction employment (thousand)
- EMCN Endogenous construction employment (thousand)
- EMTCU Trans/comm/public utility employment (thousand)
- EMSUP Trade/finance/service employment (thousand)
- EMGA State/local government employment (thousand)
- EM99 Total employment (thousand)
- POP Population (thousand)
- R.WR98 Real wage rate (1967 U.S. $)
- PR.PI Real per capita personal income (1967 U.S. $)
- HH Households (thousand)
- WS98 Wages and salaries (million $)

TABLE B.12. IMPACTS OF A SUSTAINED INCREASE IN CONSTRUCTION EMPLOYMENT

Regular Construction Employment (EMCNX2)

	EMCNX	EMCN	EMTCU	EMSUP	EMGA	EM99
1984	1.	1.066	0.061	0.191	0.06	1.482
1985	1.	1.078	0.072	0.5	0.067	1.845
1986	1.	1.077	0.097	0.656	0.128	2.104
1987	1.	1.084	0.111	0.765	0.196	2.315
1988	1.	1.093	0.126	0.871	0.253	2.518
1989	1.	1.097	0.128	0.906	0.281	2.593
1990	1.	1.099	0.131	0.927	0.284	2.625
1991	1.	1.103	0.135	0.949	0.294	2.667
1992	1.	1.104	0.136	0.971	0.297	2.698
1993	1.	1.105	0.139	0.995	0.301	2.733
1994	1.	1.107	0.142	1.016	0.303	2.763
1995	1.	1.109	0.145	1.04	0.304	2.797
1996	1.	1.111	0.148	1.067	0.308	2.836
1997	1.	1.113	0.152	1.096	0.31	2.876
1998	1	1.115	0.155	1.126	0.309	2.915
1999	1.	1.118	0.159	1.158	0.009	2.956
2000	1.	1.121	0.163	1.192	0.309	3.002

	POP	R.WR98	PR.PI	HH	WS98
1984	1.415	21.281	19.082	0.489	55.453
1985	2.299	16.125	14.656	0.797	57.941
1986	2.864	12.871	12.328	0.995	61.668
1987	3.387	10.348	10.133	1.179	65.945
1988	3.874	9.801	9.948	1.351	74.516
1989	4.227	9.75	8.508	1.478	82.012
1990	4.491	9.312	7.113	1.574	94.184
1991	4.73	10.738	6.332	1.663	103.621
1992	4.938	8.539	5.121	1.741	109.957
1993	5.101	9.512	4.969	1.804	119.93
1994	5.267	11.059	4.375	1.869	130.977
1995	5.431	11.691	3.934	1.934	142.215
1996	5.58	12.027	3.594	1.994	154.238
1997	5.717	12.215	3.383	2.051	167.312
1998	5.845	12.629	3.324	2.104	181.758
1999	5.971	12.914	3.305	2.157	197.309
2000	6.095	13.203	3.336	2.209	214.352

KEY: See Table B-11.

TABLE B.12. IMPACTS OF A SUSTAINED INCREASE IN CONSTRUCTION EMPLOYMENT

Premium Wage Remote Site, Enclave Employment (EMCNX1)

	EMCNX	EMCN	EMTCU	EMSUP	EMGA	EM99
1984	1.	1.302	0.164	0.602	0.112	2.332
1985	1.	1.417	0.164	0.726	0.084	2.561
1986	1.	1.397	0.18	0.869	0.148	2.78
1987	1.	1.383	0.181	0.915	0.194	2.865
1988	1.	1.386	0.188	0.957	0.211	2.939
1989	1.	1.388	0.182	0.934	0.213	2.913
1990	1.	1.392	0.176	0.925	0.205	2.894
1991	1.	1.4	0.186	0.932	0.205	2.921
1992	1.	1.406	0.177	0.954	0.202	2.94
1993	1.	1.412	0.161	0.96	0.206	2.94
1994	1.	1.421	0.188	0.996	0.214	3.026
1995	1.	1.43	0.214	1.061	0.221	3.142
1996	1.	1.44	0.226	1.119	0.23	3.238
1997	1.	1.449	0.234	1.176	0.242	3.333
1998	1.	1.459	0.244	1.236	0.253	3.43
1999	1.	1.47	0.253	1.298	0.264	3.531
2000	1.	1.48	0.261	1.362	0.275	3.633

	POP	R.WR98	PR.PI	HH	WS98
1984	2.23	56.863	8.402	0.772	103.055
1985	3.473	52.297	0.773	1.205	109.09
1986	4.088	45.309	-3.73	1.421	111.684
1987	4.515	40.187	-7.793	1.573	113.809
1988	4.874	39.965	-8.058	1.703	123.777
1989	5.111	40.684	-9.258	1.79	133.707
1990	5.299	40.426	-10.047	1.862	152.09
1991	5.49	43.262	-9.523	1.935	166.461
1992	5.673	40.023	-10.582	2.006	176.895
1993	5.74	41.816	-9.949	2.038	191.75
1994	5.939	44.566	-9.496	2.115	210.922
1995	6.179	45.871	-8.863	2.207	231.41
1996	6.388	46.609	-8.32	2.289	252.59
1997	6.587	47.105	-7.734	2.369	275.598
1998	6.786	47.941	-7.004	2.447	301.102
1999	6.991	48.586	-6.273	2.529	328.816
2000	7.199	49.184	-5.555	2.612	358.973

The large size of this impact is due to several factors. First, the measure of exogenous impact in Table B.12 is only construction employment (including engineers, managers, and clerical). The actual construction of a project like a pipeline involves, in addition to construction employees, a substantial support staff in transportation, trade, and services. Thus, the direct employment observed to be directly associated with construction will be larger, by perhaps one-third than the direct construction employment. (For example, only about 68 percent of Alyeska pipeline employment was categorized as construction.) In the model, this support employment appears with indirect support employment. Second in the model, investment is endogenous rather than exogenous, and this increases the size of any impact response because investment activity is a result of an increase in the basic sector. Finally, the model describes the development process within the economy, and this is reflected in impact analysis. The economic development process may be described as an increase in the ratio of support-to-basic activity. Obviously, if the <u>average</u> ratio of support-to-basic employment is increasing, then the <u>incremental</u> or <u>marginal</u> ratio must be <u>above</u> the average ratio.

B.8. Input Data Sources

Individual Items

ANCSA	payment to Alaska Natives by federal and state government under Alaska Native Claims Settlement Act; million $	based on the estimate that $690 million of the original $962.5 million remained to be paid out at the start of 1977. Payments increase when Prudhoe Bay oil production begins and cease in 1981. See Alaska Native Land Claims, Arnold
BADD	birth adjustment factor to account for birth of Native children to non-Native women	zero in simulation
BAL991	initial combined state fund balances; million $	historical data
BALDF1	initial state development fund (hypothetical) balance; million $	historical data
BALGF1	initial state general fund balance; million $	historical data
BALPF1	initial state Permanent Fund balance; million $	historical data
BASEMCNX	a base case vector of EMCNX values used for fiscal impact analysis in conjunction with fiscal policy variable EXRL4	default values all one; alternate values obtained from a base case
BASEPOP	a base case vector of POP values used for fiscal impact analysis in conjunction with fiscal policy variable EXRL4	default values all one; alternate values obtained from a base case
BASEXCAP	a base case vector of EXCAP values used for fiscal impact analysis in conjunction with fiscal policy variables EXRL4	default values all one; alternate values obtained from a base case
BASEXGF	base case expenditure value to be placed in impact run to calculate difference in state expenditures in real per capita terms	default values all one; alternate values obtained from a base case

BASEXOPS	a base case vector of EXOPS values used for fiscal impact analysis in conjunction with fiscal policy variables EXRL4	default values all one; alternate values obtained from a base case
BASPDRPI	base case value of RPI to be input into impact run to calculate difference in state expenditures in real per capita terms; index	default values all one; alternate values obtained from a base case
BIU1	initial value of the Basic Instructional Unit for School Foundations' distribution program; thousand $	zero in simulation
D***	dummy variable taking value of one in year or interval indicated; unit	-
D.80DEC6	dummy variable with value of unity in 1980, tapering off to zero in 6 years, reflecting the fact that Alaskan wage rates are "sticky downward"	-
EMAGRI	agricultural employment component of agriculture/forestry/fisheries (EMA9); thousands	DEVELOPMENT SCENARIO
EMCNX1	"enclave" or premium wage construction employment; thousand	DEVELOPMENT SCENARIO
EMCNX2	non-"enclave" exogenous construction employment; thousand	DEVELOPMENT SCENARIO
EMFISH	fish harvesting employment; thousand	DEVELOPMENT SCENARIO
EMGC	federal civilian employment; thousand	DEVELOPMENT SCENARIO
EMGM	federal military employment; thousand	DEVELOPMENT SCENARIO
EMMX1	premium wage manufacturing employment; thousand	DEVELOPMENT SCENARIO
EMMX2	low wage manufacturing employment; thousand	DEVELOPMENT SCENARIO
EMNATX	Native employment rate obtained from the income distribution model; percent	values derived from income distribution model (currently inoperative)
EMP9	mining employment; thousand	DEVELOPMENT SCENARIO

EMT9X	large pipeline project-related transportation employment; thousand	Alyeska employment based upon Alaska Department of Labor estimates; additional employment from DEVELOPMENT SCENARIO
EXBOND	proportion of state capital expenditures funded by capital projects funds; percent	historical data
EXCAP1	initial state capital expenditure level; million $	historical data
EXCPSHY1	initial highway construction expenditures out of state capital project construction funds; million $	estimated from Department of Administration, <u>Executive Budget</u>
EXCPSNH1	construction expenditures (nonhighway) out of capital project construction funds at the state level; million $	estimated from Department of Administration, <u>Executive Budget</u>
EXDF1	percent of state current account balance placed into development fund (hypothetical); percent	-
EXDFPCNT	development fund (hypothetical) withdrawals as percent of earnings; percent	-
EXDSSX	annual debt service payment to service general obligation bonds outstanding at beginning of simulation period; million $	Department of Administration, <u>Annual Financial Report</u>
EXGFCHY1	initial general fund capital expenditure--Department of Highways; million $	estimated from Department of Administration, <u>Executive Budget</u>
EXGFCNH1	initial general fund capital expenditures--all but Department of Highways; million $	estimated from Department of Administration, <u>Executive Budget</u>
EXOPS1	initial total state operating expenditures net of debt service and University of Alaska nongeneral fund assistance; it is the sum of the 9 functional categories; million $	estimated from Department of Administration, <u>Executive Budget</u>
EXPF1	percent contribution from available funds to Permanent Fund; percent	present law requires 25 percent contribution rate on areas leased before 1981 and 50 percent subsequently
EXPFBAK	percent of Permanent Fund earnings plowed back into Permanent Fund; percentage	present law directs all permanent fund earnings into general fund

EXPFCONX	Permanent Fund contributions appropriated from the general fund; million $	historical data
EXPFDIST	percent of Permanent Fund earnings transferred to general fund which are distributed to individuals; percent	author's estimate
EXPRPER	adjustment to state personnel expenditures data for consistency with state government employment data	author's estimate
EXSAVX	if EXRLOP7 is invoked in determination of state operating expenditures, this is the amount of revenues not spent; million $	zero in default case
EXSPCAP	special state capital appropriations; million $	author's estimate
EXSPLITX	the target allocation to operations when state spending falls below the authorized spending limit; percent	author's estimate
EXSUBS1	initial values for state subsidy programs initiated after 1980; million $	author's estimate
GODTX	general obligation bonded indebtedness of the state from debts incurred before 1983; million $	Department of Administration, Annual Financial Report
GRDIRPU	annual growth rate of U.S. real disposable personal income per capita; percent	Between 1950 and 1977, the average annual growth rate of real disposable personal incomes was 2.2 percent. Within the period, the growth ranged from 1.23 percent in the period 1950 to 1960 to 2.98 percent in the period 1960 to 1970. The simulation values are based upon slower-than-normal growth in the early 1980s, with a gradual return to a long-run trend somewhat below the historical rate. See U.S. Dept. of Commerce, Bureau of Economic Analysis, The National Income and Product Accounts of the U.S. 1929-74 & Survey of Current Business
GREXCAP	growth rate of state capital expenditures if fiscal rule EXRL2 is used	inoperative in default case

GREXOPS	nominal growth rate for state operating expenditures if EXRL4 is chosen in the state operating expenditure equation; percent	inoperative in default case
GRRPCEX	growth rate real per capita state operating expenditures if fiscal rule EXRL3 is used	inoperative in default case
GRRWEUS	annual growth rate of real U.S. average weekly earnings; percent	the nominal historical annual average growth rate has varied with the rate of inflation. Its values are as follows: 1960-65, 3.34%; 1965-70, 4.6%; 1970-75, 6.52%; 1975-77, 7.53%. Wages are assumed in the projection period to grow faster than the price level, implying a productivity increase of a similar magnitude. See U.S. Dept. of Labor, Bureau of Labor Statistics, Monthly Labor Review
GRSSCP	growth rate of real state capital stock per capita when fiscal policy variable EXRL3 is used	inoperative in default case
GRUSCPI	annual growth rate of U.S. consumer price index; percent	Historical annual average growth rates of the consumer price index are as follows: 1960-65, 1.3%; 1965-70, 4.2%; 1970-75, 6.7%; 1975-77, 6.1%. The simulation values are based upon projections by the Alaska Department of Revenue. See also U.S. Dept. of Commerce, Bureau of Economic Analysis, Survey of Current Business
LPTRAT	percentage of pipeline property within local jurisdictions actually subject to local tax because of limitations imposed by state statutes; percent	based upon Department of Community and Regional Affairs, Alaska Taxable
NCBP	bonus income to Natives from lease sales; million $	author's estimate
NCRP	Native recurrent income from petroleum development on Native land; million $	author's estimate

P9PTPER	percentage of petroleum property which is taxable by state which falls within local taxing jurisdiction; percentage	Department of Community and Regional Affairs, Alaska Taxable
PCNC1	proportion of ANCSA payments paid directly to individuals; percent	based upon a 10% distribution to Stockholders in village corporations and a 45% distribution to at-large stockholders; see Alaska Native Land Claims, Arnold
PCNC2	proportion of recurring income from petroleum development on Native lands paid directly in individuals; percent	author's estimate
PCNC3	proportion of earnings on Native corporation accumulated capital paid directly to individuals; percent	author's estimate
PCOLART	cost of living differential for federal employees; percentage	author's estimate
PDUSCPI1	initial value for U.S. consumer price index; index	historical data
PIPADJ	ratio of "enclave" to regular construction employee wage rate	assumed constant based upon ratio of wages paid to heavy construction and all other construction categories during Alyeska pipeline construction period; see Alaska Department of Labor, Statistical Quarterly
PR.DPIU1	initial value for U.S. real per capita disposable personal income; $	historical data
RLPTX	exogenous local property tax receipts; million $	zero in default case
RLTFPX	petroleum-related federal-local transfers; million $	author's estimate
RLTX	exogenous state-local transfers; million $	zero in default case
RNATX	Native personal income as percent of total personal income calculated using income distribution model	values derived from income distribution model; currently inoperative

RP9X	exogenous miscellaneous petroleum revenues; million $	author's estimate
RPBS	state petroleum bonuses; million $	DEVELOPMENT SCENARIO
RPPS	state petroleum property tax; million $	DEVELOPMENT SCENARIO
RPRY	state petroleum royalty revenues; million $	DEVELOPMENT SCENARIO
RPTS	petroleum production taxes consisting of oil and gas severance tax; million $	DEVELOPMENT SCENARIO
RSFDNPX	federal-state shared petroleum royalties; million $	author's estimate
RSFDNX	exogenous federal-state transfer payments; million $	default value is zero
RTCSPX	state corporate tax receipts from petroleum sector; million $	DEVELOPMENT SCENARIO
RTCSX	exogenous corporate income tax; million $	zero in default case
RTISXX	adjustment of disposable income to cover lag in refund in state personal income taxes after repeal; million $	author's estimate
SANCSA	payments to Alaska Natives under ANCSA out of state royalty revenues; million $	16 percent of state royalty revenues until $493.1 million paid out
TCRED	individual tax credit beginning after 12/31/77; dollars	zero in default case
TOURIST	number of tourist visitors to Alaska; thousands	DEVELOPMENT SCENARIO
TXBASE	change in the floor of personal income tax rate schedule; units	zero in default case
TXCRPC	state personal income tax credit (percentage of tax liability) adjustment; percentage	zero in default case
TXPTXX	allows model user to withhold from state expenditures a portion of any personal income tax reduction; percent	default value is zero

TXRT	percentage change in state personal income tax rate; percentage	zero in default case
UUS	U.S. unemployment rate; percent	author's estimate
VAEX1	value of a personal exemption on personal income tax; dollars	author's estimate
WEUS1	initial value for average weekly U.S. wage rate; $	historical data
XXMX2	large projection manufacturing real gross product	zero in default case
YR	year	-

INPUT DATA ARCHIVES

Historical Data

AKDATA — All historical data series which are either (1) used in regression analysis, (2) are required to provide a startup value for simulation, or (3) interesting and relevant but not used in the model or not necessary to model simulation (created by MACRO A83MERGE from raw data files).

AKRAW1 — Raw employment and wages data from Alaska Department of Labor, Statistical Quarterly.

AKRAW2 — Raw state expenditures data from Office of the Governor, Executive Budget.

AKRAW3 — Raw state budget data from Alaska Department of Administration, Annual Financial Report.

AKRAW4 — Raw state revenue data from Alaska Department of Revenue, Revenue Sources and Petroleum Revenue Forecast.

AKRAW5 — Raw state income data from U.S. Department of Commerce, Bureau of Economic Analysis, unpublished printouts.

AKRAW6	Raw local fiscal data from U.S. Department of Commerce, Bureau of Census, Government Finances and State Government Finances.
AKRAW7	Raw data from miscellaneous sources.
AKRAW8	Alaskan gross state product data from model IPDAK.
AKRAW9	National variables from various sources.
AKHIST	Data created by transformations of raw data in archives AKRAW1 to AKRAW9 (using A83TRANS).

Simulation Data

CONHIST	Startup and control data specifically used for historical simulation of the economic model.
CONTROL	Default values for all exogenous and policy variables for projective simulation. In certain instances, historical data is also included. Many of these variables are overridden in simulation by the scenario model output.
FLAT	Constant levels for exogenous employment variables used to test model steady state properties.
STARTUP	Startup values for all endogenous variables in the economic and fiscal components of the model for which a complete historical time series (up to the last year before the first year of simulation) does not exist. The values contained in these data files are values specifically created for model simulation and should not be used for any other purpose. In most cases, the specific value for the variable is immaterial to the output of the simulation since the purpose of these variables is to give TROLL an initial value from which to search for a solution to the simulation.
POPST2	Startup values for all endogenous variables in the population component of the model for which a complete historical time series (up to the last year before the first year of simulation) does not exist. The values contained in these data files are values specifically created for model simulation and should not be used for any other purpose. In most cases, the specific value for the variable is immaterial to the output of the simulation since the purpose of these variables is to give TROLL an initial value from which to search for a solution to the simulation.

B.9. Programs for Model Use

A83DEFLT	Deflates user-specified simulation output to 1982 real dollars using PDCPI
A83FLAT	Sets searches to perform test simulation with constant exogenous employment levels
A83INIT	Prints selected simulation results and compares values to actual historical data
A83MERGE	Combines individual historical data archives into a single archive called AKDATA
A83REG	Sets searches for regression analysis
A83RUN	Sets searches and calls state model (A83.2) for simulation
A83RUNCD	Sets searches and calls regionalization model (A83.CD) for disaggregation of employment and population to census division level.
A83RUNH	Sets searches and calls model for historical simulation
A83TRANS	Performs transformations on raw data files to create archive AKHIST
A83XPAR	Prints model economic parameter values
LOOK	Lists all archives in specified account

B.10. Model Adjustments for Simulation

After preliminary estimation of all parameters and construction of the model as well as whenever significant new data becomes available, the model must be adjusted for simulation. The objectives of the adjustments are to initialize the model so that simulation values begin as closely as possible to actual historical values, to correct any imbalances within the model structure which show up in initial simulations, or to handle special conditions which arise each year as the structure of the economy evolves. Model initialization is difficult because the data for a particular year becomes available over a period of more than one year. Thus, at any point in time the most current historical data available will vary over a two-year period, depending upon the variable and source. As a general rule, the most important variables for initializing the model are employment in total and by sector (1982 preliminary data), total population (1982), wage rates by industry (1980), and the price level (1982).

The following is a discussion of all adjustments and initialization procedures used in the economic and fiscal modules in the spring of 1983.

Wage rate intercept adjustments. Combined wage rates for agriculture/forestry/fisheries and manufacturing (WRM9A9) as well as communications with public utilities (WRCMPU) are stochastically estimated over the historical period. For simulation, the intercepts on the wage rate equations in these sectors are initialized to their most current known values (C62A, C70A, C74A, and C95A).

The intercept term in the equation determining the federal civilian wage rate is adjusted upward (C89A). The rationale for this is that the equation accurately reflects the long-term trend of the wage rate growing with overall productivity of the labor force but does not reflect short-run cyclical behavior. Thus, in a deep recession year when the real average wage rate in the private sector falls, one would not expect the real wage rate in federal civilian government to immediately fall in response.

Price ratio adjustment. The term relating the relative Alaskan price level (PDRATIO) to the growth in local support sector employment has the correct sign and is significant in the regression but in simulation performs poorly. Its value (C67A) is increased so that the Alaskan price level is more responsive to growth in support employment. The rationale for this adjustment is that the Alaskan price level has proved to be sticky downward, and the recent historical events, which should be putting downward pressure on

Alaskan relative prices, are taking a long time having their impact felt.

Local government wages and salaries (PC13C). The intercept term on the equation relating local government personnel expenditures to wages and salaries is adjusted upward to force consistency in the most recent year between two data sources showing very different movements.

State and local government wage rate equations. The equation used to simulate state and local government wage rates are altered so that the real wage in these sectors never falls below the level of the previous year. The rationale for this adjustment is similar to that used to adjust the federal wage rate.

Price ratio equation. This equation is adjusted to incorporate the possibility of a one-time upward adjustment in some future year, using the coefficient C67C, resulting from a reimposition of the state personal income tax. This change would be essentially symmetrical, but opposite in sign, to the fall in the price level which occurred in 1980 when the tax was eliminated.

General wage rate adjustment. All private sector wage rates are adjusted upward over the interval 1980 through 1986 through the use of the variable D.80DEC6. The wage rate equations are designed to trend upward with the secular growth in the real average weekly wage in the United States for which a close historical relationship can be shown. In 1980, however, there was a dramatic one-year fall in that indicator with no corresponding fall in real wages in Alaska in spite of a dramatic fall in the relative price level. The reasons are (1) that there was no recession in Alaska, (2) that wage rates in Alaska are relatively inflexible on the down side, and (3) that Alaska wage rate movements in general will respond to dramatic reductions in the price level with a lag. We assume equilibrium is restored in 1987.

State government wages and salaries. The historical relationship between state personnel expenditures and state government wages and salaries no longer holds. An adjustment factor (EXPRPER) is entered into the equation relating those variables.

Total population. A discrepancy in the MAP and Alaska Department of Labor estimates for Alaska population in 1982 comes from the manner in which they were computed and, consequently, the information they are intended to convey. The Alaska Department of Labor (ADOL) population estimates are based on sample surveys of population and housing units as of July 1 of the year. The ISER population model projects forward the U.S. Census April 1, 1981, benchmark population by adding the estimated excess of births over deaths and the estimated net in-migration.

The ISER figure is clearly an average annual population estimate. Both the computation of births and deaths and the statistical procedure used to estimate net migration are based on measurements of year-to-year flows. There is no attempt to measure seasonal fluctuations in the flows of births, deaths, or migration. The ADOL figures, on the other hand, are based on a point estimate of population as of July 1 of the year. In this sense, the difference in the method of computation of the two estimates is analogous to the difference between seasonally adjusted (ISER) and not seasonally adjusted (ADOL) estimates.

There are several reasons why the Alaska population measured on July 1 would be particularly large in 1982, relative to the average figure for that year. In the first place, this was a year of deteriorating economic conditions in the rest of the United States and rapid immigration to Alaska. Because of this, it is likely that a much higher-than-usual number of people were attracted to the state in search of temporary seasonal employment, with the possibility of staying longer if permanent work was available. Some of these seasonal increments to the labor force are undoubtedly counted in the July 1 survey, and the number was probably much higher than usual in 1982.

In 1982, as well, the state of Alaska offered $1,000 to every resident through the Permanent Fund Dividend Program. In addition to the incentive this program provided for seasonal workers to take steps to establish legal residency, the program encouraged longer-term visitors for family or recreational pursuits to appear also to be residents. There is no way accurately to determine the impact of the Permanent Fund Dividend Program on reported July 1, 1982, population.

Both explanations for the discrepancy in the 1982 figures suggest that it will diminish quickly as economic conditions in the United States improve and as the Permanent Fund Dividend Program is phased out.

Composition of Employment--State Government and Services. The rapid expansion of state operating expenditures since 1980 is reflected in the model by an increase in state government employment. A larger-than-average portion of the budget increases, however, have gone into grants and contracts, which is reflected in the employment statistics primarily in the service sector. The model slightly overestimates state government employment but underestimates service employment by a like amount in the early 1980s. No attempt is made to correct for this.

B.11. Key to Regressions

Variable	Symbol	Range (may vary with particular variable)
State operating budget component	EXaaa	1962 to 1981
State personnel expenditure component	EXPRaaa	1962 to 1981
State revenues	Raaa	various
Local revenues and expenditures	RLaa, ELaa	various
Wage rates	WRaa	1961 to 1980
Gross product	XXaa	1961 to 1980
Employment	EMaa	1961 to 1980

APPENDIX C

ISER MAP ALASKA ECONOMIC MODEL: POPULATION MODULE

Institute of Social
and Economic Research
MAP Documentation
May 1983

C.1 General Model Description

The population module of the Alaska economic model provides annual forecasts of total population and detailed population characteristics for the State of Alaska. Population in each year is estimated as an average annual value which is determined by the sum of natural increase of the previous year's population and net immigration. The former is based upon age-sex-race-specific fertility and mortality rates. The latter is based upon a stochastically determined equation relating net immigration to the change in employment opportunities in Alaska, Alaskan unemployment, and real wage levels relative to the U.S. average. This specification is based upon the theory that migration flows clear regional labor markets, with people moving into regions where employment opportunities are increasing faster than local supplies can satisfy them and out of economically declining regions.

The three main components of population--Native, military, and civilian non-Native--each receive separate treatment because of different characteristics. The Native population can only migrate out of Alaska and has different fertility and mortality rates than do civilian non-Natives. The military population consists of armed forces personnel and military dependents. Births, deaths, and net migration are not calculated for this component of the population. Its age-sex structure essentially remains constant in simulation, as each year those leaving are replaced by individuals with identical characteristics.

Total Population. Total population is the sum of the three components of the population which are individually treated because of different characteristics. These components are civilian/non-Native population, Native population, and military population which is armed forces personnel plus military dependents. Each of the components of the population is divided into 30 age-sex cohorts. The population under 1 year is the first cohort for each sex, and the 65-and-over population is cohort 15. Cohort 2 is the population aged 1 through 4 years; all others span five years.

The military population is static in the sense that the age-sex structure of both the armed forces personnel and the military dependents does not change over time, nor does the ratio of military dependents to armed forces personnel. The total military population is calculated as a percentage of the 1980 military population and its age-sex structure scaled accordingly.

Civilian/Non-Native Natural Increase. Each year, a percentage of individuals within each cohort die, and another percentage move into the next cohort as people age. The aging process applies to all individuals within a cohort, and the result of this process is an "intermediate cohort" to which migrants must be added to arrive at the final cohort value for the new year.

The population of the 0-1-aged cohort is determined by the number of births, which is the sum of cohort-specific fertility rates applied to the female population surviving from the previous year. While mortality rates change very slowly, fertility rates are affected by a number of socioeconomic variables. Since precise relationships cannot be determined for Alaskan fertility rates, these are held constant in the model for the projection period. A percentage of infants do not survive, and a specific sex division of births is applied to total births.

From these calculations, both infant deaths and total deaths can be calculated as sums. Finally, natural increase is the excess of births over deaths.

Civilian/Non-Native Migration. Net immigration is a function of the year-to-year change in the level of total Alaskan civilian employment, the percentage change in the lagged value of the Alaskan-U.S. ratio of real weekly earnings, and the lagged ratio of U.S.-to-Alaska unemployment rates. Migrants, according to this formulation, will be drawn to Alaska in response to a tightening of the Alaskan labor market indicated by low unemployment rates and rising real wages. Higher relative unemployment rates and declining real wages would cause net immigration to be negative.

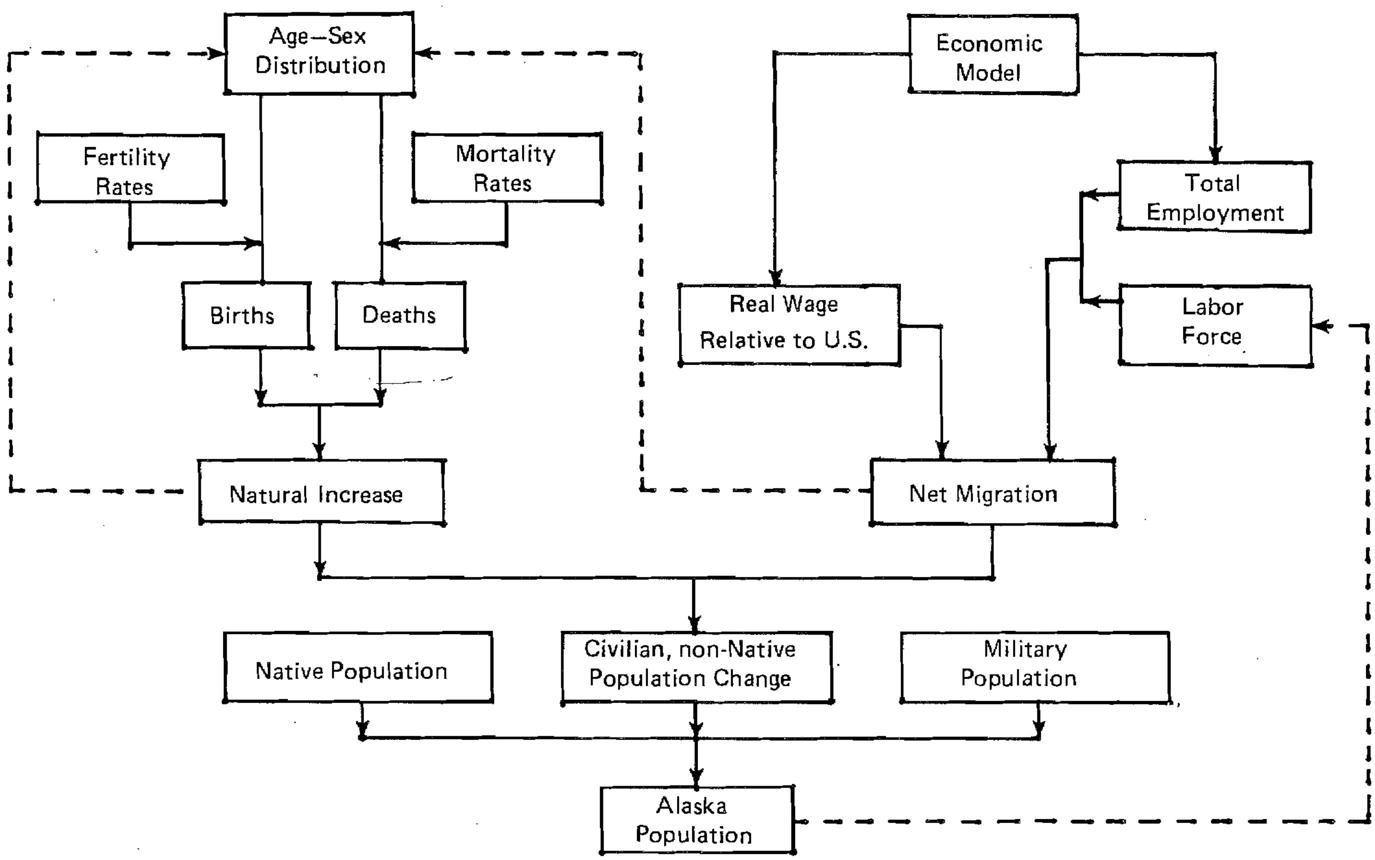
Net immigration is distributed among the age-sex cohorts by a two-step process. First, a percentage of each cohort of the population leaves the state independent of the overall amount of net migration. The remainder of net migration is allocated among all the cohorts on the basis of a percentage of total net migration. (This remainder can be a negative number.) Net migration to Alaska is biased toward young males relative to the U.S. average.

Total civilian/non-Native population is finally calculated by summing the population in each cohort including the results of the migration process during the year.

Net Native Population. As with the civilian/non-Native population, a percentage of individuals die each year within each cohort, and a percentage age into the next cohort. Native births are the sum of cohorts of the female population of child-bearing age times the fertility rate for Natives within each cohort. Total Native births are allocated between the sexes and reduced by the percentage of Native infant deaths by sex. Native infant deaths are the difference between total births and infant deaths, and total Native deaths include those of all cohorts. Native natural increase is the excess of births over deaths. The Native population migrates out of Alaska at a rate independent of the level of economic activity.

Two distinct definitions of the total Native population are calculated. The first is based upon Native self-enumeration data from the 1980 Census. This forms the basis for the age-sex distribution of the Native population. A second larger number is calculated from the number of enrollees for the twelve Native corporations residing in the state. This latter concept of Native population is assumed to grow at the same rate as the census-based Native population.

C.2 MAP Economic Population Module



C.3 Output Variables of the Population Module

Total Population

POP	Total Alaska population
CNNTOT	Total Alaska civilian non-Native population
NATTOT	Total Alaska Native population (civilian)
POPij	Total Alaska population in cohort ij
CNNPij	Alaska civilian non-Native population in cohort ij
NATPij	Alaska Native population in cohort ij
POPC	Alaska Population not in military service
BTOT	Total Alaska civilian births
DTOT	Total Alaska civilian deaths
POPNI9	Total Alaska civilian natural increase

Military Population

POPM	Alaska active duty military personnel
MILPCT	Alaska military population as a fraction of 1980 level

Civilian Non-Native Natural Increase

Cij	Alaska Civilian non-Native population in cohort ij before migration
BTHTOT	Total Alaska civilian non-Native births to civilian population
DTHINF	Alaska infant civilian non-Native deaths
DTHTOT	Total Alaska civilian non-Native deaths
NATINC	Alaska civilian non-Native natural increase

(Civilian) Native Natural Increase

NCij	Alaska Native population in cohort ij before migration
NBTHTOT	Total Alaska Native births
NDTHINF	Alaska Native infant deaths
NDTHTOT	Total Alaska Native deaths
NNATINC	Alaska Native natural increase
POPNE	Alaska Native enrollment population

Civilian Migration and Total Civilian Population

POPMIG	Total net civilian migration to Alaska
MIGOUT	Exogenous civilian migration to Alaska
MIGIN	Endogenous civilian migration to Alaska

Labor Force and Unemployment

PLFDOMC	Alaska potential civilian non-Native labor force (population age 15 to 64)
PLFDOMN	Alaska potential civilian Native labor force
PLFDOMM	Alaska potential military labor force (military dependents age 15 to 64, active-duty military are excluded)
PLFD9	Total Alaska potential civilian labor force
LF	Total Alaska civilian labor force
UNEMP	Alaska unemployed
WR.AK.US	Relative real wage rate, Alaska to U.S.
U.AK.US	Relative unemployment rate, Alaska to U.S.

Households

HH	Total Alaska households
HHC	Total Alaska civilian non-Native households
HHN	Total Alaska civilian Native households
HHM	Total Alaska military households
CHHij	Alaska households headed by civilian non-Native persons in cohort ij
NHHij	Alaska households headed by civilian Native persons in cohort ij
HHij	Total Alaska households headed by persons in cohort ij

Non-Household Population and Average Household Size

POPCGQ	Alaska civilian non-Native population in group quarters
POPNGQ	Alaska Native population in group quarters
POPGQ	Total Alaska population in group quarters
HHSIZEN	Average Alaska Native household size
HHSIZEC	Average Alaska civilian non-Native household size
HHSIZE	Average Alaska household size, all households

Special Population Characteristics

POPSKL	Total Alaska population age 5-19
POPKID	Total Alaska population under 15
POPGER	Total Alaska population 65 and over
POPADS	Total Alaska population age 15-64
POP.AD	Ratio of Alaska population 15-64 to total population
POP.KID	Ratio of Alaska population under 15 to total population
POP.GER	Ratio of Alaska population 65 and over to total population
POP.MIL	Ratio of Alaska military and military dependents to total population

POP.NAT	Ratio of Alaska Native population to total population
POP.CIV	Ratio of Alaska civilian non-Native population to total population
NCBR	Alaska crude Native birth rate (per thousand)
NCDR	Alaska crude Native death rate
CBR	Alaska crude civilian non-Native birth rate
CDR	Alaska crude civilian non-Native death rate
BCRUDE	Alaska crude civilian birth rate
DCRUDE	Alaska crude civilian death rate

C.4 Cohort Designation

Sex (i)

F	Female
M	Male

Age (j)

1	Under 1 year
2	1 - 4 years
3	5 - 9 years
4	10 - 14 years
5	15 - 19 years
6	20 - 24 years
7	25 - 29 years
8	30 - 34 years
9	35 - 39 years
10	40 - 44 years
11	45 - 49 years
12	50 - 54 years
13	55 - 59 years
14	60 - 64 years
15	65 years and older

C.5 Parameter Definitions

Military Population

AFTOT	Total armed forces personnel in 1980
MDTOT	Total military dependents in 1980
MILij	Armed forces personnel and military dependents in cohort ij in 1980

Civilian Non-Native Natural Increase

Gj	Shift factor for aging of cohorts
Sij	Non-Native survival rate for cohort ij
FERTj	Non-Native fertility rate for female cohort j
SEXDIV	Non-Native sex division at birth
SURINFi	Non-Native infant survival rates
BADD	Birth adjustment factor to account for birth of Native children to non-Native women

(Civilian) Native Natural Increase

NSij	Native survival rate for cohort ij
NFERTij	Native fertility in female cohort j
NSEXDIV	Native sex division at birth
NSURINFi	Native infant survival rates

Civilian Migration

NMij	Migration rate (positive for in, negative for out) for Native population in cohort ij
OEMij	Exogenous civilian non-Native migration rate (positive for in, negative for out) for population in cohort ij
Mij	Fraction of total endogenous civilian (non-Native) migration assigned to cohort ij

Household Formation

HHRij	Household formation rate for civilian non-Native population in cohort ij
NHHRij	Household formation rate for civilian Native population in cohort ij
RCij	Rate of change in HHRij
NRCij	Rate of change in NHHRij
CPGQij	Fraction of civilian non-Native population in cohort ij in group quarters

NPGQij	Fraction of civilian Native population in cohort ij in group quarters
POPMGQ	Military population in group quarters in 1980
MHHAGE	Average age of head of military household

Labor Force

LFPART	Labor force participation rate as a fraction of potential labor force
PLFRATE	Fraction of migrant population in potential labor force

C.6 Coefficients

Regression coefficients for net migration equation:

CMIGa	Net migration to Alaska	a = 1,2,3,4

C.7 Input Variables for Population Module

The following variables require a forecast for each year:

EMGM	Alaska military employment (thousands)
EM96	Total Alaska employment (thousands)
R.WR97	Average Alaska real wage rate
WEUS	U.S. weekly earnings
PDUSCPI	U.S. consumer price index
U.US	U.S. unemployment rate
YR	Year

All other population variables may be updated as new population estimates become available.

C.8 Input Data Sets

Input data required to run the population module are contained in the following data sets:

AKHIST	Historical time series data
POPST2	Estimated 1980 Alaska population by age, sex, and race.*

*Alaska population by age, sex, and race cohorts estimated from the 1980 U.S. Census are shown in Table C-6. These figures represent Alaska population as of April 1, 1980, the date of the census. Population estimates for the MAP population module, however, represent average annual values. The census-derived figures for population cohorts were adjusted to average annual figures using the following procedure:

(1) The population module was simulated for one full year starting from the April 1, 1980, population, but with average annual 1980 employment and wage data.

(2) The average annual 1980 population estimates, contained in the Data Set POPST2, were computed using the formula:

POPST2_POPijk = 0.25 * [POPijk (1981) - POPijk (1980)]

where POPST2_POPijk is the average 1980 population of sex i in age cohort j and race k; POPijk(1981) is the simulated 1981 population cohort, and POPijk(1980) is the census April 1, 1980, cohort.

C.9 Structural Description

Refer to the variable list and symbol dictionary for names and symbols.

Total Population

$$POP = CNNTOT + NATTOT + MILPCT * (AFTOT + MDTOT)$$

$$POPij == CNNPij + NATPij + MILPCT * (AFPij + MDPij)$$

$i = M, F$
$j = 1$ to 15

$$POPM == EMGM$$

Civilian/Non-Native Natural Increase

$$Cij == Gj * Sij * CNNPij (-1) + (1-Gj-1) * Si,j-1 * CNNPi,j-1 (-1)$$

$i = M, F$
$j = 2$ to 15

$$BTHTOT == \left(\sum_{j=4}^{11} (CFj * FERTj)\right) - BADD$$

$$CM1 == SEXDIV * BTHTOT * SURINFM$$

$$CF1 == (1-SEXDIV) * BTHTOT * SURINFF$$

$$DTHINF == BTHTOT - CM1 - CF1$$

$$DTHTOT == DTHINF + \sum_{i=M,F} \sum_{j=1}^{15} (Cij(-1) * (1-Sij))$$

$$NATINC == BTHTOT - DTHTOT$$

(Civilian) Native Natural Increase

$$NC_{ij} == G_j * NS_{ij} * NATP_{i,j-1} + (1-G_{j-1}) * NS_{i,j-1} * NATP_{i,j-1}(-1)$$

$i = M,F$
$j = 1$ to 15

$$NBTHTOT == \left(\sum_{j=4}^{11} (NCF_j * NFERT_j)\right) + BADD$$

$$NCPM1 == NSEXDIV * NBTHTOT * NSURINFM$$

$$NCPF1 == (1-NSEXDIV) * NBTHTOT * NSURINFF$$

$$NDTHINF == NBTHTOT - NCM1 - NCF1$$

$$NDTHTOT == NDTHINF + \sum_{i=M,F} \sum_{j=1}^{15} (NC_{ij}(-1) * (1-NS_{ij}))$$

$$NNATINC == NBTHTOT - NDTHTOT$$

Civilian Migration and Total Civilian Population

$$NATP_{ij} = NC_{ij} * (1 + NM_{ij}) \qquad i=M,F \qquad j=1 \text{ to } 15$$

$$POPMIG = CMIG1 + CMIG2 * 1/U.AK.US(-1) + CMIG3 * WR.AK.US(-1) + CMIG4 * DELEMP$$

$$MIGOUT = \sum_{i=M,F} \sum_{j=1}^{15} ((OEM_{ij} * C_{ij}) + (NM_{ij} * NC_{ij}))$$

$$MIGIN = POPMIG - MIGOUT$$

$$NATTOT = \sum_{i=M,F} \sum_{j=1}^{15} NATP_{ij}$$

$$CNNP_{ij} = MIGIN * M_{ij} + C_{ij} * (1 + OEM_{ij}) \; (M_{ij} \geq 0) \qquad i=M,F \qquad j=1 \text{ to } 15$$

$$CNNTOT = \sum_{i=M,F} \sum_{j=1}^{15} CNNPij$$

Labor Force and Unemployment

$$PLFD9 == \sum_{i=M,F} \sum_{j=5}^{14} POPij$$

LF == LFPART * PLFD9

UNEMP == LF - EM96

U.AK.US == UNEMP/LF/U.US

WR.AK.US == LOG(R.WR97) - LOG(WEUS * 100/PDUSCPI) -
(LOG(R.WR97(-1)) - LOG(WEUS(-1) * 100/PDUSCPI(-1)))

DELEMP == EM96 - EM96(-1)

C.10 Regression Coefficients

Net Migration to Alaska

$$POPMIG = CMIG1 + CMIG2 * 1/U.AK.US(-1) + CMIG3 * WR.AK.US(-1) + CMIG4 * DELEMP$$

Coefficient	Value	Standard Error	t Statistic
CMIG1	-16.0216	5.5354	-2.8944
CMIG2	14.1206	5.4030	2.6135
CMIG3	49.2216	13.7389	3.5827
CMIG4	0.9567	0.0969	9.8699

Range: 1971 to 1980 $F(3,6) = 53.57$

$R^2 = 0.964$ standard error of regression = 2.816

Estimation method: generalized least squares (correction for autocorrelation), $\hat{\rho} = 0.75$

Notes: Historical series for POPMIG taken from the series AKHIST_POPMIGNW. Historical series for U.AK.US taken from ANANHIST_U.AK.USU. Other series archived in ANANHIST.

C.11 Parameter Values

Military Population (Table C-6)

AFTOT	From Alaska Air Command and J. Kruse, Design and Implementation of Alaska 1980 Reapportionment Data Collection Effort, ISER, August 1980.
MDTOT, MILij	Military age-sex-race distribution outside Anchorage assumed equal to Anchorage on-base distribution. Anchorage figures from 1980 U.S. Census, Anchorage Census Tracts 3 and 4.

Civilian Natural Increase

Gj	1/Tj where Tj is the number of years spanned by age cohort j; except G15 (65 and over) = 0
All Others	See Tables C-4 (birth rates) and C-5 (survival rates).

Civilian Migration

NMij	Parameters assumed = 0. Insufficient information available on migration of Native population
OEMij	See Table C-3.
Mij	Estimated from columns 1 and 2, Table C-1, and columns 1 and 2, Table C-2.

Household Formation

Military Households	Estimated using data from Alaska Air Command and 1980 U.S. Census
Civilian Households	See Appendix D

Labor Force

LFPART	Ratio of sum of total civilian employment and unemployment to civilian potential labor force
PLFRATE	Fraction of population 15-64 from Table C-6

TABLE C-1: CIVILIAN MIGRATION TO ANCHORAGE,
ALASKA PUBLIC SURVEY SAMPLE
(N = 1,867 Individuals)

	Interstate Migrants		Alaska Natives		Non-Native Intrastate		Total	
Age Group	F	M	F	M	F	M	F	M
Under 5	19	15	3	5	11	8	33	28
5-9	18	19	4	6	5	9	27	34
10-14	8	7	3	1	7	5	18	13
15-19	9	13	0	3	8	6	17	22
20-24	33	27	1	3	11	10	45	40
25-29	26	34	4	2	15	16	45	52
30-34	22	27	3	3	15	17	40	47
35-39	10	14	2	2	5	6	17	22
40-44	9	12	1	1	4	3	14	16
45-49	5	6	1	0	4	5	10	11
50-54	1	1	0	0	2	3	3	4
55-59	2	3	0	0	2	2	4	5
60-64	1	1	0	0	0	2	1	3
65 and over	1	0	0	0	1	0	2	0
Total	164	179	22	26	90	92	276	297

NOTE: Figures include all members of the household of survey respondents resident in community (in Alaska for interstate migrants) thirty-six months or less.

TABLE C-2. ESTIMATED CIVILIAN MIGRATION RATES TO ANCHORAGE

(percent of migrants in each category)

	Interstate Migrants		Alaska Natives		All Non-Native Migrants	
Age Group	F	M	F	M	F	M
Under 5	5.0	5.0	8.3	8.3	5.0	5.0
5-9	5.4	5.4	10.4	10.4	4.9	4.9
10-14	2.2	2.2	4.2	4.2	2.6	2.6
15-19	2.6	3.8	3.1	3.1	3.2	3.6
20-24	9.6	7.9	4.2	4.2	8.3	7.0
25-29	7.6	9.9	6.3	6.3	7.8	9.4
30-34	6.4	7.9	6.3	6.3	7.0	8.4
35-39	2.9	4.1	4.2	4.2	2.9	3.8
40-44	2.6	3.5	2.0	2.0	2.5	2.9
45-49	1.5	1.7	1.0	1.0	1.7	2.1
50-54	0.3	0.3	-	-	0.6	0.8
55-59	0.6	0.8	-	-	0.8	1.0
60-64	0.3	0.3	-	-	0.4	0.4
65 and over	0.1	0.1	-	-	0.2	0.2
Total	47.1	52.9	50.0	50.0	47.9	52.1

SOURCE: Data from Alaska Public Survey.

TABLE C-3. ESTIMATED EXOGENOUS OUT-MIGRATION RATES

	Percent of Migrants		Percent of Age-Sex Cohort	
Age Group	F	M	F	M
Under 5	5.8	5.8	10.77	10.17
5-9	5.8	5.8	10.76	10.37
10-14	2.9	2.9	5.17	4.79
15-19	3.3	3.3	5.10	4.98
20-24	3.2	3.6	4.52	5.33
25-29	7.0	8.2	8.79	9.98
30-34	5.8	8.1	7.42	9.77
35-39	4.0	5.2	6.56	9.35
40-44	3.2	3.5	7.26	6.38
45-49	1.8	1.4	4.49	3.26
50-54	1.9	1.9	7.09	5.61
55-59	1.1	1.3	4.41	5.07
60-64	1.3	1.3	9.60	8.55
65 and over	0.3	0.3	1.41	1.78
Total	47.4	52.6	6.63	

SOURCE: Richard Ender, Anchorage Urban Observatory and U.S. Census, 1980.

TABLE C-4. 1980 BIRTHS: NUMBER OF BIRTHS AND BIRTH RATES PER THOUSAND WOMEN IN FIVE-YEAR AGE COHORTS, ALASKA RESIDENTS

	Native		Non-Native	
Age of Mother	No. of Births	Rate	No. of Births	Rate
10-14 years	1	0.3	5	0.4
15-19 years	438	138.5	686	48.4
20-24 years	821	297.9[a]	2,632	145.1[a]
25-29 years	528	173.3	2,548	127.2[a]
30-34 years	260	101.1	1,212	71.7
35-39 years	84	46.5	283	22.7
40-44 years	18	12.7	38	4.3
Not Stated	1	--	2	--
Total	2,151		7,406	

(9,557 total births in Alaska in 1980)

[a]Rate includes one case where age was not stated.

SOURCE: Number of births from Alaska Department of Health and Social Services, Office of Information Systems; and Alaska Native Medical Center, Anchorage.

TABLE C-5. 1980 DEATHS: NUMBER OF DEATHS AND DEATH RATES PER THOUSAND, ALASKA RESIDENTS

	NATIVE				NON-NATIVE			
	Female		Male		Female		Male	
Age	Number	Rate	Number	Rate	Number	Rate	Number	Rate
<28 Days	8	7.63	14	12.69	16	4.48	24	6.26
28 days - 1 year	10	12.36	13	15.53	11	3.15	21	5.81
1-4 yrs.	3	1.09	4	1.36	8	0.67	11	0.87
5-9	2	0.55	3	0.78	1	0.07	2	0.14
10-14	1	0.28	5	1.32	1	0.08	6	0.43
15-19	10	3.16	24	6.70	6	0.42	22	1.36
20-24	8	2.90	32	10.00	9	0.50	50	2.38
25-29	11	3.61	29	8.60	13	0.65	56	2.52
30-34	10	3.89	13	4.34	13	0.77	50	2.54
35-39	8	4.42	22	10.10	13	1.04	28	1.88
40-44	9	6.34	17	9.82	15	1.71	43	4.00
45-49	3	2.67	8	5.87	20	2.74	43	4.99
50-54	12	12.90	12	10.80	22	3.54	59	7.76
55-59	10	13.00	19	21.20	40	7.89	76	12.92
60-64	8	16.00	19	33.50	34	10.30	77	20.62
65 +	45	31.10	91	63.20	148	34.10	268	62.05
Totals	158		325		370		836	

SOURCE: Number of deaths from Alaska Department of Health and Social Services, Office of Information Systems.

TABLE C-6. ALASKA POPULATION, APRIL 1, 1980

Age	Native Population			Civilian Non-Native			Military Population			Total Population		
	Total	Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male
0 - 1	1,646	806	840	5,648	2,763	2,885	1,459	732	727	8,753	4,301	4,452
1 - 4	5,674	2,734	2,940	19,061	9,020	10,041	5,461	2,854	2,607	30,196	14,608	15,588
5 - 9	6,867	3,390	3,477	22,502	10,983	11,519	5,674	2,727	2,947	35,043	17,100	17,943
10 - 14	7,433	3,638	3,795	23,264	11,206	12,058	3,585	1,718	1,867	34,282	16,562	17,720
15 - 19	8,346	4,091	4,255	25,048	11,965	13,083	3,760	1,279	2,481	37,154	17,335	19,817
20 - 24	6,899	3,445	3,454	27,681	14,168	13,513	10,510	3,291	7,219	45,090	20,904	24,186
25 - 29	5,639	2,798	2,841	35,490	17,029	18,461	7,516	3,254	4,262	48,645	23,081	25,564
30 - 34	4,373	2,179	2,194	32,480	14,929	17,551	5,310	2,379	2,931	42,163	19,487	22,676
35 - 39	3,539	1,753	1,786	24,961	11,506	13,455	2,847	1,001	1,846	31,347	14,260	17,087
40 - 44	2,802	1,376	1,426	18,280	8,008	10,272	1,593	816	777	22,675	10,200	12,475
45 - 49	2,657	1,301	1,356	15,440	6,992	8,448	298	120	178	18,395	8,413	9,982
50 - 54	2,176	1,074	1,102	13,422	5,938	7,484	250	125	125	15,848	7,137	8,711
55 - 59	1,802	857	945	10,734	4,940	5,794	81	43	38	12,617	5,840	6,777
60 - 64	1,307	679	628	6,751	3,095	3,656	38	19	19	8,096	3,793	4,303
65 +	2,875	1,411	1,464	8,600	4,263	4,337	72	57	15	11,547	5,731	5,816
	64,035	31,532	32,503	289,362	136,805	152,557	48,454	20,415	28,039	401,851	188,752	213,099

SOURCE: 1980 U.S. Census

Institute of Social
and Economic Research
MAP Documentation
May 1983

C.12 Model Validation

The population module of the economic model uses as the basis of its forecasts the demographic characteristics of the population enumerated by the 1980 U.S. Census. No detailed enumeration of the state population has been undertaken since the 1980 Census. The most recent past detailed population count that could be used to test the ability of the full module to predict demographic shifts up to 1980 is the 1970 U.S. Census. Conceptually, one could use the population module to "predict" the 1980 population given the 1970 population characteristics and estimated migration between 1970 and 1980.

Such a test is impractical, however, since Alaskan cohort-specific birth, death, and household formation rates changed significantly between the 1970 and 1980 Census benchmarks. Consequently, one would not expect a module to forecast population changes accurately during this period using the 1980 parameters.

Although it is not practical to test predictions of the full population module against historical events, it is possible to examine closely one important component of the module--net migration. The equation forecasting net civilian migration was estimated using recent historical data. To the extent that future economic conditions resemble those that have occurred in the past decade, the ability of the module equation to estimate historical migration flows provides a reliable indicator of the type and magnitude of likely future forecasting errors. Table C-7 displays a comparison of actual estimated net civilian migration to the migration equation predictions in the years for which it is possible to compute a forecast from available data.

TABLE C-7. COMPARISON OF ACTUAL AND PREDICTED NET MIGRATION TO ALASKA

Year	Implied Net Civilian Migration[1]	Regression Prediction[2]	Difference
1980	- 7,900	- 4,566	-3,334
1979	-10,490	-12,694	2,204
1978	-14,270	-12,963	-1,307
1977	- 4,460	- 3,008	-1,452
1976	22,530	23,324	- 794
1975	33,760	33,140	620
1974	10,380	14,443	-4,063
1973	4,290	3,660	630
1972	6,050	3,539	2,511
1971	4,000	2,116	1,884

[1]Net migration in year t is defined as the difference between the (mid-year) population estimate for year t and for year t-1, less the excess of births over deaths (computed as a two-year moving average), adjusted to exclude estimated military population changes.

[2]Using the equation presented in Section C-10, including the estimate of serial correlation in the error term.

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APPENDIX D

ISER MAP ALASKA ECONOMIC MODEL: HOUSEHOLD FORMATION MODULE

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D.1 Model Description

A household is a living unit of one of two types: a family or an individual or group of individuals, not related, who are living as a unit.

The population projections determine the number of households in the state. The number of households is a function of both the level of population and its age-sex distribution. The age-sex distribution of the population is important because the rate at which people form households differs across age-sex cohorts. This household formation module accounts for both of these influences of population on house hold formation.

The household formation module is an accounting model which depends on a set of assumptions about the age-sex cohort-specific rates of household formation, known as headship rates, and changes in those rates. The module is based on the assumption that the social, economic, and life-cycle factors which determine the formation of households can be described by a set of headship rates. Headship rates describe the probability that a person in a particular cohort is a household head.

The module requires input from the population module in the form of the projected size and age-sex distribution of the population. The total number of households in the state (HH) is equal to the number of households summed across age and sex cohorts.

(1) $$HH = \sum_{i}\sum_{j} HH_{ij}$$

The total number of households in sex cohort i and age cohort j (HH_{ij}) describes the number of households with household head or primary individual in the ith sex and jth age cohort. This total is, in turn, composed of three components: the number of civilian/non-Native households in cohort ij (CHH_{ij}), the number of Native households in cohort ij (NHH_{ij}), and the number of military households in cohort ij (MHH_{ij}).

(2) $$HH_{ij} = CHH_{ij} + NHH_{ij} + MHH_{ij}$$

The number of civilian and Native households in each cohort is a function of the population and headship rate for the cohort. The number of households in any cohort equals the cohort-specific headship rate (HHR_{ij} for civilian/non-Natives and $NHHR_{ij}$ for Natives) multi plied by the cohort population ($CNNP_{ij}$ for civilian/non-Natives and $NATP_{ij}$ for Natives) net of the proportion of the population in group quarters ($CPGQ_{ij}$ for civilian/non-Natives and $NPGQ_{ij}$ for Natives).

(3) $CHH_{ij} = CNNP_{ij} * (1 - CPGQ_{ij}) * HHR_{ij}$

(4) $NHH_{ij} = NATP_{ij} * (1 - NPGQ_{ij}) * NHHR_{ij}$

The cohort distribution of military households (MHH_{ij}) is assumed to remain constant throughout the projection period. The number of military households (MHH_{ij}) equals the number in 1980.

The headship rates have changed historically and are expected to continue to vary. The headship rates are assumed to approach a specified target over a specified time period. Thus, the headship rate in any year equals:

(5) $$HHR_{ij} = HHR_{ij}(80) + RC_{ij} * \frac{\log(T-80)}{\log TP}$$

(6) $$NHHR_{ij} = NHHR_{ij}(80) + NRC_{ij} * \frac{\log (T-80)}{\log NTP}$$

where RC_{ij} (NRC_{ij}) is the specified target change for non-Natives (Natives) and TP_{ij} (NTP) is the time period in which the change is assumed to take place.

The model also calculates Native, civilian/non-Native, and total population in group quarters, as well as average household size for Natives, civilian/non-Natives, military, and total population.

(7) $NPGQ = = \sum_{ij}\sum (NPGQ_{ij} * NATP_{ij})$

(8) $CPGQ = = \sum\sum (CNNP_{ij} * CPGQ_{ij})$

(9) $POPGQ = = NPGQ + CPGQ + MILPCT * MPGQ$

(10) $HHSIZEN = = (NATTOT - NPGQ) / \sum_{ij}\sum NHH_{ij}$

(11) $HHSIZEC = = (CNNTOT - CPGQ) / \sum_{ij}\sum CHH_{ij}$

(12) $HHSIZEM = = (MILPCT * [AFTOT + MDTOT - MPGQ]) / \sum_{ij}\sum MHH_{ij}$

(13) $HHSIZE = = (POP - POPGQ) / HH$

D.2 Model Parameter Assumptions

The model was calibrated using the 1980 Census as a benchmark. The civilian/non-Native and Native headship rates were calculated from the statewide census data. These parameter values are shown in Table D-1.

The civilian/non-Native and Native population proportions in group quarters, also derived from the census, are assumed to remain a constant proportion of each cohort over the projection period. These are shown in Table D-2.

Military households are taken directly from the 1980 Census and are shown in Table D-3. The age-sex distribution of military house holds is assumed to remain constant over time and to increase or decrease proportionately as total military population changes. The proportion in group quarters also remains the same constant proportion of total military as it was in 1980.

The parameters determining the rates of change of headship rates are discussed in the next section.

TABLE D-1. 1980 ALASKA CIVILIAN HEADSHIP RATES

	Civilian/Non-Native		Native	
Age	Male	Female	Male	Female
15-19	.063	.036	.025	.026
20-24	.553	.201	.257	.127
25-29	.742	.234	.539	.188
30-34	.836	.237	.691	.219
35-39	.905	.215	.807	.227
40-44	.914	.216	.807	.227
45-49	.943	.224	.864	.267
50-54	.931	.223	.864	.267
55-59	.923	.262	.893	.297
60-64	.922	.320	.925	.330
65+	.884	.466	.888	.503

NOTES: Assumes 1970 distribution for age 15-54 in group quarters after military in group quarters of 8,078 males and 1,365 females was subtracted from total age 15-54 in group quarters. Other group quarters by cohort is from U.S. Census.

Assumes no Natives in military.

SOURCE: U.S. Department of Commerce, Bureau of Census, 1980, Census of Population, Census Tape STF2, Table 11.

TABLE D-2. ALASKA CIVILIAN POPULATION IN GROUP QUARTERS, 1980

	Non-Native				Native			
	Male		Female		Male		Female	
Age	Number	Percent	Number	Percent	Number	Percent	Number	Percent
< 1	0	0	0	0	0	0	0	0
1-4	71	.0071	41	.0045	12	.0041	7	.0026
5-9	53	.0046	35	.0032	20	.0058	20	.0059
10-14	53	.0044	35	.0031	20	.0053	20	.0055
15-19	569	.0435	48	.0040	160	.0376	98	.0240
20-24	986	.0729	401	.0283	239	.0692	98	.0284
25-29	439	.0238	69	.0040	115	.0405	33	.0118
30-34	291	.0166	33	.0022	69	.0314	20	.0092
35-39	374	.0278	13	.0011	40	.0224	10	.0057
40-44	379	.0369	29	.0036	41	.0288	4	.0029
45-49	331	.0392	64	.0092	35	.0258	12	.0092
50-54	198	.0265	30	.0051	20	.0181	12	.0112
55-59	154	.0266	46	.0093	22	.0233	11	.0128
60-64	98	.0268	10	.0032	22	.0350	7	.0103
65+	281	.0648	320	.0751	61	.0417	72	.0510
	4,277		1,174		876		424	

SOURCE: U.S. Census Tape STF2B

TABLE D-3. ALASKA MILITARY HOUSEHOLDS
(percent of total)

Age	Male	Female
15-19	.6	.1
20-24	18.3	.6
25-29	29.1	.9
30-34	23.7	.3
35-39	15.8	.2
40-44	6.7	.1
45-49	1.7	.1
50-54	1.0	.1
55-59	.3	-
60-54	.1	-
65+	.1	.1

SOURCE: 1980 Census, Census Tapes.

D.3 Projecting Alaskan Households in the Future

National Trends

The relationship between population and the number of households has not remained constant over time. Table D-4 shows historical trends in the size and composition of households in the United States since 1940. Average household size has declined steadily since World War II, primarily as a result of the increase in the proportion of "primary individual" households. The average size of families actually increased after the war until the mid-1960s because of the "baby boom," but this was more than compensated for by the fact that the average household size of "primary individual" households has fallen dramatically from 1.94 to 1.19 in 1980.

Somewhat more detail on recent historical trends is provided by Table D-5 which focuses on the composition of households in the last ten years. Total households increased by 27 percent over that period in contrast to an increase in population of 7.6 percent. Family households increased by 15.7 percent while nonfamily households grew 78 percent.

Part of the decline in average household size for families can be attributed to the relative growth of one-parent households and families with no children less than 18 years of age. All categories of nonfamily households grew rapidly, but those with more than one member grew most rapidly at 157 percent. This category includes both couples living together and groups of unrelated individuals sharing households.

The dominant factors which underlie these trends are the in creased life expectancy of people, which has increased the proportion of older-couple family households, and more importantly the aging of the post-war baby boom population which is now entering the primary headship years both in and out of families.

These trends have been projected forward nationally by the Department of Commerce (Table D-6) to predict the number of households in the future under different sets of assumptions of population (I, II, III) and headship rates (A, B, C, D).

These projections all assume a continued reduction of average household size during the next fifteen years. A control projection, K, is presented which assumes no change in headship rates to isolate the effect of population growth alone on the number of households.

TABLE D-4. HISTORICAL ANALYSIS OF HOUSEHOLDS IN THE UNITED STATES (thousands)

	Households	Average Household Size	Primary Families: Number	Primary Families: Average Family Size	Primary Families: Percent of Households	Primary Individuals: Number	Primary Individuals: Average Family Size	Primary Individuals: Percent of Households
1940		3.67		3.76				
1950	43,554	3.37	38,838	3.54	89.2	4,716	1.94	10.8
1955	47,874	3.33	41,732	3.59	87.2	6,142	1.61	12.8
1960	52,799	3.33	44,905	3.67	85.0	7,895	1.40	15.0
1965	57,436	3.29	47,838	3.70	83.3	9,598	1.28	16.7
1970	63,401	3.14	51,456	3.58	81.2	11,945	1.25	18.8
1975	71,120	2.94	55,563	3.42	78.1	15,557	1.23	21.9
1979	77,330	2.78	57,498	3.34	74.4	19,831	1.19	25.6
1980	80,776	2.76	59,550	3.31	73.7	21,226	1.19	26.3

SOURCES: U.S. Department of Commerce, Bureau of the Census, Statistical Abstract, 1979.

U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Population Estimates and Projections, Series P-25, No. 805, May 1979.

U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Household and Family Characteristics: March 1979, Series P-20, No. 352, July 1980.

U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Households, Families, Marital Status and Living Arrangements, Series P-20, No. 376, October 1982.

TABLE D-5. U.S. HOUSEHOLD COMPOSITION IN THE MOST RECENT DECADE

	1980		1970		
	Millions	Percent	Millions	Percent	Percent Growth 1970 to 1980
Total	80.776		63.401		27.4
Family Households	59.550	73.7	51.456	81.2	15.7
Married Couples	49.112	60.8	44.728	70.5	9.8
Other Family Households	10.438	12.9	6.728	10.6	55.1
Nonfamily Households	21.226	26.3	11.945	18.8	77.7
Persons Living Alone	18.419	22.8	10.851	17.1	69.7
Other Nonfamily Households	2.807	3.5	1.094	1.7	156.6

SOURCES: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Household and Family Characteristics: March 1979, Series P-20, No. 352, July 1980.

U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Households, Families, Marital Status, and Living Arrangements, Series P-20, No. 376.

TABLE D-6. PROJECTIONS OF HOUSEHOLDS AND HOUSEHOLD COMPOSITION IN 1995

Dept. of Commerce Projection Series[a]	Households	Average Household Size	Family Households	Percent	Nonfamily Households	Percent
1979 (BASE)	77,330	2.78	57,498	74.4	19,831	25.6
A I	107,528	2.46	72,709	67.6	34,819	32.4
II		2.31				
III		2.21				
B I	103,856	2.55	72,234	69.4	31,622	30.6
II		2.39				
III		2.28				
C I	104,194	2.54	70,715	67.8	33,479	32.2
II		2.38				
III		2.28				
D I	97,180	2.72	71,590	73.5	25,590	26.5
II		2.55				
III		2.44				
K	94,192		71,424	75.8	22,768	

[a]For definition of terms, see text.

SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Projection of the Number of Households and Families, 1979 to 1995, Series P-25, No. 805, May 1979.

For high rates of population growth (primarily due to natural increase), the average household size in 1995 would vary between 2.46 and 2.72. For low rates of population increase (fewer births and more deaths), average household size is projected to decline to between 2.21 and 2.44. Conversion of these trends in household size into annual rates of change yields a range of from -01.5 percent annually for the high population growth case to -.1 percent for the low population growth case.

Alaskan Trends

Turning to Alaska, the data is not so complete, but some trends can be identified. Table D-7 shows the growth in the number of households since 1950 and their composition. Several similarities and contrasts with the national trends are in evidence. Briefly, they are as follows:

Similarities

- Average household size has fallen since 1970.
- Average family size has fallen.
- The importance of female family heads has increased dramatically.
- The proportion of family households has declined at about the rate of the United States.

Contrasts

- The average household size for nonfamily households has not declined.
- In 1950 the average household size was below the national average, but since 1960 it has exceeded the national average by a substantial amount.

Average household size estimates from surveys conducted in Anchorage and Fairbanks in the mid-1970s confirm the declining trend in average household size. Estimates of 3.27 to 3.32 for Anchorage for 1975 and 3.18 for 1977 have been published by the Anchorage Urban Observatory. An estimate of 2.9 for 1976 for Fairbanks has been published by the Institute of Social and Economic Research (ISER).

Further comparison of Alaska with other states reveals that in 1980, the average household size in Alaska of 2.93 was fourth highest in the nation, after Hawaii (3.15), Utah (3.20), and Mississippi (2.97). Alaska experienced the greatest change between 1970 and 1980. Household size fell 16.8 percent, compared to the U.S. average which fell 11.6 percent.[1]

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[1]U.S. Department of Commerce, Bureau of the Census, Statistical Abstract of the United States 1981, December 1981.

TABLE D-7. ALASKA HISTORICAL HOUSEHOLD STATISTICS

	All Households[a]			Primary Family Households[a]							Primary Individual Households[a]					
	Households	Persons in HH	Average HH Size* (2) / (1)	Households No.	(%)	Husband/ Wife	Male Head	Female Head	All Persons	Average HH Size* (9) / (5)	Households No.	%	Male Head	Female Head	All Persons	Average HH Size* (15)/(12)
1950[b]	31,047	100,779	3.25	NA		21,788	NA	NA	NA	NA	NA		NA	NA	NA	NA
1960[b]	57,250	199,982	3.49	46,261	(80.8)	42,750	NA	NA	184,385	3.99	10,989	(19.2)	NA	NA	15,597	1.42
1960[c]	57,250	200,418	3.50	46,613	(81.4)	43,172	1,235	2,706	185,655	3.98	10,637	(18.6)	7,804	2,833	14,763	1.39
1970[d]	79,054	278,039	3.52	66,034	(83.5)	61,697		4,067	258,469	3.91	13,025	(16.5)	8,674	4,351	19,570	1.5
1970[c]	79,739	278,145	3.49	66,670	(83.6)	60,380	2,233	4,057	258,640	3.88	13,069	(16.4)	8,654	4,415	19,505	1.49
1976[e]	104,000	339,000	3.26	82,000	(78.8)	70,000	2,000	8,000	298,000	3.71	22,000	(21.2)	14,000	9,000	41,000	--
1980[f]	132,369	385,608	2.91	96,840	(73.2)	82,102	4,683	10,055	332,161	3.43	35,529	(26.8)	22,606	12,923	53,447	1.5

*Person per household

[a]By definition, Primary Families and Primary Individuals sum to total households.

[b]U.S. Census of Population, 1960, General Population Characteristics PC(1) 3B, Table 19, pp. 3-26, May 1961.

[c]U.S. Census of Population, Detailed Characteristics PC(1) D3, Alaska, Table 153, pp. 3-246, June 1972.

[d]U.S. Census of Population, General Characteristics PC(1) B3, Table 22, pp. 3-43, September 1971.

[e]Current Population Reports, Population Characteristics, Series P-20, No. 334, Table 4, p. 24, January 1979.

[f]U.S. Department of Commerce, Bureau of the Census, Supplementary Report, Advance Estimates of Social, Economic, and Housing Characteristics, Table P-1, 1980.

Finally, it is possible to compare the age-sex-specific headship rates in Alaska with those in the United States as a whole. Table D-8 compares the civilian headship rates in Alaska with those of the United States as a whole by age, sex, and race. As expected, the average headship rate for Alaskan Natives is considerably less than that of the population as a whole. The average headship rate for civilian/non-Native males was less than or equal to the national average, while for females it was, in most cases, greater.

Projections

Although there are some apparent differences between the patterns of household formation in the United States overall and for civilian/non-Native Alaskans in the aggregate, the rates are similar. There was, in 1980, a smaller proportion of nonfamily households in Alaska, but average household size exceeded the national average. The probability of being a household head was greater for a civilian/non-Native Alaska female than in the United States, but in contrast, somewhat less for males. Alaska's difference from future national trends should be due mainly to its demographic composition; for example, smaller-than-average population of retired people should reduce the rate of household formation. Alaska's pattern of growth in population because of in-migration (rather than births) should increase the rate of household formation. (This does not necessarily imply, however, a reduction in average household size.)

We project that household formation in Alaska will become more like the U.S. average rates over the projection period. We expect both U.S. and Alaska rates to change over the period; however, we do not expect the rapid change experienced in the past to continue. We assume that Alaska rates approach the U.S. year-2000 rates in a logarithmic trend and reach this rate by 2010.

Table D-9 shows the projected pattern of U.S. change. The year-2000 projections were found by extending the logarithmic trend found between 1970 and 1980 to the year 2000. The log trend assumes that headship rates are approaching some limit of change. The rates of change for each Alaska cohort (RC_{ij}) equal the difference between 1980 rates and these projected 2000 U.S. rates.

Trends in Native headship rates are more difficult to project because of the rapid social and economic changes occurring in the Native community. We assume that urbanization of the Native community will continue and, with it, a trend in headship rates similar to that in the nation as a whole. Thus, the same pattern of change in headship rates is applied to the Native population; however, the Natives are assumed to approach U.S. rates over a longer period.

TABLE D-8. COMPARISON OF 1970 ALASKA AND U.S. HEADSHIP RATES

	Alaska		United States
	Civilian/Non-Native	Native	
Male			
15-19	.063	.025	-
20-24	.553	.257	.415
25-29	.742	.539	.759
30-34	.836	.691	.886
35-39	.905	.807	.928
40-44	.914	.807	.928
45-49	.943	.864	.942
50-54	.931	.864	.942
55-59	.923	.893	.922
60-64	.922	.925	.922
65+	.884	.888	.828
Female			
15-19	.036	.026	-
20-24	.201	.127	.162
25-29	.234	.188	.213
30-34	.237	.219	.205
35-39	.215	.227	.194
40-44	.216	.227	.194
45-49	.224	.267	.211
50-54	.223	.267	.211
55-59	.262	.297	.268
60-64	.320	.330	.268
65+	.466	.503	.509

NOTES: Assumes 1970 distribution for age 15-54 in group quarters after military in group quarters of 8,078 males and 1,365 females was subtracted from total age 15-54 in group quarters. Other group quarters by cohort is from U.S. Census.

Assumes no Natives in military

SOURCE: U.S. Department of Commerce, Bureau of Census, 1980, Census of Population, Census Tape STF2.

TABLE D-9. U.S. HEADSHIP RATE PROJECTIONS

Age	Males			Females		
	1970	1980	2000	1970	1980	2000
20-24	.520	.415	.365	.098	.162	.193
25-29	.828	.759	.726	.114	.213	.260
30-34	.904	.886	.877	.118	.205	.247
35-44	.931	.928	.927	.130	.194	.225
45-54	.946	.942	.940	.167	.211	.232
55-64	.950	.922	.909	.265	.268	.269
65+	.908	.828	.938	.452	.509	.536

SOURCE: U.S. Department of Commerce, Bureau of the Census, U.S. Census 1970, 1980.

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APPENDIX E
ISER MAP ECONOMIC MODELING SYSTEM: REGIONALIZATION MODEL

E.1. Model Description

Introduction

This appendix presents in general outline form the structure of the revised regionalization model which allocates population, households, and employment to the census division level from a simulation of the state economic model. Southeast census divisions and Bristol Bay Borough census divisions are aggregated due to a prior constraint imposed by limited computer capabilities. The model essentially takes cross-sectional information on employment and population and projects the panel forward through time. The regional allocations are affected by variation over time in the location of basic sector and government activity. The total support employment and dependent population proportions vary over time to maintain consistency with the results of the state model.

In developing this model, several major objectives have been addressed as follows:

- o that the structure be simple and generalizable
- o that the parameters be specified in terms with clear, intuitive meaning
- o that the regions be disaggregated to census division levels
- o that the model be sufficiently flexible to be tied easily to the MAP statewide model

As such, the main strength of the model is in providing interregional consistency for any simulation analysis. On the other hand, because it treats each region in quite aggregate form, it cannot substitute for a detailed economic analysis for a particular labor market area, and in general the chance of projection error increases as the size of the census division analyzed declines.

The model consists of two components. First, given an exogenous estimate of statewide employment by sector (provided from a corresponding state model run) and vectors of basic and government employment in each of the twenty regions (1970 census division aggregates and Alaska Department of Labor, Labor Market Areas), the employment component of the model allocates support and total employment to each of the twenty regions. The population component then uses these estimates along with estimates of statewide population and households (from the statewide model) to generate regional population and household allocations.

The Employment Component

For each of the twenty regions, the model projects three types of employment: basic, government, and support. The basic sector consists of (1) all sectors or portions of sectors treated as exogenous in the state model: agriculture, fisheries, exogenous manufacturing, mining, exogenous construction, and a portion of transportation, as well as (2) some sectors which are endogenous in the state model: endogenous construction, forestry, miscellaneous, endogenous manufacturing, proprietors, and tourism employment. Government consists of federal civilian and military employees as well as state and local employees. State and local government are endogenous in the state model, but exogenous in the regionalization model. The support sector is defined as all other employment.

Total employment (M.aa) in each region aa is the sum of basic (B.aa), government (G.aa), and support (S.aa) employment.

$$M.aa = B.aa + G.aa + S.aa$$

Support employment in any region aa is a function of total employment in every region of the state as follows:

$$S.aa = \sum^{bb} M.bb * A.aa.bb * BETA$$

where A.aa.bb is the proportion of support sector employment stimulated by an increase in total employment in region bb which is observed in region aa.. The preliminary estimate is adjusted by the parameter BETA to yield a final figure which, when aggregated, is consistent with the state model simulation. According to this model formulation, an increase in basic or government employment in a single region can, in theory, give rise directly and indirectly to support employment in every other region of the state.

The support employment is calculated for each region aa based upon demand in region bb as follows:

$$S.aa.bb = A.aa.bb * M.bb * BETA$$

The Population Component

Population (P.aa) in each region is a function of residence-adjusted employment. Specifically,

$$PRE.aa = PM.aa * \sum^{bb} M.bb * IM.aa.bb$$

where PRE.aa is a preliminary population estimate for region aa, IM.aa.bb is the proportion of workers employed in region bb (M.bb) who live in region aa, and PM.aa is the ratio of population to residence-adjusted employment in region aa. This preliminary estimate is forced to conform in the aggregate to total state population by multiplying through by an adjustment factor (ADJ). This yields final population (P.aa).

P.aa = PRE.aa * ADJ

Since the 1970 census division boundaries were changed in 1980 and were renamed census areas, the population by 1980 census areas (PCEN.cc) is calculated from the estimates of population by 1970 census divisions (P.aa) as follows:

$$PCEN.cc = \overset{aa}{S}\, P.aa * PC.cc.aa$$

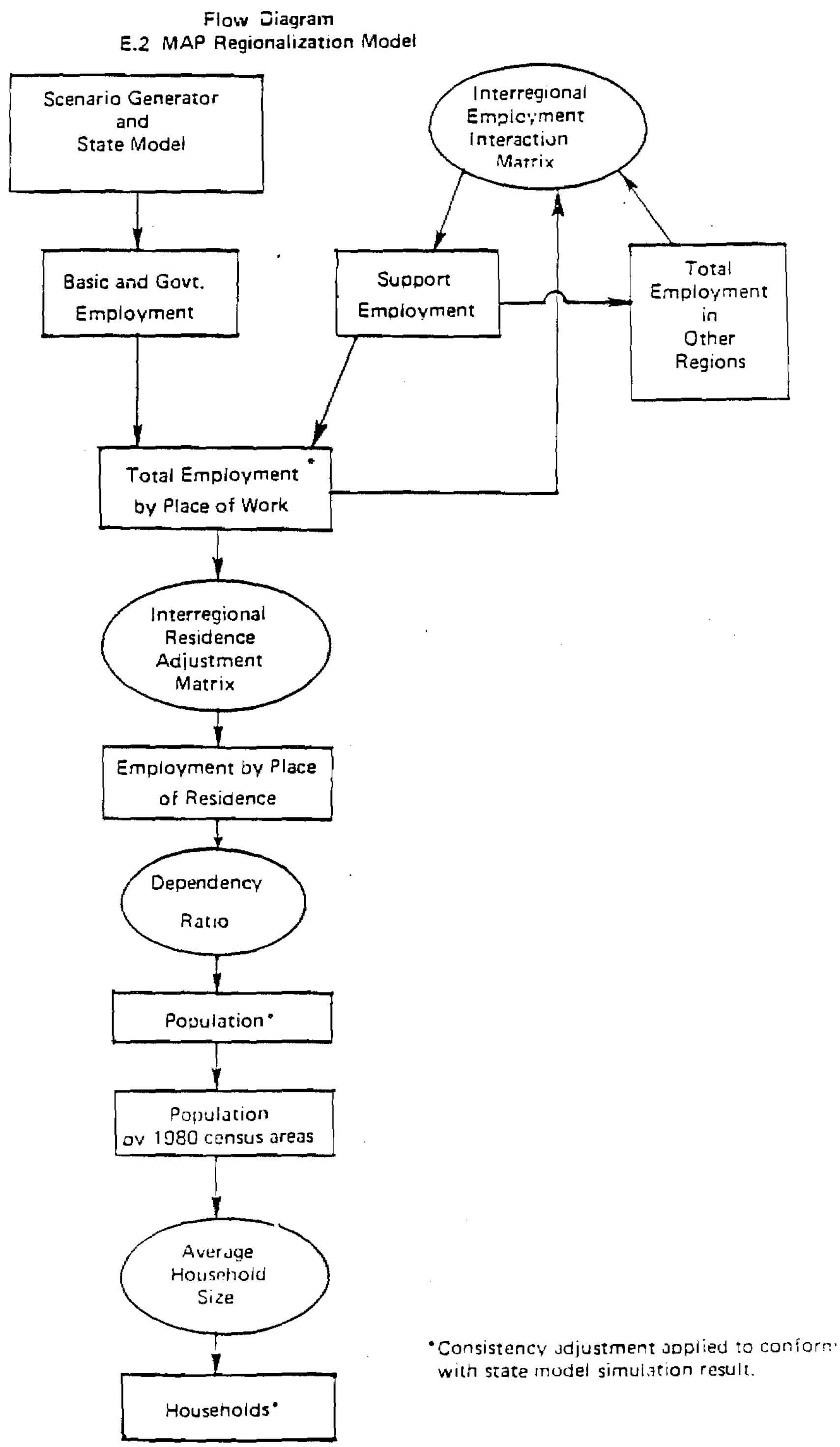
where PC.cc.aa is the proportion of population in region aa (1970 census division) allocated to region cc (1980 census area).

From these regional population figures, a preliminary value for the number of households (HPRE.cc) can be calculated as follows:

HPRE.cc = (PCEN.cc - PGQ.cc)/HHSZ.cc

where PGQ.cc is population in group quarters and HHSZ.cc is average household size in region cc. The preliminary figure is adjusted using the ratio ADJHH for consistency with the state simulation result (HHCEN.cc). A final product of the model is a set of household figures based upon the 1970 census divisions using the same allocation factors as employed in allocating population (HH.aa).

E.2 Flow Diagram



E.3. Model Inputs

Provided by the Scenario Generator

Baa — Portion of basic employment in region aa (mining [EMP9], exogenous construction [EMCNX], exogenous manufacturing [EMMX], exogenous transportation [EMT9X], agriculture [EMAGRI], fishing [EMFISH])

Gaa — Portion of government employment in region aa (federal civilian and military [EMGC and EMGM])

Provided by MAP State Economic Model

HH — Households

POP — Population

Provided by the Program for Running the Model*

B.aa — Total basic employment in region aa (EMP9, EMM9, EMCN, EMA9, EMT9X, EMPRO, EMTOUR)

BETA — Support employment/total employment ((EM99-EMA9-EMM9-EMCN-EMP9-EMT9X-EMPRO-EMGA-EMGF-EMTOUR)/EM99)

G.aa — Government employment in region aa (EMGC, EMGM, EMGS, EMGL)

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*The program used to run the regionalization model converts the basic sector employment from the scenario generator, utilizing output from the MAP state economic model, into the basic sector employment definition used in the regionalization model.

E.4. Variable and Parameter Names

Variables

M.aa	Total employment, region aa (EM99)
G.aa	Government employment, region aa (EMGC, EMGM, EMGS, EMGL)
B.aa	Basic employment, region aa (EMP9, EMCN, EMM9, EMA9, EMTOUR, EMT9X, EMPRO)
S.aa	Support employment, region aa (M.aa - G.aa - B.aa)
S.aa.bb	Support employment in region aa caused by economic activity in region bb
P.aa	Population[a], region aa
PCEN.cc	Population, region cc
HH.aa	Households, region aa
HHCEN.cc	Households[b], region cc

Parameters

A.aa.bb	Proportion of support sector employment stimulated by increase in total employment in region bb which occurs in region aa
IM.aa.bb	Percent of workers employed in region bb who live in region aa
PM.aa	Ratio of population to residence-adjusted employment in region aa
HHSZ.cc	Average household size in 1980 in Census Division cc
PGQ.cc	Population in group quarters in 1980 in Census Division cc
PC.cc.aa	Proportion of population in region aa (1970 Census division definiton) allocated to region cc (1980 Census area definition)

[a]A preliminary population, PRE.aa, is calculated for internal use.

[b]A preliminary household, HPRE.cc, is calculated for internal use.

Suffixes

aa	Labor Market Areas--1970 Census Divisions	Use in Model Yes	*
01	Aleutian Islands	x	
02	Anchorage	x	
03	Angoon		11
04	Barrow-North Slope	x	
05	Bethel	x	
06	Bristol Bay	x (includes 7)	
07	Bristol Bay Borough		6
08	Cordova-McCarthy	x	
09	Fairbanks	x	
10	Haines		11
11	Juneau	x (includes 3, 10, 13, 19, 20, 22, 23, 28)	
12	Kenai-Cook Inlet	x	
13	Ketchikan		11
14	Kobuk	x	
15	Kodiak	x	
16	Kuskokwim	x	
17	Matanuska/Susitna	x	
18	Nome	x	
19	Outer Ketchikan		11
20	Prince of Wales		11
21	Seward	x	
22	Sitka		11
23	Skagway/Yakutat		11
24	Southeast Fairbanks	x	
25	Upper Yukon	x	
26	Valdez/Chitina/Whittier	x	
27	Wade Hampton	x	
28	Wrangell/Petersburg		11
29	Yukon/Koyukuk	x	
ST	State		
RB	Railbelt = 2 + 9 + 12 + 17 + 21 + 24 + 26		
AG	Greater Anchorage = 2 + 12 + 17 + 21		
AM	Anchorage + MatSu = 2 + 17		
NR	Non-Railbelt = ST - RB		
FG	Greater Fairbanks = 9 + 24		
IR	Intertied Railbelt = RB - 26		

*Aggregated into area indicated.

cc	--1980 Census Areas	Used in Model Yes	*
01	North Slope	x	
02	Kobuk	x	
03	Nome	x	
04	Yukon/Koyukuk	x	
05	Fairbanks	x	
06	Southeast Fairbanks	x	
07	Wade Hampton	x	
08	Bethel	x	
09	Dillingham		10
10	Bristol Bay Borough	x (includes 09)	
11	Aleutian Islands	x	
12	Matanuska/Susitna	x	
13	Anchorage	x	
14	Kenai Peninsula	x	
15	Kodiak	x	
16	Valdez/Cordova	x	
17	Skagway/Yakutat/Angoon		19
18	Haines		19
19	Juneau	x (includes 17, 18, 20, 21, 22, 23)	
20	Sitka		19
21	Wrangell/Petersburg		19
22	Prince of Wales/Outer Ketchikan		19
23	Ketchikan Borough		19

*Aggregated into area indicated.

E.5. Parameter Values

HHSZ.cc Average Household Size

PGQ.cc Population in Group Quarters

These parameters are calculated from the 1980 census as shown in Table E.1.

TABLE E.1.

	1980 Census Area (Aggregated as Required by Model)	Average Household Size (HHSZ.cc)	Population in Group Quarters (PGQ.cc) (thousands)
1	North Slope	3.91	.365
2	Kobuk	4.2	.048
3	Nome	3.7	.088
4	Yukon/Koyukuk	3.18	.614
5	Fairbanks	2.78	3.339
6	Southeast Fairbanks	3.16	.399
7	Wade Hampton	4.87	.055
8	Bethel	4.05	.118
9	Dillingham[a]	0	0
10	Bristol Bay Borough	3.68	.339
11	Aleutian Islands	3.27	2.548
12	Matanuska/Susitna	3.06	.324
13	Anchorage	2.80	4.848
14	Kenai Peninsula	2.92	.32
15	Kodiak	3.06	.681
16	Valdez/Cordova	2.84	.702
17	Skagway/Yakutat/Angoon[b]	0	0
18	Haines[b]	0	0
19	Juneau	2.89	1.418
20	Sitka[b]	0	0
21	Wrangell/Petersburg[b]	0	0
22	Prince of Wales/ Outer Ketchikan[b]	0	0
23	Ketchikan[b]	0	0

[a]Aggregated with Bristol Bay Borough
[b]Aggregated with Juneau

SOURCE: 1980 Census of Population

PM.aa Ratio of Population to Residence-Adjusted Employment

This parameter is calculated using the most recent population and employment estimates of the Department of Labor (see Table E.2). The 1981 population estimate is adjusted to a labor-market basis using PC.cc.aa to be consistent with employment data by labor markets. Employment by place of residence is estimated using the interregional residence adjustment matrix, IM.aa.bb, applied to an estimated 1981 regional distribution of employment. This estimate is determined by running the regionalization model to allocate regionally the estimated 1981 statewide employment. The simplest way to accomplish this is to run the model once and then calibrate PM.aa to hit the correct population figure.

TABLE E.2. CALCULATION OF POPULATION/RESIDENT EMPLOYMENT RATIO (PM.aa)

	Labor Market Area	Estimated Residence-Adjusted Average Annual Employment 1981	Census Population 1981	Census Population per Avg. Annual Employed Resident (PM.aa)
1	Aleutian Islands	2.556	8.624	3.374
2	Anchorage	87.458	180.740	2.066
4	Barrow/North Slope[1]	.591	7.098	7.1
5	Bethel	2.983	9.579	3.211
6	Bristol Bay*	1.920	5.716	2.977
8	Cordova/McCarthy	.903	2.374	2.629
9	Fairbanks	26.047	58.313	2.239
11	Juneau**	27.495	55.985	2.036
12	Kodiak/Cook Inlet	8.984	23.574	2.624
14	Kobuk	1.586	4.960	3.127
15	Kodiak	5.461	9.728	1.782
16	Kuskokwim	.468	2.577	5.506
17	Matanuska-Susitna	6.183	19.123	3.093
18	Nome	1.910	7.565	3.961
21	Seward	.757	2.947	3.893
24	Southeast Fairbanks	1.472	5.734	3.895
25	Upper Yukon	.485	1.229	3.534
26	Valdez/Chitina/Whittier	3.023	6.471	2.141
27	Wade Hampton	1.077	4.726	4.388
29	Yukon/Koyukuk	1.665	5.122	3.076
ST	Statewide	183.024	422.185	2.307

[1]The 1980 population of 4.199 was used for Barrow due to a change in the definition of residence in 1982.

*Includes 7

**Includes 3, 10, 13, 19, 20, 22, 23, 28

A.aa.bb Interregional Employment Interaction Matrix

Regional employment for 1979 was available from the Alaska Department of Labor publications, specifically Statistical Quarterly and Alaska Economic Trends. The breakdown of such employment by basic, government, and support sectors is shown in Table E.3 for 1979.

Since the major concern of the regional model is to capture the effect of support sector demands which are supplied in regions other than the one giving rise to such demands, rather than to examine the effects of differential support demands across regions, it seems plausible, or at least not overly restrictive, to impose the condition that the ratio of support employment generated by a unit of basic employment is the same wherever the basic employment occurs. The difference between regions, then, is solely the difference in the locations from which these demands will be supplied.

This assumption has the obvious disadvantage that it neglects real interregional differences in demand for support sector services. However, it also has several advantages which may more than compensate for this shortcoming. Most obviously, it reduces our estimation problem by n-1 parameters. More importantly, it is extremely valuable as a tool for maintaining consistency with the statewide MAP model, in both a static and a dynamic sense. Currently, a unit of basic sector employment in the state model has the same static employment impact regardless of its location in the state. Regionally varying support/basic ratios would produce differing total statewide static impacts by location, thus being inconsistent with the state model. Furthermore, the introduction of BETA (the ratio of support to total employment from the state model) exogenously provides a valuable tool for maintaining dynamic consistency between the models. By letting BETA vary with time so as to reflect the corresponding state model simulation, we both force the matrix (A.aa.bb) to vary over time to reflect the same degree of structural change represented by the state model and force the employment totals to replicate the statewide results.

The major reason that not all support sector requirements are supplied internally within the region is that it would be more costly to do so than to secure those services from a different region. It is only natural, then, that the cost of supply should be the major determining factor in deciding to which other regions to allocate the supply. Such costs as transportation, communication, etc. are generally expected to increase with distance and to decrease with the size of the support sector source for the region. We hypothesize that the location of support services is chosen in such a way as to minimize the costs of providing the required services observed in region bb from each of the sources of such supply aa. Cost between locations is an increasing function of distance and an inverse function of employment in the supplying region.

TABLE E.3. EMPLOYMENT COMPOSITION, 1979

	Region	Support (S_i)	Basic[1] (B_i)	Government[2] (G_i)	Total (M_i)
1	Aleutian Islands	377	2,463	3,264	6,104
2	Anchorage	45,404	13,828	34,009	93,241
4	Barrow/North Slope	594	3,467	1,514	5,575
5	Bethel	1,917	420	1,360	3,697
6	Bristol Bay*	839	1,778	1,197	3,814
8	Cordova/McCarthy	403	1,005	344	1,752
9	Fairbanks	11,191	3,584	12,801	27,576
11	Southeast Alaska**	9,475	9,284	11,081	29,840
12	Kenai/Cook Inlet	2,819	3,564	1,481	7,864
14	Kobuk	402	114	935	1,451
15	Kodiak	1,644	3,631	2,051	7,326
16	Kuskokwim	123	13	435	571
17	Matanuska-Susitna	1,505	560	1,345	3,410
18	Nome	1,083	298	980	2,361
21	Seward	433	709	390	1,532
24	Southeast Fairbanks	240	149	1,636	2,025
25	Upper Yukon	99	25	302	426
26	Valdez/Chitina/ Whittier	715	678	927	2,320
27	Wade Hampton	208	236	595	1,039
29	Yukon/Koyukuk	506	807	1,208	2,521
ST	Statewide	79,977	46,613	77,855	204,445

[1]Mining, manufacturing, construction, agriculture-forestry-fisheries, and miscellaneous.

[2]Federal, state, and local government

*Includes Bristol Bay and Bristol Bay Borough Census Divisions

**Includes the following Census Divisions: Angoon, Haines, Juneau, Ketchikan, Outer Ketchikan, Prince of Wales, Sitka, Skagway-Yakutat, and Wrangell-Petersburg.

SOURCE: Alaska Economic Projections for Electricity Requirements for the Railbelt, ISER, 1981.

The A.aa.bb matrix was estimated by a linear programming routine for the problem of minimizing the cost of service delivery using 1979 data. It is presented in Table E.4. The solution, A.aa.bb, comprises a matrix which we call the interregional employment interaction matrix. Each entry represents the share of support requirements for region bb supplied from region aa. Each of the columns, therefore, must sum to unity. Thus, a quick glance down each column provides a subjective test of the plausibility of the matrix. _A priori_, one would expect nonzero entries in all of the diagonal elements and along the rows of the regional support centers (Bethel, Fairbanks, Nome) and probably along the entire row corresponding to Anchorage, which is a statewide support center. The pattern is as would have been expected. All diagonal terms are nonzero, with the larger support centers being self-sufficient vis-a-vis the rest of the state (having diagonal entries of 1). Anchorage and Fairbanks appear to be the only significant support centers, with Anchorage supplying most regions and Fairbanks supplying Kuskokwim, Upper Yukon, and Yukon/Koyukuk. Two local support centers emerge, with Bethel supporting Wade Hamption and Nome supporting Kobuk.

A complete description of the methodology used to derive this matrix appears in _Alaska Economic Projections for Estimating Electricity Requirements for the Railbelt_, ISER.

TABLE E.4. INTERREGIONAL EMPLOYMENT INTERACTION MATRIX (A.aa.bb)

	Demand Region																			
Supply Region	01	02	04	05	06	08	09	11	12	14	15	16	17	18	21	24	25	26	27	29
01 Aleutian Islands	.16																			
02 Anchorage	.84	1.	.73		.44	.41		.19	.08	.01	.43				.28	.7			.21	.25
04 Barrow			.27																	
05 Bethel				1.															.49	
06 Bristol Bay					.56															
08 Cordova/McCarthy						.59														
09 Fairbanks							1.					.45					.41			.24
11 Southeast Alaska								.81												
12 Kenai/Cook Inlet									.92											
14 Kobuk										.71										
15 Kodiak											.57									
16 Kuskokwim												.55								
17 Matanuska/Susitna													1.							
18 Nome										.28				1.						
21 Seward															.72					
24 S.E. Fairbanks																.3				
25 Upper Yukon																	.59			
26 Valdez/Chitina/Whittier																		.79		
27 Wade Hampton																			.51	
29 Yukon/Koyukuk																				.51

IM.aa.bb Interregional Residence Adjustment Matrix

The interregional residence adjustment matrix calculates the place of residence of workers employed in Alaska. It is an expanded and refined version of the Interregional Wage and Employee Flow Matrix constructed for the econometric model of Anchorage (see Municipality of Anchorage: Economic Modeling Project, ISER, 1982, p. II-24).

Four sources of information are used to construct the matrix. The first is the U.S. Census data on commuting which provides information on the proportion of residents in a region who are employed outside the region. The second is an analysis of tax returns by Alaskan places which, when compared to wages and salaries earned by place of work, provides a comparison of wages earned by workers in a region and workers living in a region. The third is the residency adjustment figures of the Bureau of Economic Analysis which provides another estimate of the ratio of wage and salary income earned in a region to resident wage and salary income. The fourth is the preliminary results of a special census for oil-related work sites on Alaska's North Slope conducted by the Alaska Department of Labor which reports usual place of residence of oil field employees. This census provided the basis for the column vector of the matrix for Barrow, after adjustment for non-oil-related employment on the North Slope.

Filling in the other cells of the matrix involved a judgmental approach because the available data left too many degrees of freedom to specify values for the 360 remaining cells.

The first step was calculation of the diagonal elements--the proportion of employment in each region done by residents of the region. This involved the following equation:

$$IM.aa.aa = \frac{(1-\%) * WR}{WP}$$

where % is the proportion of workers reporting employment outside their census area of residence in 1980 (1980 Census Table 36, STF3); WR is wages reported by residents on their 1978 income tax returns (Federal Income Taxpayer Profile 1978, Alaska Department of Revenue, 1981); and WP is wages and salaries paid in 1978 by labor market area (Statistical Quarterly, Alaska Department of Labor). The resulting parameter is net of both outflows of wages by nonresidents and inflows of wages by commuting residents. Table E.5 shows the ratio of wages reported to wages paid in 1978 and demonstrates a considerable amount of job commuting, particularly in certain census divisions.

TABLE E.5. WAGES PAID BY LOCATION AND WAGES EARNED BY RESIDENTS IN 1978
(million $)

Census Division	(1) Wages[a] Paid	(2) Wages[b] Reported by Residents	(2)-(1) Net Inflo (Outflo)	(3)/(1) Wages Reported as Percent of Wages Paid
Matanuska-Susitna	52.5	110.4	58.2	211
Kobuk	15.5	21.5	6.0	139
Skagway/Yakutat	12.5	14.6	2.1	117
Haines	6.8	7.4	0.6	110
Kenai/Cook Inlet	147.3	160.4	13.1	109
Upper Yukon	5.5	6.0	0.5	109
Valdez/Chitina/ Whittier	40.7	44.3	3.6	109
Wade Hampton	8.7	9.0	0.3	103
Seward	20.2	19.1	(1.1)	95
Bethel	36.0	31.7	(4.3)	88
Juneau	191.9	169.0	(22.9)	88
Anchorage	1,737.3	1,513.2	(224.1)	87
Fairbanks	532.6	459.0	(73.6)	86
Ketchikan	102.6	86.6	(16.0)	84
Nome	32.6	27.3	(5.3)	84
Angoon	2.4	2.0	(0.4)	83
Wrangell/Petersburg	41.0	33.6	(7.4)	82
Kuskokwim	8.8	6.9	(1.9)	79
Sitka	73.1	56.7	(16.4)	78
Southeast Fairbanks	26.1	19.4	(6.7)	74
Bristol Bay	17.8	13.0	(4.8)	73
Outer Ketchikan	8.4	5.9	(2.5)	70
Kodiak	86.7	60.6	(26.1)	70
Yukon/Koyukuk	54.4	32.8	(21.6)	60
Cordova/McCarthy	21.8	12.6	(9.2)	58
Prince of Wales	14.7	7.5	(7.2)	51
Bristol Bay Br.	13.9	5.7	(8.2)	41
Aleutian Islands	85.3	14.5	(70.8)	17
Barrow/North Slope	237.3	27.0	(210.3)	11
Alaska	3,634.1	2,977.9	(656.2)	82
United States	1,102,062.0	1,092,000.0	(10,062.0)	99

[a]U.S. Department of Commerce, Bureau of Economic Analysis.

[b]Alaska Department of Revenue, Federal Income Taxpayers Profile 1978, December 1981.

Off-diagonal elements are best understood by thinking of the columns where the elements in a particular column represent the percentage of employees working in the location represented by that column who live in each census area. To determine these elements, three assumptions are made. First, Alaskan residents earn no wage income outside of Alaska. Second, non-Alaskan residents can earn wage income in Alaska. Third, based upon a general knowledge of the state, certain elements can be assumed to be zero, thus reducing the number of degrees of freedom for the problem considerably. The matrix was then regionally aggregated into seven regions, and the wage income earned by nonresidents in each region was allocated to the other six and out of the state so that each column summed to one and each row completely allocated all earned income. The resulting parameters were then split into the twenty regions proportionately, except in a few instances where judgment about local conditions resulted in an adjustment. The full matrix is shown as Table E.6.

TABLE E.6. INTERREGIONAL RESIDENCE ADJUSTMENT MATRIX (IM.aa.bb)

Place of Residence \ Place of Work	01	02	04	05	06	08	09	11	12	14	15	16	17	18	21	24	25	26	27	29
01 Aleutian Islands	.41																			
02 Anchorage	.09	.86	.38	.09	.09	.02			.02		.02	.09			.02					
04 Barrow			.08																	
05 Bethel			0	.86							.02									
06 Bristol Bay					.5															
08 Cordova/McCarthy						.55														
09 Fairbanks			.16				.86									.05				
11 Southeast Alaska			.01					.84												
12 Kenai/ Cook Inlet	.02		.06	.02	.02				.97			.02								
14 Kobuk			.01							1										
15 Kodiak	.02				.02						.69	.02								
16 Kuskokwim												.78								
17 Matanuska/ Susitna	.02	.02	.06	.02	.02	.01			.01		.01	.02	1		.01					
18 Nome			.0											.79						
21 Seward															.80					
24 S.E. Fairbanks			.01													.69				
25 Upper Yukon																.005	1			
26 Valdez/Chitina/ Whittier			.01															1		
27 Wade Hampton																			1	
29 Yukon/Koyukuk			.01																	.61
Total Residential*	.56	.88	.78	.99	.65	.58	.86	.84	1	1	.74	.93	1	.79	.83	.75	1	1	1	.61
Out of Alaska	.44	.12	.22	.01	.35	.43	.14	.16	0	0	.26	.07	0	.21	.17	.25	0	0	0	.39

*Components may not sum to total due to rounding.

PC.cc.aa 1970 to 1980 Census Boundary Allocations

These allocations are based upon population by place from the 1980 Census.

PC.04.16	.5079
PC.04.25	.9475
PC.06.25	.0525
PC.08.16	.4921

SOURCE: 1980 Census, Population data by place

E.6. Model Validation

The regionalization model has been initialized on 1981 population. The year 1981 is considered to be less affected by the temporary effects of the business cycle and the permanent fund dividend distribution program than 1982.

Because accurate historical data on interregional commuter patterns and a complete historical data set on basic employment by region are not available, it is not possible to do a historical simulation using the regionalization model. It is possible to compare the historical trends in the regional distribution of employment and population with the projections.

Historically, the proportion of state employment occurring in the railbelt has remained remarkably constant (Table E.7). Aside from the years of peak construction of the oil pipeline, the proportion has ranged between 67.1 and 68.6 percent since 1965. On the other hand, there has been an increasing concentration of population in the railbelt, growing from 62.1 percent of the total in 1960 to 68.9 percent in 1980 (Table E.8).

The differentially more rapid population growth in the railbelt (and conversely the differentially slower population growth outside of the railbelt) is an interesting phenomenon explained partially by the nature of the labor market. The demand for labor has been increasing at a rapid pace historically throughout the state, as reflected by the employment data. The growth in population through in-migration augments the supply of labor to clear the labor market. Outside of the railbelt, rates of unemployment have historically been higher, indicating that employment can increase without requiring population increase through in-migration. In March 1982, for example, the unemployment rates for the railbelt and nonrailbelt were 10.8 and 13.7 pecent, respectively.

The uncertainty surrounding projections of the regional distribution of population is not so much where the employment opportunities are located but where those workers who have the skills necessary to do those jobs choose to live. The assumption reflected in the structure of the regionalization model is that there will be a continuation of the trend in concentration of population in the railbelt but that the moderation of the growth rate in population through in-migration will slow this trend.

TABLE E.7. EMPLOYMENT
(thousand)

	Anchorage M.02	Matanuska-Susitna M.17	Cook Inlet (Includes Seward) M.12 + M.21	Fairbanks M.09	Southeast Fairbanks M.24	Railbelt M.IR	Railbelt % of Total	State M.ST
Historical								
1965	47.8	1.2	3.3	21.8		74.1	67.7	109.5
1966	48.2	1.2	4.1	21.8		75.3	67.7	111.3
1967	49.3	1.2	5.3	21.6		77.4	67.3	115.0
1968	50.0	1.1	6.1	22.1		79.3	67.7	117.2
1969	54.6	1.1	5.6	24.0		85.3	68.1	125.3
1970	58.0	1.2	5.0	24.3		88.5	68.5	129.2
1971	60.6	1.5	5.0	23.7		90.8	68.4	132.7
1972	63.3	1.6	5.1	23.4		93.4	68.6	136.1
1973	65.5	1.7	5.4	22.6		95.2	67.7	140.7
1974	73.3	1.9	5.8	26.5		107.5	68.0	158.2
1975	83.8	2.1	7.5	37.0		130.4	67.1	194.3
1976	86.7	2.4	7.9	37.0		134.0	66.6	201.2
1977	91.7	2.7	8.6	31.9		134.9	70.0	192.6
1978	90.6	3.1	7.8	29.4		130.9	68.4	191.5
1979	91.3	3.3	8.1	29.3		132.0	68.2	193.7
Projection								
1981	99.3	3.4	9.3	31.2		143.2	65.5	218.5
1990	125.1	4.2	12.5	36.8		178.6	64.3	277.6
2000	140.3	4.4	12.6	40.2		197.5	65.8	300.1
2010	168.6	5.1	14.6	47.0		235.4	67.9	346.7

HISTORICAL DATA SOURCE: ISER data base; employment includes active-duty military and reservists but not proprietors.

PROJECTION DATA SOURCE: Projection HER.9; employment includes proprietors.

TABLE E.8. POPULATION
(thousand)

	Anchorage P.02	Matanuska-Susitna P.17	Cook Inlet (Includes Seward) P.12 + P.21	Fairbanks P.09	Southeast Fairbanks P.24	Railbelt P.IR	State P.ST
Historical							
1960							
Number	82.833	5.188	9.053	41.089	2.323	140.486	226.167
% of State	36.6	2.3	4	18.2	1	62.1	
1970							
Number	126.385	6.509	16.586	45.864	4.326	199.670	302.583
% of State	41.8	2.2	5.5	15.2	1.4	66.0	
1980							
Number	173.017	17.766	25.282	53.983	5.770	275.818	400.481
% of State	43.2	4.4	6.3	13.5	1.4	68.9	
Projection							
1990							
Number	233.675	24.768	35.636	71.219	6.242	371.539	533.184
% of State	43.8	4.7	6.7	13.4	1.2	69.7	
2000							
Number	267.251	26.969	36.863	79.156	6.384	416.622	593.611
% of State	45.0	4.5	6.2	13.3	1.1	70.2	
2010							
Number	318.393	31.014	42.155	92.530	6.530	490.620	684.180
% of State	46.5	4.5	6.2	13.5	1.0	71.7	

HISTORICAL DATA SOURCE: U.S. Census.

PROJECTION DATA SOURCE: Simulation HER.9.

E.7. Programs for Model Use

A83RUNCD This MACRO takes output from a simulation using the state economic model and inputs provided by the scenario generator on basic and government sector employment by census division and runs the regionalization model.

The definition of basic sector plus government employment in the regionalization model includes the following categories of employment:

EMP9	Mining
EMM9	Total Manufacturing
EMCN	Total Construction
EMA9	Agriculture/Forestry/Fisheries
EMT9X	Exogenous Transportation
EMPRO	Proprietor Employment
EMTOUR	Tourism Employment
EMGA	State and Local
EMGF	Federal

In the state model, however, EMTOUR, EMGA, and portions of EMA9, EMM9, EMCN, and EMPRO are endogenous and thus not provided on a regional basis from the scenario generator. This program includes a procedure for converting the endogenous portions of these industries to exogenous and regionalizing them.

Specifically, the following variables are regionalized and added to Baa to derive B.aa:

EMCN1	Endogenous Construction
EMA9-EMAGR1-EMAFISH	Forestry and Nonclassifiable
EMPRO1	Endogenous Proprietor Employment
EMTOUR	Tourism Employment
EMMO	Endogenous Manufacturing

In addition, the following variable is regionalized and added to Gaa to derive G.aa:

EMGA	State and Local Government Employment

The parameters used in the regional allocation of these variables are calculated using the 1979 regional distribution of employment. The values used are shown in the accompanying table (Table E.9).

TABLE E.9. PARAMETER VALUES USED IN REGIONAL ALLOCATION OF CERTAIN EXOGENOUS VARIABLES*

Region Number aa	Endogenous Construction	Forestry	Proprietors	Tourism	State and Local Government
1	.01	0	.02	0	.01
2	.57	.45	.46	.33	.34
4	.03	0	0	0	.03
5	.01	0	.01	0	.03
6	.01	0	.01	0	.02
8	0	0	.01	.01	.01
9	.16	.27	.11	.13	.13
11	.10	.04	.23	.30	.22
12	.04	.17	.05	.07	.04
14	0	0	0	0	.02
15	.01	.02	.04	.04	.02
16	0	0	0	0	.01
17	.02	.02	.02	.1	.03
18	0	.02	.01	0	.02
21	0	0	.01	0	.01
24	0	0	.01	0	.01
25	0	0	0	0	.01
26	.01	0	.01	.11	.02
27	0	0	0	0	.01
29	.01	.01	0	0	.01

*May not sum to 1 due to rounding error.

APPENDIX F
ISER MAP ALASKA ECONOMIC MODEL: VARIABLE AND PARAMETER DICTIONARY

Variable	Definition; Units	Historical Data Source[a]
ADMDIS	average daily membership in district schools; thousand	ADE, Annual Report
ADMREA	average daily membership in REAA schools; thousand	ADE, Annual Report
ADMSD	average daily membership in district and REAA schools; thousand	ADE, Annual Report
AEX	Alaskan personal income tax exemptions; million $	Constructed from IRS, Statistics of Income, ADL, Statistical Quarterly and unpublished data, and 1970 U.S. Census
AFTOT	total armed forces personnel in 1980	Alaska Air Command and Kruse, Design and Implementation of Alaska, 1980 Reapportionment Data Collection Effort
AGI	gross income reported on Alaskan state personal income tax returns; million $	Constructed from IRS, Statistics of Income, ADL, Statistical Quarterly and unpublished data, and 1970 U.S. Census
AHG	Alaskan highway gasoline consumption per vehicle; gallons	-
ANCSA	payment to Alaska Natives by federal and state government under Alaska Native Claims Settlement Act; million $	Constructed from Alaska Native Land Claims, Arnold and BEA personal income data

[a] No entry indicates either a constructed variable or no historical data available.

Data Source Abbreviations:

- ADA - Alaska Department of Administration
- ADC - Alaska Department of Commerce and Economic Development
- ADCR - Alaska Department of Community and Regional Affairs
- ADE - Alaska Department of Education
- ADL - Alaska Department of Labor
- ADPW - Alaska Department of Transportation and Public Facilities
- ADR - Alaska Department of Revenue
- BEA - U.S. Department of Commerce, Bureau of Economic Analysis
- BOC - U.S. Department of Commerce, Bureau of Census
- IRS - U.S. Department of Treasury, Internal Revenue Service

Variable	Definition; Units	Historical Data Source[a]
ATD	Alaska personal income tax deductions; million $	Constructed from IRS, Statistics of Income, ADL Statistical Quarterly and unpublished data, and 1970 U.S. Census
ATI	Alaska state personal income tax taxable income; million $	Constructed from IRS, Statistics of Income, ADL Statistical Quarterly and unpublished data, and 1970 U.S. Census
ATI.TT	Alaska state taxable personal income per taxpayer; thousand $	-
ATT	Alaska state personal income tax returns - individual plus joint returns; thousand	constructed from IRS Statistics of Income and ADL Statistical Quarterly
BADD	birth adjustment factor to account for birth of Native children to non-Native women	-
BAL99	combined state fund balances; million $	ADA, Annual Financial Report
BAL991	initial combined state fund balances; million $	-
BALCAB	state general fund revenues minus general fund expenditures; million $	-
BALCABBM	unrestricted general fund revenues minus unrestricted general fund expenditures	-
BALCAP84	net additions to the state capital stock put in place after 1983, inflated to current dollar value; million $	-
BALDF	development fund balance; million $	-
BALDF1	initial state development fund (hypothetical) balance; million $	-
BALGF	state general fund balance (available for appropriations); million $	ADA, Annual Financial Report
BALGF1	initial state general fund balance; million $	-
BALGFCP	positive change in general fund balance from year to year (if change negative, this takes zero value); million $	-

Variable	Definition; Units	Historical Data Source[a]
BALGFP	state general fund balance if positive; if state general fund balance negative, then zero; million $	-
BALLANDS	state plus local government current account balance; million $	-
BALOCAL	local government revenues minus nondebt financed expenditures; million $	-
BALPF	permanent fund balance; million $	ADA, Annual Financial Report
BALPF1	initial state permanent fund balance; million $	-
BASEMCNX	a base case vector of EMCNX values used for fiscal impact analysis in conjunction with fiscal policy variable EXRL4	-
BASEPOP	a base case vector of POP values used for fiscal impact analysis in conjunction with fiscal policy variable EXRL4	-
BASEXCAP	a base case vector of EXCAP values used for fiscal impact analysis in conjunction with fiscal policy variable EXRL4	-
BASEXGF	base case expenditure value to be placed in impact run to calculate difference in state expenditures in real per capita terms	-
BASEXOPS	a base case vector of EXOPS values used for fiscal impact analysis in conjunction with fiscal policy variable EXRL4	-
BASPDRPI	base case value of RPI to be input into impact run to calculate difference in state expenditures in real per capita terms	-
BCRUDE	Alaska crude civilian birth rate	-
BIU	the Basic Instructional Unit for School Foundation distribution program; thousand $	ADE, Annual Report
BIU1	initial value of Basic Instructional Unit for School Foundation distribution program; thousand $	-
BL	Alaska business licenses issued; thousand	ADR, unpublished data

Variable	Definition; Units	Historical Data Source[a]
BTHTOT	total Alaska civilian non-Native births to civilian population	-
BTOT	total Alaska civilian births; thousand	-
C***	stochastic coefficient	-
CBR	Alaska crude civilian non-Native birth rate	-
CDR	Alaska crude civilian non-Native death rate	-
CEabN	proportion of Native employment in sector ab	1970 U.S. Census, Alaska public use samples
CHHij	Alaska households headed by civilian non-Native persons in cohort ij	-
CNNPij	Alaska civilian non-Native population in cohort ij	-
CNNTOT	total Alaska civilian non-Native population	-
COLA	federal cost of living adjustment for Alaska state personal income tax purposes; million $	Constructed from ADL Statistical Quarterly and PCOLART
CPGQij	fraction of civilian non-Native population in cohort ij in group quarters	BOC, 1980 Census Tape STF2B
Cij	Alaska civilian non-Native population in cohort ij before migration	-
D****	dummy variable with value of 1 for year or period of years indicated; units	-
D.80DEC6	dummy variable with value of one in 1980 tapering off to zero in 6 years, reflecting the fact that Alaskan wage rates are "sticky downward"	-
DCRUDE	Alaska crude civilian death rate	-
DEBTP82	sum of general obligation bonded debt incurred by the state after 1982; million $	-
DELEMP	annual change in civilian employment (EM96); thousand	-
DF.***	variable deflated to 1982 dollars (PDRPIBAS is base year index);	-

Variable	Definition; Units	Historical Data Source[a]
DF.RSVP	cumulative discounted value of petroleum revenues received from 1982; million 1982 $	-
DPI	Alaska disposable personal income; million $	BEA disposable personal income data & ADA, Annual Financial Report
DPI8	Alaska disposable personal income plus residency adjustment; million $	BEA disposable personal income data & ADA, Annual Financial Report
DPIRES	total nonfederal, nonstate personal income tax payments paid out of Alaskan personal income for purposes of calculating disposable personal income; million $	BEA, disposable personal income data
DTHINF	Alaska infant civilian non-Native deaths	-
DTHTOT	total Alaska civilian non-Native deaths	-
DTOT	total Alaska civilian deaths	-
EL99	total local government expenditures; million $	-
ELBD	local government debt service; million $	BOC, Governmental Finances
ELED	local government education expenditures; million $	BOC, Governmental Finances
ELED1	local government education expenditures from own sources; million $	Constructed from ADA, Executive Budget and BOC, State Government Finances
ELEDCP	local government education expenditures for capital outlays; million $	BOC, Governmental Finances
ELNED1	local government non-education expenditures net of debt service; million $	BOC, Governmental Finances
ELPERS	local government personal services expenditures; million $	BOC, Governmental Finances
EM.EMCN	ratio of construction to total employment	-
EM.EMG9	ratio of total government to total employment	-
EM.EMGA	ratio of state and local government to total employment	-

Variable	Definition; Units	Historical Data Source[a]
EM.EMGF	ratio of federal government to total employment	-
EM.EMNR	ratio of total minus support type (SP), government, construction, and petroleum employment to total employment	-
EM.EMNS	ratio of total minus support type (SP) and government to total employment	-
EM.EMP9	ratio of mining to total employment	-
EM.EMSP	ratio of service type (T9, CM, PU, D9, FI, S9) to total employment	-
EM.EMSUP	ratio of trade, finance, and service to total employment	-
EM.EMTCU	ratio of transport, communication, and public utilities to total employment	-
EM96	total wage and salary plus proprietor employment; thousand	-
EM97	nonagricultural wage & salary employment; thousand	ADL, <u>Alaska Labor Force Estimates and Statistical Quarterly</u>
EM98	wage and salary and military employment; thousand	-
EM99	total wage and salary, nonwage and salary (proprietor), and military employment; thousand	-
EMAFISH	wage and salary component of fish harvesting employment; thousand	-
EMAGRI	wage and salary component of agriculture employment; thousand	ADL, <u>Statistical Quarterly</u>
EMCN1	construction employment net of exogenous construction employment; thousand	-
EMCNRT	ratio of premium wage construction employment to EM98 net of premium wage construction employment. Employed as a measure of labor market "tightness"; percent	-
EMCNX	exogenous construction employment; thousand	-

Variable	Definition; Units	Historical Data Source[a]
EMCNX1	"enclave" high (premium) wage exogenous construction employment; thousand	constructed from ADL, unpublished worksheets
EMCNX2	non- "enclave" low (normal) wage exogenous construction employment; thousand	-
EMCU	communications plus public utilities employment; thousand	-
EMDR	employment in retail trade; thousand	ADL, Statistical Quarterly
EMDW	employment in wholesale trade; thousand	ADL, Statistical Quarterly
EMDRNT	employment in retail trade net of tourism; thousand	-
EMDTOUR	tourism employment in trade sector; thousand	Improvements to Specification of the MAP Model
EMFISH	fish harvesting employment; thousand	G. Rogers, Measuring the Socio-economic Impact of Alaska's Fisheries
EMG9	federal, state, and local government employment; thousand	-
EMGA	state and local government employment; thousand	-
EMGC	federal civilian employment; thousand	ADL, Statistical Quarterly
EMGF	federal civilian and military employment; thousand	-
EMGL	local government employment; thousand	ADL, Statistical Quarterly
EMGM	military employment; thousand	ADL
EMGS	state government employment; thousand	ADL, Statistical Quarterly
EMM91	manufacturing employment net of new large project employment (EMMX1); thousand	ADL, Statistical Quarterly
EMMO	employment in endogenous manufacturing; thousand	ADL, Statistical Quarterly
EMMX	exogenous manufacturing employment; thousand	-
EMMX1	high (premium) wage exogenous manufacturing employment; thousand	-

Variable	Definition; Units	Historical Data Source[a]
EMMX2	low wage exogenous manufacturing employment; thousand	ADL, Statistical Quarterly
EMNA	Native employment; thousand	-
EMNAT	Native employment obtained from the income distribution model; thousand	-
EMNATX	Native employment obtained from the income distribution model; thousand	-
EMNC	Native Corporation direct employment; thousand	-
EMNNC	total civilian non-Native employment; thousand	-
EMNR	total employment minus support type (SP), government, construction, and mining; thousand	-
EMNS	total employment minus support type (SP) and government	-
EMOCSX	sum of mining, exogenous construction, exogenous transportation, and high wage exogenous manufacturing employment; thousand	-
EMP9	mining employment; thousand	ADL, Statistical Quarterly
EMPRO	total proprietor employment; thousand	BEA employment data
EMPROFIS	fish harvesting proprietor employment; thousand	DOL, Statistical Quarterly; BEA employment data; and G. Rogers, Measuring the Socioeconomic Impact of Alaska's Fisheries
EMPRO1	proprietor employment net of fish harvesting; thousand	-
EMRATE	ratio of wage and salary plus proprietor employment to civilian population	-
EMRATN	Native employment rate based on Native enrollments; percent	-
EMRATN1	interim calculation of Native employment rate; percent	-

Variable	Definition; Units	Historical Data Source[a]
EMS8NT	employment in support services (net of business, tourism, and Native claims); thousand	-
EMS91	service sector employment net of direct Native Corporation employment; thousand	-
EMSB	business service employment; thousand	ADL, Statistical Quarterly
EMSP	transport, communication, public utility, trade, finance, and service employment; thousand	-
EMSTOUR	tourism employment in service sector; thousand	Improvements to Specification of the MAP Model
EMSUP	trade, finance, and service employment; thousand	-
EMT91	transportation employment net of exogenous employment; thousand	-
EMT9X	exogenous (large pipeline project-related) transportation employment; thousand	-
EMTCU	transport, communication, and public utility employment; thousand	-
EMTNT	employment in transportation net of tourism and exogenous components; thousand	-
EMTOUR	total tourism employment; thousand	Improvements to Specification of the MAP Model
EMTTOUR	transportation-related tourism employment; thousand	Improvements to Specification of the MAP Model
EMX	extractive industries-related employment consisting of mining and exogenous construction; thousand	-
EMab	employment by industry; ab=CM CN D9 FI PU GS GL M9 S9 T9 A9 GM GC P9; thousand	ADL, Statistical Quarterly
EX.DSS	ratio of debt service expenditures to total state general fund expenditures	-
EX.NPET	ratio of state "non-endowment" revenues to total state general fund expenditures	-

Variable	Definition; Units	Historical Data Source[a]
EX.NRP9	ratio of state nonpetroleum revenues to total state general fund expenditures	-
EX.PET	ratio of "endowment" type revenues to total state general fund expenditures	-
EX.R99S	ratio of general fund plus Permanent Fund revenues to total state general fund expenditures	-
EX.RP9S	ratio of petroleum revenues to total state general fund expenditures	-
EX.RSEN	ratio of endogenous revenues to total state general fund expenditures	-
EX.RSIN	ratio of total fund earnings to total state general fund expenditures	-
EX.RVNT	ratio of general fund revenues net of permanent fund contributions to total state general fund expenditures	-
EX99S	total state government expenditures from all funds—capital and operating; million $	-
EXANNU	if EXRLOP8 is in effect in the state operating expenditure equation, the base amount of the annuity which adds to state operating expenditures; $	-
EXANSAV	amount of state government saving when using fiscal rule option EXRLOP8; million $	-
EXBM.CAB	ratio of general fund current account balance (BALCABBM) to unrestricted general fund expenditures	-
EXBM.END	ratio of development fund withdrawals (EXDFWITH) to unrestricted general fund expenditures	
EXBM.FD	ratio of total fund balance (BAL99) to unrestricted general fund expenditures	-
EXBM.GR1	ratio of revenues net of petroleum (RSGFBM+EXPFCON-EXPFBAK*RSIP-RP9S) to unrestricted general fund expenditures	-

Variable	Definition; Units	Historical Data Source[a]
EXBM.RV	ratio of general fund unrestricted revenues to unrestricted general fund expenditures	-
EXBOND	proportion of capital expenditures financed by general obligation bonds and federal grants; percent	constructed from ADA, Annual Financial Report
EXBUD	state operating expenditures as defined in the budget; million $	ADA, Executive Budget
EXCAP	total state capital expenditures; million $	-
EXCAP1	initial state capital expenditures; million $	-
EXCAPFR	capital expenditures for ferries--assumed to be purchases out of state; million $	ADPW unpublished data
EXCAPIMP	per capita impact state capital expenditures used with fiscal rule EXRL4	Goldsmith and Mogford, The Relationship Between the Alaska Natural Gas Pipeline and State and Local Government Expenditures
EXCAPNEW	new additions to state capital stock in a given year; million $	-
EXCAPOLD	state spending to replace capital stock put in place prior to 1984	-
EXCAPREP	capital expenditures necessary to replace state capital stock which depreciates each year; million $	-
EXCDS	state development operating expenditures net of debt service; million $	ADA, Executive Budget
EXCDS4	initial model estimate of state development operating expenditures net of debt service before application of RATIO1; million $	-
EXCDSNT	development component of the state operating budget net of transfers to local government; million $	-
EXCPS	construction expenditures from state capital project funds; million $	ADA, Annual Financial Report

Variable	Definition; Units	Historical Data Source[a]
EXCPSFED	portion of capital project fund revenues from federal capital grants; million $	ADA, Annual Financial Report
EXCPSGOB	portion of capital project fund revenues from bond sales; million $	ADA, Annual Financial Report
EXCPSHY	highway construction expenditures out of state capital project construction funds; million $	ADA, Annual Financial Report
EXCPSHY1	initial highway construction expenditures out of state capital project construction funds; million $	-
EXCPSM	portion of capital project fund revenues from bond sales (used to calculate bond maturation); million $	ADA, Annual Financial Report
EXCPSNH	nonhighway construction expenditure out of state capital project construction funds; million $	ADA, Annual Financial Report
EXCPSNH1	initial nonhighway construction expenditures out of state capital project construction funds; million $	-
EXDF1	percent of state current account balance placed into development fund (hypothetical); percent	-
EXDFCON	development fund contribution; million $	-
EXDFPCNT	percent of development fund earnings withdrawn; percent	-
EXDFWITH	development fund withdrawals; million $	-
EXDSS	annual debt service payment to service general obligation bonded debt of the state; million $	ADA, Annual Financial Report
EXDSSX	annual debt service payment to service general obligation bonds outstanding at beginning of simulation period; million $	ADA, Annual Financial Report
EXEDS	state education operating expenditures net of debt service; million $	ADA, Executive Budget
EXEDS4	state education operating expenditure net of debt service before application of RATIO1; million $	-

Variable	Definition; Units	Historical Data Source[a]
EXEDSNT	state education operating expenditures net of transfers to local government; million $	-
EXEL1	elasticity of state expenditures with respect to population	-
EXEL2	elasticity of state expenditures with respect to prices	-
EXEL3	elasticity of state expenditures with respect to real per capita personal income	-
EXEL4	elasticity of state expenditures with respect to personal income	-
EXEL5	elasticity of state expenditures to personal income net of "enclave" employment-related income (PI3)	-
EXEL6	elasticity of state expenditures to population net of "enclave" construction employment	-
EXGF	state general fund expenditures; million $	ADA, Annual Financial Report
EXGFBM	state general fund expenditures net of expenditures from restricted revenues; million $	-
EXGFCAP	state general fund capital outlays—actual disbursements; million $	ADA, Annual Financial Report
EXGFCHY	state general fund capital expenditures for highways; million $	ADA, Annual Financial Report
EXGFCHY1	initial state general fund capital expenditures for highways; million $	-
EXGFCNH	state general fund capital expenditures nonhighways; million $	ADA, Annual Financial Report
EXGFCNH1	initial state general fund capital expenditures nonhighways; million $	-
EXGFOPER	state general fund operating expenditures; million $	-
EXGGS	state general government operating expenditures net of debt service; million $	ADA, Executive Budget

Variable	Definition; Units	Historical Data Source[a]
EXGGS4	initial model estimate of state general government operating expenditures net of debt service before application of RATIO1; million $	-
EXHES	state health operating expenditures net of debt service; million $	ADA, Executive Budget
EXHES4	state health operating expenditures net of debt service before application of RATIO1; million $	-
EXHYCAP	state capital expenditures for highways; million $	-
EXINREC	state government interagency receipts; million $	ADA, Annual Financial Report
EXJUS	state administration of justice operating expenditures net of debt service; million $	ADA, Executive Budget
EXJUS4	state administration of justice operating expenditures net of debt service before application of RATIO1; million $	-
EXLIM	state expenditures allowed by constitutionally mandated spending limit; million $	-
EXLIM82	constitutionally mandated 1982 state spending limit; million $	-
EXLIMOK	actual state expenditures which can be supported by revenues and general fund balance under constitutionally mandated spending limit; million $	-
EXNHYCP	state capital expenditures for nonhighway projects; million $	-
EXNOPS	state expenditures--total net of the operating budget; million $	-
EXNRS	state natural resource operating expenditures net of debt service; million $	ADA, Executive Budget
EXNRS4	state natural resource operating expenditures net of debt service before application of RATIO1; million $	-
EXOM84	annual operations and maintenance cost associated with incremental state capital stock put in place in 1984 and succeeding years; million $	-

Variable	Definition; Units	Historical Data Source[a]
EXOMCOST	annual operations and maintenance cost of incremental state capital stock (EXOM84) as a percentage of original cost; percent	-
EXONTR	state operating expenditures net of local government transfers; million $	-
EXOPS	total state operating expenditures net of debt service and University of Alaska nongeneral fund assistance. It is the sum of the nine functional categories; million $	ADA, Executive Budget
EXOPS1	initial total state operating expenditures net of debt service and University of Alaska nongeneral fund assistance. It is the sum of the nine functional categories; million $	ADA, Executive Budget
EXOPSIMP	per capita impact state operation expenditure used with fiscal rule EXRL4	Goldsmith and Mogford, The Relationship Between the Alaska Natural Gas Pipeline and State and Local Government Expenditures
EXPF1	percent contribution from available funds to Permanent Fund; percent	-
EXPFBAK	percent of Permanent Fund earnings plowed back into the Permanent Fund; percentage	-
EXPFCON	total contributions to Permanent Fund, including special appropriations and reinvested earnings; million $	-
EXPFCON1	contributions to the Permanent Fund, not including special appropriations; million $	-
EXPFCONX	special Permanent Fund contributions appropriated from the general fund; million $	-
EXPFDIST	percent of Permanent Fund earnings transferred to general fund which are distributed to individuals; percent	-
EXPFNEW	constitutionally mandated Permanent Fund contributions from petroleum revenues; million $	ADR, Revenue Sources
EXPFREIN	reinvested Permanent Fund earnings; million $	-

Variable	Definition; Units	Historical Data Source[a]
EXPPS	state public protection operating expenditures net of debt service; million $	ADA, Executive Budget
EXPPS4	state public protection operating expenditures net of debt service before application of RATIO1; million $	-
EXPR99	total state personnel expenditures; million $	ADA, Executive Budget
EXPRCDS	state personnel expenditures for development; million $	ADA, Executive Budget
EXPREDS1	state personnel expenditures for education net of University of Alaska; million $	ADA, Executive Budget
EXPRGGS	state personnel expenditures for general government; million $	ADA, Executive Budget
EXPRHES	state personnel expenditures for health; million $	ADA, Executive Budget
EXPRJUS	state personnel expenditures for administration of justice; million $	ADA, Executive Budget
EXPRNRS	state personnel expenditures for natural resources; million $	ADA, Executive Budget
EXPRPER	adjustment to state personnel expenditures data for consistency with state government employment data; percent	-
EXPRPPS	state personnel expenditures for public protection; million $	ADA, Executive Budget
EXPRSSS	state personnel expenditures for social services; million $	ADA, Executive Budget
EXPRTRS	state personnel expenditures for transportation; million $	ADA, Executive Budget
EXPRUA	wages and salaries of University of Alaska; million $	constructed from University of Alaska records and ADL data
EXRL1	policy switch which, if set at 1, determines state operating expenditure growth based primarily upon aggregate demand;	-

Variable	Definition; Units	Historical Data Source[a]
EXRL2	policy switch which, if set at 1, determines state operating expenditure growth based upon exogenous growth rate	-
EXRL3	policy switch which, if set at 1, determines state expenditure growth based upon real per capita operating expenditure levels and real per capita capital stock levels	-
EXRL4	policy switch which, if set at 1, determines state expenditure growth based upon a specified expenditure level per impact individual (for use in impact analysis)	-
EXRL4OP	policy switch used with EXRL4 with value of one if enclave construction employment not counted in impact population	-
EXRL5	policy switch which, if set at 1, determines state expenditure growth based upon constitutionally imposed spending limit	-
EXRLOP6	policy switch which, if set at 1, determines state operating expenditure growth based upon annual change in level of general fund balance	-
EXRLOP7	policy switch which, if set at 1, determines state operating expenditures growth based upon saving a specified amount of revenues	-
EXRLOP8	policy switch which, if set at 1, determines state operating expenditure growth based upon spending an annuity (EXANSAV)	-
EXRP84	annual cost for replacement of capital stock put in place after 1983; million $	-
EXSAVS	if EXRLOP7 is invoked in determination of state operating expenditures, this is the amount of revenues not spent; million $	-
EXSAVX	if EXRLOP7 is invoked in determination of state operating expenditures, this is the exogenous amount of revenues not spent; million $	-
EXSPCAP	special state capital appropriations; million $	-

Variable	Definition; Units	Historical Data Source[a]
EXSPLIT	the allocation to operations when state spending falls below the authorized spending limit; percent	-
EXSPLITX	the target allocation to operations when state spending falls below the authorized spending limit; percent	-
EXSSS	state social services operating expenditures net of debt service; million $	ADA, Executive Budget
EXSSS4	state social services operating expenditures net of debt service before application of RATIO1; million $	ADA, Executive Budget
EXSUBS	state subsidy programs initiated after 1980; million $	-
EXSUBS1	initial values for state subsidy programs initiated after 1980; million $	-
EXTRNS	state Permanent Fund dividend distribution; million $	-
EXTRS	state transportation operating expenditures net of debt service; million $	ADA, Executive Budget
EXTRS4	state transportation operating expenditures net of debt service before application of RATIO1; million $	-
EXUA	University of Alaska operating budget; million $	ADA, Executive Budget
FAGI	federal adjusted gross income earned in Alaska; million $	Constructed from IRS, Statistics of Income and ADL Statistical Quarterly
FAGII	federal adjusted gross income reported on federal tax returns filed from Alaska; million $	IRS Statistics of Income
FERTj	non-Native fertility rate for female cohort j	Alaska Department of Health and Social Services and Alaska Native Medical Center
G.BAL99	annual growth in total state fund balance	-
G.BAL9PC	annual growth in per capita value of combined state funds	-

Variable	Definition; Units	Historical Data Source[a]
G.EL99	annual growth in local government expenditures	-
G.EM99	annual growth in total employment	-
G.EX99S	annual growth in state government expenditures	-
G.PDRPI	annual growth in Alaskan relative price index	-
G.POP	annual growth in population	-
G.PR.DPI	annual growth in real disposable personal income per capita	-
G.PR.PI	annual growth in real per capita personal income	-
G.R.WR98	annual growth in the average annual real wage	-
G.RNSPC	annual growth in endogenous state revenues per capita	-
G.RSEN	annual growth in endogenous state revenues	-
G.SRPC	annual growth in real state expenditures per capita	-
G.XONRPC	annual growth in real per capita state expenditures net of local transfers (EXONTR)	-
GOBONDL	general obligation bonded indebtedness of local government; million $	ADCR, Alaska Taxable
GODT	general obligation bonded indebtedness of state; million $	ADA, Annual Financial Report
GODTX	general obligation bonded indebtedness of the state from debt incurred before 1983; million $	ADA, Annual Financial Report
GR	gross business receipts; million $	ADA, Annual Financial Report
GRDIRPU	annual growth rate of U.S. real disposable personal income per capita; percent	-
GREXCAP	nominal growth rate of state capital expenditures using EXRL2	-
GREXOPS	nominal growth rate of state operating expenditures using EXRL2	-

Variable	Definition; Units	Historical Data Source[a]
GRRPCEX	growth rate of real per capita state expenditures using EXRL3	-
GRRWEUS	annual real growth rate of U.S. average weekly earnings; percent	-
GRSSCP	growth rate of state real per capita state capital stock using EXRL3	-
GRUSCPI	annual growth rate of U.S. consumer price index; percent	-
GTR	gross taxable receipts; million $	Constructed from ADA, Annual Financial Report and ADR unpublished data
Gj	shift factor for aging of cohorts	-
HH	total Alaska households; thousand	BOC, Census of Population
HH24	households: head under age of 25; thousand	BOC, Census of Population
HH25.29	households: head between ages of 25 and 29; thousand	BOC, Census of Population
HH30.54	households: head between ages of 30 and 54; thousand	BOC, Census of Population
HH55	households: head over 54; thousand	BOC, Census of Population
HHC	total Alaska civilian non-Native households; thousand	BOC, Census of Population
HHM	total Alaska military households; thousand	BOC, Census of Population
HHN	total Alaska civilian Native households; thousand	BOC, Census of Population
HHRij	household formation rate for civilian non-Native population in cohort ij	BOC, 1980 Census of Population, Census Tape STF2
HHSIZE	average Alaska household size, all households	-
HHSIZEC	average Alaska civilian non-Native household size	-
HHSIZEN	average Alaska Native household size	-
HHij	total Alaska households headed by persons in cohort ij; thousand	BOC, Census of Population

Variable	Definition; Units	Historical Data Source[a]
IM.BAL	the summation over time of the annual increments to IM.REV; million $	-
IM.BAL99	the sum of the general fund, Permanent Fund, and IMBAL; million $	-
IM.BALPC	"impact balance" per capita; $	-
IM.BALR	real "impact balance"; million 1967 U.S. $	-
IM.BALRV	annual revenues contributed to IMBAL, including interest; million $	-
IM.BLRPC	real per capita "impact balance"; 1967 U.S. $	-
IM.REV	the difference between actual state expenditures in an impact analysis case and what they would have been if expenditures in real per capita terms had been kept equivalent to the base case; million $	-
INDEX.DI	ratio of Alaskan to U.S. per capita real disposable personal income	-
INDEX.S1	ratio of trade/service/finance employment to Alaska real disposable personal income	-
INDEX.S2	ratio of transportation/communications/utilities employment to Alaska real disposable personal income	-
INDEX.WG	ratio of Alaskan to U.S. real average wage	-
LF	labor force; thousand	-
LFPART	labor force participation rate as a percent of potential labor force (civilian population 15 through 64); percent	-
LPTB	total value of real property falling within local government jurisdiction; million $	-
LPTBFV	total assessed value of real, personal, and petroleum property falling within local government jurisdiction; million $	-
LPTBP9	taxable petroleum property falling within local government jurisdiction; million $	ADCR, Alaska Taxable

Variable	Definition; Units	Historical Data Source[a]
LPTB1	assessed value of real and personal property (A.S. 29.53) (not full value); million $	ADCR, Alaska Taxable
LPTB1FV	assessed value of real and personal property assessed at full value; million $	ADCR, Alaska Taxable
LPTRAT	percentage of pipeline property within local jurisdictions actually subject to local tax because of limitations imposed by state statutes; percent	Constructed from ADCR, Alaska Taxable
MDPij	military dependents in cohort ij; thousand	BOC, 1980 Census of Population
MDTOT	total military dependents in 1980; thousand	BOC, 1980 Census of Population
MHHij	military households headed by individual in cohort ij; thousand	BOC, 1980 Census of Population
MIGIN	endogenous civilian migration to Alaska; thousand	-
MIGOUT	exogenous civilian migration to Alaska; thousand	-
MILPCT	Alaska military population as a fraction of 1980 level	-
MILRAT	the ratio of military employment (EMGM) to military population (POPM)	-
MILij	armed forces personnel and military dependents in cohort ij in 1980; thousand	BOC, 1980 Census of Population
Mij	fraction of total endogenous civilian (non-Native) migration assigned to cohort ij	Alaska Public Survey
NAPik	Native population in aggregated cohorts k (for use with income distribution model); thousand	-
NATINC	Alaska civilian non-Native (SIC) natural increase	-
NATPij	Alaska Native population in cohort ij; thousand	BOC, 1980 Census of Population
NATTOT	total Alaska Native population (civilian); thousand	BOC, 1980 Census of Population
NBTHTOT	total Alaska Native births; thousand	-

Variable	Definition; Units	Historical Data Source[a]
NCBP	bonus income to Natives from lease sales on Native lands; million $	-
NCBR	Alaska crude Native birth rate (per thousand)	-
NCCAP	accumulated capital of Native Corporations; million $	-
NCCI	Native Corporation income from ANCSA-related activities; million $	-
NCDR	Alaska crude Native death rate	-
NCEXP	current expenditures of Native Corporations; million $	-
NCPI	Native personal income from ANCSA-related activities; million $	-
NCRP	Native recurrent income from petroleum development on Native lands; million $	-
NCWS	wages and salaries paid by Native Corporations; million $	-
NCij	Alaska Native population in cohort ij before migration; thousand	BOC, Census of Population
NDTHINF	Alaska Native infant deaths; thousand	-
NDTHTOT	total Alaska Native deaths; thousand	-
NEMabN	Native employment in sector ab; thousand	-
NFERTj	Native fertility in female cohort j	Alaska Department of Health and Social Services and Alaska Native Medical Center
NHHRij	household formation rate for civilian Native population in cohort ij; percent	BOC, Census of Population, Census Tape STF2
NHHij	Alaska households headed by civilian Native persons in cohort ij; thousand	BOC, Census of Population, Census Tape STF2
NMij	migration rate (positive for in; negative for out) for Native population in cohort ij; percent	-
NNATINC	Alaska Native natural increase; thousand	-

Variable	Definition; Units	Historical Data Source[a]
NNPik	non-Native population in aggregated cohorts k for use with income distribution model; thousand	-
NONPET	general fund plus Permanent Fund revenues net of petroleum revenues and fund earnings - "non-endowment" revenues; million $	-
NONRP9S	general fund plus Permanent Fund revenues net of petroleum revenues; million $	-
NPGQij	fraction of civilian Native population in cohort ij in group quarters	BOC, 1980 Census of Population
NRCij	targeted total change in Native household formation rate for cohort ij	-
NSEXDIV	Native sex division at birth	Alaska Department of Health and Social Services
NSURINFi	Native infant survival rates	Alaska Department of Health and Social Services
NSij	Native survival rate for cohort ij	Alaska Department of Health and Social Services
NTP	period over which Native household formation rates trend; years	-
NWSabN	Native wages and salaries in sector ab; million $	-
OEMij	exogenous civilian non-Native migration rate (positive for in; negative for out) for population in cohort ij	Anchorage Urban Observatory and BOC, 1980 Census of Population
P.BAL99	combined fund balance per capita; $	-
P.BALGF	general fund balance per capita; $	-
P.BALPF	Permanent Fund balance per capita; $	-
P.DPINN	non-Native disposable personal income per capita; $	-
P.DPINN1	Native disposable personal income (SIC) per capita net of nontaxable ANCSA payment; $	-
P.EL99	per capita EL99; $	-

Variable	Definition; Units	Historical Data Source[a]
P.ELED	per capita ELED; $	-
P.ELNED1	per capita ELNED1; $	-
P.EX99S	per capita EX99S; $	-
P.EXBM	per capita unrestricted general fund expenditures (EXGFBM); $	-
P.EXCAP	per capita state capital expenditures; $	-
P.EXONTR	per capita state operating expenditures net of local government transfers; $	-
P.EXOPS	per capita state operating expenditures; $	-
P.GEXP	per capita state plus local government expenditures; $	-
P.GODT	per capita state government bonded indebtedness; $	-
P.NPET	per capita state "non-endowment" revenues; $	-
P.NRP9S	per capita state nonpetroleum revenues; $	-
P.PI	per capita personal income; $	-
P.PIN	per capita Native personal income; $	-
P.PINCL	per capita Native claims personal income; $	-
P.PINN	per capita non-Native personal income; $	-
P.R99S	per capita state general plus Permanent Fund revenues; $	-
P.RLT99	per capita state-local revenue transfers; $	-
P.RSEN	per capita state endogenous revenues; $	-
P.RSIN	per capita general and Permanent Fund earnings; $	-
P.RSIP	per capita interest on the Permanent Fund; $	-
P.RT99	per capita total state taxes; $	-
P.RTIS	per capita state personal income tax revenues; $	-

Variable	Definition; Units	Historical Data Source[a]
P1-P6	variables to facilitate printing population distribution model results;	-
P9PTPER	percentage of petroleum property which is taxable by state which falls within local taxing jurisdiction; percentage	ADCR, Alaska Taxable
PAD1	proportion of population aged 5 to 19 attending district schools; percent	-
PAD2	proportion of population aged 5 to 19 attending REAA schools; percent	-
PADJ	ratio of premium (WRM9P) to average wage (WRM91) in manufacturing sector	-
PARLVFV	ratio of local estimate to full value of local property according to state appraiser; percent	-
PARNONGF	proportion of University of Alaska revenues not from the general fund; percent	-
PBLTBL	proportion of gross business receipts taxable after 1978 tax law change; percent	-
PBTRATE	state business license tax rate per business; million dollars per business	ADR, Revenues Sources
PC12N	proportion of ANCSA payments made to 12 regional Native corporations in Alaska; percent	Robert Nathan Associates, 2(c) Report: Federal Programs and Alaska Natives
PC12RN	proportion of members of 12 regional Native corporations residing in Alaska; percent	Robert Nathan Associates, 2(c) Report: Federal Programs and Alaska Natives
PC13C	exogenous adjustment to force consistency between local government personnel expenditures and wages and salaries	DOL, Statistical Quarterly, Alaska Economic Trends, and BOC, Governmental Finances
PC39A	miscellaneous employment within agriculture-forestry-fisheries industrial category; thousand	DOL, Statistical Quarterly
PC39B	forestry employment within agriculture-forestry-fisheries as proportion of manufacturing employment	DOL, Statistical Quarterly

Variable	Definition; Units	Historical Data Source[a]
PCINDA	proportion of gap between average industry employment share and Native industry employment share that is closed within one time period	-
PCIVPY	ratio of military to federal civilian wage rate; percent	-
PCNC1	proportion of ANCSA payments paid directly to individuals; percent	-
PCNC2	proportion of recurring income from petroleum development on Native lands paid directly to individuals; percent	-
PCNC3	proportion of earnings on Native Corporation accumulated capital paid directly to individuals; percent	-
PCNC4	proportion of bonus income from lease sales on Native lands paid directly to individuals; percent	-
PCNCSV	proportion of Native Corporation income used for investment; percent	-
PCNCSV1	proportion of bonus income from lease sales on Native lands and retained by Native Corporations which is used for investment; percent	-
PCNCWS	proportion of current expenditures of Native Corporations paid in wages and salaries; percent	-
PCOLART	the cost of living differential for federal employees; percentage	-
PCWS1	ratio of state government wage and salary payments to personnel expenditures; percent	ADL, Statistical Quarterly and ADA, Executive Budget
PCYNA1	proportion by which the ratio of personal income to wages and salaries for Native exceeds that of the total population; percent	-
PDCON	state government construction price deflator; index	for construction methodology, see Kresge and Thomas "Estimating Alaska Gross Product by Industry," Alaska Review of Business and Economic Conditions, Vol. XI, No. 1

Variable	Definition; Units	Historical Data Source[a]
PDEXOPS	state government operating expenditures price deflator; index	constructed from ADL, Statistical Quarterly, BEA personal income and employment data
PDRATIO	ratio of Alaskan relative price index to U.S. consumer price index	-
PDRPI	Alaskan relative price index—1967 value is 1.425 times U.S. CPI which in 1967 was 100; index	constructed from U.S. Department of Labor, Bureau of Labor Statistics and University of Alaska, Agriculture Extension Service, Quarterly Food Price Survey of 13 Alaskan cities
PDRPIBAS	1982 Alaskan price level using 1967 US as base; index	-
PDUSCPI	U.S. consumer price index (1967=100); index	U.S. Department of Labor, Bureau of Labor Statistics
PDUSCPI1	initial value for US consumer price index; index	
PECIG	proportion of cigarette tax receipts paid to special fund	-
PERNA1	proportion of change in state employment rate reflected in change in Native employment rate; percent	-
PERNA2	proportion of gap between Native and state employment rates that is closed in one year; percent	-
PERNA3	percentage of Native Corporation jobs held by Natives	-
PESLT	proportion of "other" state taxes shared with local government; percent	-
PESLTC	proportion of state corporate income tax shared with local government; percent	-
PF	non-Native females 14 and under; thousand	-
PFISH1	percentage of fish harvesting employment reported as proprietors	DOL, Statistical Quarterly; BEA employment data; and G. Rogers, Measuring the Socioeconomic Impact of Alaska's Fisheries
PFN	Native females 14 and under; thousand	-

Variable	Definition; Units	Historical Data Source[a]
PI	personal income; million $	BEA personal income data
PI.DPI	ratio of disposable personal income to total personal income	-
PI.EL99	ratio of local government expenditures to personal income	-
PI.EX99S	ratio of total state government expenditures to personal income	-
PI.EXL	ratio of local government expenditures net of debt service to personal income	-
PI.EXS	ratio of state government general fund expenditures (EXGF) to personal income	-
PI.EXT	ratio of state and local government expenditures to personal income	-
PI.GODT	ratio of state general obligation bonded debt to personal income	-
PI.RL99	ratio of local government revenues to personal income	-
PI.RLPT	ratio of local property taxes to personal income	-
PI.RSEN	ratio of endogenous state revenues to personal income	-
PI.TXL	ratio of locally generated local government taxes to personal income	-
PI.TXS	ratio of state taxes net of petroleum-related taxes to personal income	-
PI.WS98	ratio of wage and salary plus military salary income to personal income	-
PI3	personal income net of "enclave" construction employee personal income; million $	-
PI8	personal income plus residence adjustment; million $	-
PIDIR	dividends, interest, and rent component of income; million $	BEA personal income

Variable	Definition; Units	Historical Data Source[a]
PIDIST	model switch which results in retrieval of Native employment and wages and salaries from income distribution model if a value of one is chosen; units	-
PIL	the value of personal income lagged one year for use in income distribution model	-
PIN	Native personal income, including Native claims income to individuals; million $	-
PIN1	Native personal income net of Native claims income to individuals, million $	-
PINN	non-Native personal income; million $	-
PIOL1	other labor income component of personal income; million $	BEA, personal income data
PIPADJ	ratio of "enclave" to regular construction wage rate; percent	ADL Statistical Quarterly
PIPE	a proxy variable which takes a value of one in years of very substantial exogenous construction activity	-
PIPRO	proprietors income component of personal income; million $	BEA, personal income data
PIPRO1	nonfishery proprietor income component of personal income; million $	BEA, personal income data
PIPROF	fishery proprietor income component of personal income; million $	BEA, personal income data
PIRADJ	residence adjustment component of personal income; million $	BEA, personal income data
PISSC	personal contributions to Social Security component of personal income; million $	BEA, personal income data
PITRAN	transfers component of personal income; million $	BEA, personal income data
PITRAN1	transfers (excluding Permanent Fund dividend payments) component of personal income; million $	-
PIU.PIA	ratio of non-Native disposable personal income per capita in Alaska to disposable personal income per capita in the U.S.	-

Variable	Definition; Units	Historical Data Source[a]
PLFD9	total Alaska potential civilian labor force aged 15 to 64; thousand	-
PLFDOMC	Alaska potential civilian non-Native, non-military dependent labor force (population aged 15 to 64); thousand	-
PLFDOMM	Alaska potential military labor force (military dependents aged 15 to 64; active-duty military are excluded); thousand	-
PLFDOMN	Alaska potential civilian Native labor force aged 15 to 64; thousand	-
PM	non-Native males 14 and under used with income distribution model; thousand	-
PMN	Native males 14 and under used with income distribution model; thousand	-
PNTGR	amount of gross receipts exempt from state gross receipts tax; million $	-
POP	total population; thousand	BOC and ADL
POP.AD	ratio of Alaska population aged 15 to 64 to total population	-
POP.CIV	ratio of Alaska civilian non-Native population to total population	-
POP.GER	ratio of Alaska population aged 65 and over to total population	-
POP.KID	ratio of Alaska population under 15 to total population	-
POP.MIL	ratio of Alaska military and military dependents to total population	-
POP.NAT	ratio of Alaska Native population to total population	-
POPADS	total Alaska population aged 15 to 64; thousand	-
POPC	total population net of armed forces personnel (includes military dependents); thousand	BOC and ADL

Variable	Definition; Units	Historical Data Source[a]
POPCGQ	Alaska civilian non-Native population in group quarters; thousand	BOC, Census of Population
POPGER	total Alaska population aged 65 and over; thousand	BOC, Census of Population
POPGQ	total Alaska population in group quarters; thousand	BOC, Census of Population
POPKIDS	total Alaska population under 15; thousand	BOC, Census of Population
POPM	armed forces personnel; thousand	BOC, Census of Population
POPMGQ	military population in group quarters; thousand	BOC, Census of Population
POPMIG	total net civilian migration to Alaska; thousand	-
POPNE	Native population based upon Native Corporation enrollment records; thousand	2(c) Report-Federal Program & Alaska Natives by Robert Nathan Associates, for U.S. Department of Interior
POPNGQ	Alaska Native population in group quarters; thousand	BOC, Census of Population
POPNI9	total Alaska civilian natural increase; thousand	-
POPSKUL	total Alaska population aged 5 to 19; thousand	BOC, Census of Population
POPij	total Alaska population in cohort ij; thousand	-
PPVAL	total full assessed value of real, personal, and petroleum-related property in the state; million $	-
PR.BAL99	general plus Permanent Fund balance real per capita; 1967 $	-
PR.BALCP	value of state capital stock real per capita; 1967 U.S. $	-
PR.BALG1	general fund balance real per capita; 1967 U.S. $	-
PR.BALG2	general fund balance real per capita deflated by state operating budget deflator; 1967 U.S. $	-
PR.BALP2	Permanent Fund balance real per capita deflated by operating budget deflator; 1967 U.S. $	-
PR.BALPF	Permanent Fund balance real per capita; 1967 U.S. $	-

Variable	Definition; Units	Historical Data Source[a]
PR.DPI	dispoable personal income real per capita; 1967 U.S. $	-
PR.DPIN	Native disposable personal income real per capita; 1967 U.S. $	-
PR.DPINN	non-Native disposable income real per capita; 1967 U.S. $	-
PR.DPIU1	initial value for US real per capita disposable personal income; $	-
PR.DPIUS	U.S. disposable personal income real per capita; 1967 U.S. $	U.S. Department of Commerce
PR.ECP	state capital expenditures for highways from bond funds real per capita (EXCPSHY); 1967 U.S. $	-
PR.ECPN	state capital expenditures nonhighway from bond funds real per capita (EXCPSNH); 1967 U.S. $	-
PR.EL99	total local expenditures (EL99) real per capita; 1967 U.S. $	-
PR.ELED	local expenditures for education (ELED) real per capita; 1967 U.S. $	-
PR.ELEDC	local government capital expenditures for education (ELEDCP) real per capita; 1967 U.S. $	-
PR.ELNED	local non-education expenditures (ELNED1) real per capita; 1967 U.S. $	-
PR.EX99S	total state expenditures (EX99S) real per capita; 1967 U.S. $	-
PR.EXBM	state general fund expenditures (EXBM) real per capita; 1967 U.S. $	-
PR.EXCAP	state capital expenditures real per capita; 1967 U.S. $	-
PR.EXONT	state operating expenditures net of local government transfers real per capita; 1967 U.S. $	-
PR.EXOPS	state operating expenditures real per capita; 1967 U.S. $	-

Variable	Definition; Units	Historical Data Source[a]
PR.EXccc	state expenditures in program category ccc real per capita; 1967 $	-
PR.GEXP	state and local government expenditures real per capita; 1967 U.S. $	-
PR.GFC	state general fund highway capital expenditures (EXGFCHY) real per capita; 1967 U.S. $	-
PR.GFCN	state general fund nonhighway capital expenditures (EXGFCNH) real per capita; 1967 U.S. $	-
PR.GODT	state government bonded indebtedness real per capita; 1967 U.S. $	-
PR.NCEXP	real current expenditures of Native Corporations per Native; 1967 U.S. $	-
PR.NPET	state "non-endowment" revenues real per capita; 1967 U.S. $	-
PR.NRP9	state nonpetroleum revenues real per capita; 1967 U.S. $	-
PR.PI	personal income real per capita; 1967 U.S. $	-
PR.PI3	personal income net of "enclave" construction employee personal income (PI3) real per capita; 1967 U.S. $	-
PR.PIN	Native personal income real per capita; 1967 U.S. $	-
PR.PINCL	Native personal income real per capita plus real current expenditures of Native Corporations per capita; 1967 U.S. $	-
PR.PINN	non-Native personal income real per capita; 1967 U.S. $	-
PR.R99S	total state revenues (R99S) real per capita; 1967 U.S. $	-
PR.RLT99	state-local revenue transfers real per capita; 1967 U.S. $	-
PR.RSEN	state endogenous revenues (RSEN) real per capita; 1967 U.S. $	-

Variable	Definition; Units	Historical Data Source[a]
PR.RSIN	general and Permanent Fund earnings real per capita; 1967 U.S. $	-
PR.RSIP	Permanent Fund earnings real per capita; 1967 U.S. $	-
PR.RT99	state tax revenues (RT99) real per capita; 1967 U.S. $	-
PR.RTIS	state personal income tax receipts real per capita; 1967 U.S. $	-
PRINT	variable from income distribution model which allows results to be printed if value of one is chosen	-
PRINT2	variable from income distribution model which allows results to be printed if value of one is chosen	-
PTBP9	total value of taxable petroleum property; million $	ADCR, Alaska Taxable
PTOURB	intercept term on tourist industry employment equation	Improvements to Specification of the MAP Model
PTOURD	proportion of tourist industry employment in trade	Improvements to Specification of the MAP Model
PTOURE	elasticity of tourism employment to growth in number of tourists	Improvements to Specification of the MAP Model
PTOURS	proportion of tourist industry employment in services	Improvements to Specification of the MAP Model
PTOURT	proportion of tourist industry employment in transportation	Improvements to Specification of the MAP Model
PTRTS	tax rate on state petroleum-related property; percent	-
PWRBASE	average U.S. wages paid in government in 1967; $	-
R.BALCAP	real value of state capital stock; million 1967 U.S. $	constructed using ADA, Annual Financial Report
R.DPI	real disposable personal income; million 1967 U.S. $	-
R.DPI8N	real disposable personal income plus residence adjustment; million 1967 U.S. $	-

Variable	Definition; Units	Historical Data Source[a]
R.DPI8X	real disposable personal income plus residence adjustment of "enclave" construction employees; million 1967 U.S. $	constructed using ADL, Statistical Quarterly
R.PI	real personal income; million 1967 U.S. $	-
R.PIN	Native real personal income; million 1967 U.S. $	-
R.PINN	non-Native real personal income; million 1967 U.S. $	-
R.WR97	average annual real wage rate for civilian employment; 1967 U.S. $	-
R.WR98	average annual real wage rate including military; 1967 U.S. $	-
R99S	total general fund and Permanent Fund revenues; million $	ADA, Annual Financial Report
R99SNT	total state revenues net of Permanent Fund contributions (EXPFCON); million $	-
R99SON	total state revenues net of federal grants-in-aid; million $	-
RAT1	ratio of non-Native income to total taxable income; percent	-
RATIO1	variable used to make individual state budget items consistent with total operating budget constraint; percent	-
RCij	targeted total change in civilian household formation rate for cohort ij	-
RL99	total local government revenues; million $	constructed from BOC Governmental Finances and BOC State Government Finances
RL99.PT	ratio of local property taxes to total local government revenues	-
RL99.RT	ratio of state-local transfers to state-local government revenues	-
RL991	total local government revenues net of miscellaneous revenues; million $	-

Variable	Definition; Units	Historical Data Source[a]
RLMC	local charges and miscellaneous revenue; million $	BOC, Governmental Finances
RLOT	local government taxes net of property tax; million $	BOC, Governmental Finances
RLPT	local property taxes; million $	BOC, Governmental Finances
RLPT1	local property tax revenues net of exogenous component; million $	BOC, Governmental Finances
RLPTX	exogenous local property tax; million $	-
RLT99	total revenue transfers from state to local government; million $	-
RLTCS	state-local shared corporate income tax after 1978 tax law change; million $	-
RLTCS4	initial estimate of state-local shared corporate income tax before application of RATIO1; million $	-
RLTE99	total state-local government transfers for education purposes; million $	-
RLTE994	initial estimate of transfers from state to local government for education purposes before application of RATIO1; million $	-
RLTEA	total transfers from state to local government for primary and secondary education; million $	ADA, Annual Financial Report
RLTEA4	initial estimate of transfers from state to local government for primary and secondary education before application of RATIO1; million $	-
RLTEB	state aid to local education net of aid to district schools and since their inception, the REAA schools; million $	constructed from BOC, State Governmental Finances and ADA Annual Financial Report
RLTEB4	initial estimate of state aid to local government for education net of district and REAA aid before application of RATIO1	-
RLTEC	cigarette tax education transfers from state to local government; million $	ADA, Annual Financial Report

Variable	Definition; Units	Historical Data Source[a]
RLTEC4	initial estimate of cigarette tax education transfers from state to local government before application of RATIO1; million $	-
RLTEF	school foundation program transfers from state to local government; million $	ADA, Annual Financial Report
RLTEF4	initial estimate of school foundation program transfers from state to local government before application of RATIO1; million $	-
RLTEO	miscellaneous state aids to district schools; million $	ADA, Annual Financial Report
RLTEO4	initial estimate of miscellaneous state aids to district schools before application of RATIO1; million $	-
RLTET	state aid to local district schools for transportation; million $	ADA, Annual Financial Report
RLTET4	initial estimate of state aid to district schools for transportation before application of RATIO1; million $	-
RLTF	federal-local government transfers; million $	BOC, Governmental Finances
RLTFPX	petroleum-related federal-local government transfers; million $	-
RLTMA	state local transfers under municipal assistance program; million $	ADA, Executive Budget
RLTMA4	initial estimate of state-local transfers under municipal assistance program; million $	-
RLTMS	state-local revenue transfers net of education, revenue sharing, and tax sharing; million $	constructed from BOC State Government Finances & ADA Executive Budget
RLTOT	state-local tax sharing of other taxes (amusement licenses, aviation fuel tax, liquor licenses, fisheries tax); million $	-
RLTOT4	initial estimate of state-local sharing of other taxes before application of RATIO1; million $	-
RLTRS	state-local revenue sharing; million $	ADA, Executive Budget

Variable	Definition; Units	Historical Data Source[a]
RLTRS4	initial estimate of state-local revenue sharing before application of RATIO1; million $	-
RLTT9	total state-local tax transfers; million $	-
RLTT94	initial estimate of total state-local tax transfers; million $	-
RLTVS	state-local shared electric and telephone co-op taxes; million $	ADA, Executive Budget
RLTVS4	initial estimate of state-local shared electric and telephone co-op taxes before application of RATIO1; million $	-
RLTX	exogenous state-local transfers; million $	-
RMIS	miscellaneous unrestricted general fund revenues; million $	ADR, Revenue Sources
RMISRES	miscellaneous restricted general fund revenues; million $	-
RN.FED	ratio of federal transfers to general fund plus Permanent Fund revenues net of Permanent Fund contributions (EXPFCON)	-
RN.OIL	ratio of state petroleum revenues to general fund plus Permanent Fund revenues net of Permanent Fund contributions (EXPFCON)	-
RN.RSEN	ratio of endogenous revenues to general fund plus Permanent Fund revenues net of Permanent Fund contributions (EXPFCON)	-
RN.RSIN	ratio of general and Permanent Fund earnings to state general fund plus Permanent Fund revenues net of Permanent Fund contributions (EXPFCON)	-
RNAT	Native personal income as percentage of total personal income calculated using the income distribution model	-
RNATX	Native personal income as percentage of total personal income calculated using the income distribution model	-
ROFAS	state auto licenses and fees; million $	ADA, Annual Financial Report

Variable	Definition; Units	Historical Data Source[a]
ROFERS	general fund ferry receipts; million $	ADA, Annual Financial Report
ROFOS	nonauto-related business and nonbusiness licenses and fees to general fund; million $	constructed from ADA, Annual Financial Report
ROFTS	total general fund fees and licenses; million $	ADA, Annual Financial Report
ROR	real rate of return on general fund balance; percent	-
RORANGRO	under EXRLOP8, rate at which state operating expenditure annuity grows; percent	-
RORCPDEP	real rate of depreciation of state-owned capital; percent	-
RORCRF	capital recovery factor for calculating annual servicing of bonded debt; percent	-
RORDISK	discount rate applied to future petroleum revenues to calculate present value in 1982 dollars (DF.RSVP)	-
RORNC	nominal rate of return on accumulated capital of Native Corporations; percent	-
RORPDF	real rate of return premium applied to development fund over general fund; percent	-
RORPPF	real rate of return premium applied to Permanent Fund in excess of general fund; percent	-
RP7S	total petroleum royalties and bonuses; million $	ADR Revenue Sources
RP9S	total petroleum revenues before Permanent Fund deductions; million $	ADR, Revenue Sources
RP9SGF	total petroleum revenues paid to general fund; million $	ADR, Revenue Sources
RP9X	miscellaneous exogenous petroleum revenues; million $	-
RPBS	state petroleum bonuses before Permanent Fund deduction; million $	ADR, Revenue Sources
RPBSGF	state petroleum bonuses paid to general fund; million $	ADR, Revenue Sources

Variable	Definition; Units	Historical Data Source[a]
RPPS	state petroleum property tax; million $	ADR, Revenue Sources
RPRY	state petroleum royalties before Permanent Fund deduction; million $	ADA, Revenue Sources
RPRYGF	state petroleum royalties paid to general fund; million $	ADR, Revenue Sources
RPTS	state petroleum production taxes; million $	ADR, Revenue Sources
RS.FED	ratio of federal transfers to total state revenues	-
RS.OWN	ratio of revenues net of federal transfers to total state revenues	-
RS.PET	ratio of "endowment" type revenues to total state revenues	-
RS.REC	ratio of endogenous and interest revenues to total state revenues	-
RS.RN	ratio of state general fund revenues net of permanent fund contributions (EXPFCON) to total state revenues	-
RS.RP9S	ratio of petroleum revenues to total state revenues	-
RS.RSEN	ratio of endogenous revenues to total state revenues	-
RS.RSIN	ratio of general and Permanent Fund earnings to total state revenues	-
RSBM.B99	ratio of fund earnings (RSIG+RSID+RSIPGF) to unrestricted general fund revenues	-
RSBM.EXD	ratio of debt service expenditures (EXDSS) to unrestricted general fund revenues	-
RSBM.GF	ratio of general fund earnings (RSIG) to unrestricted general fund revenues	-
RSBM.PET	ratio of endowment revenues (RP9SGF+RSIG+RSID+RSIPGF) to unrestricted general fund revenues	-

Variable	Definition; Units	Historical Data Source[a]
RSBM.PF	ratio of Permanent Fund earnings transferred to general fund (RSIPGF) to unrestricted general fund revenues	-
RSBM.REN	ratio of endogenous general fund revenues (RSENGF) to unrestricted general fund revenues	-
RSBM.RP9	ratio of petroleum revenues (RP9SGF) to unrestricted general fund revenues	-
RSEN	state endogenous revenues; million $	-
RSENGF	endogenous state unrestricted general fund revenues; million $	-
RSFDN	total federal grants-in-aid to state general fund; million $	ADA, Annual Financial Report
RSFDNPX	federal-state shared petroleum royalties; million $	ADR, Revenue Sources
RSFDNPXG	general fund portion of federal-state shared petroleum royalties; million $	ADR, Revenue Sources
RSFDNX	exogenous federal-state transfer payments; million $	-
RSFFS	fees and licenses receipts paid into the fish and game special revenue fund; million $	ADA, Annual Financial Report
RSFS	total revenues of the special funds except the Permanent Fund; million $	ADA, Annual Financial Report
RSFS1	miscellaneous receipts of state special revenue funds; million $	ADA, Annual Financial Report
RSGF	total state general fund revenues (unrestricted and restricted); million $	ADA, Annual Financial Report
RSGFBM	total general fund unrestricted revenues; million $	ADR, Revenue Sources
RSGFGAP	the difference between the statutory spending limit and available funds; million $	-
RSGFRS	restricted state general fund revenues; million $	-
RSIAS	international airport receipts (enterprise fund); million $	ADA, Annual Financial Report

Variable	Definition; Units	Historical Data Source[a]
RSID	state development fund earnings; million $	-
RSIDNET	state development fund earnings net of inflation; million $	-
RSIG	state general fund interest; million $	-
RSIGNET	state general fund interest net of inflation; million $	-
RSIN	state general fund interest plus Permanent Fund interest; million $	ADR, Revenue Sources
RSINNET	state general fund interest plus Permanent Fund interest net of inflation; million $	-
RSIP	state Permanent Fund interest; million $	ADR, Revenue Sources
RSIPGF	state Permanent Fund interest transferred into general fund; million $	-
RSIPNET	state Permanent Fund interest net of inflation; million $	-
RT99	total state tax revenues; million $	-
RTAS	alcoholic beverage tax; million $	ADA, Annual Financial Report and ADR, Revenue Sources
RTBS	gross receipts tax and business license tax; million $	ADA, Annual Financial Report
RTBS1	portion of gross receipts tax revenues derived from business licenses; million $	constructed from ADR unpublished data
RTBS2	portion of gross receipts tax revenues derived from gross receipts in excess of exempted amount per business; million $	constructed from ADA, Annual Financial Report and ADL, unpublished data
RTCIS	cigarette tax receipts (sum of general fund and tobacco fund receipts); million $	ADA, Annual Financial Report and ADR, Revenue Sources
RTCS	state corporate tax receipts; million $	ADA, Annual Financial Report and ADR, Revenue Sources
RTCS1	corporate income tax net of petroleum sector; million $	-

Variable	Definition; Units	Historical Data Source[a]
RTCSPX	state corporate tax receipts from petroleum sector; million $	ADR, Revenue Sources
RTCSX	exogenous corporate income tax; million $	-
RTIS	personal income tax; million $	ADA, Annual Financial Report
RTISC	personal income tax on a calendar year basis; million $	ADR, Cumulative Summary of Revenue, a monthly report
RTISCA	personal income tax liability per taxpayer on a calendar year basis; thousand $	-
RTISCA1	initial estimate of personal income tax liability per taxpayer on a calendar year basis; thousand $	-
RTISCA2	initial estimate of personal income tax liability per taxpayer on a calendar year basis without tax structure changes introduced by modeler; thousand $	-
RTISCP	calendar-year state income taxes paid out of Alaskan resident personal income; million $	ADR, unpublished data
RTISLOS	difference per taxpayer between personal income tax liability before and after structural changes introduced by modeler; million $	-
RTISXX	adjustment of disposable income to cover lag in refund in state personal income taxes after repeal; million $	-
RTMF	highway, aviation, and marine fuel taxes; million $	ADA, Annual Financial Report and ADR, Revenue Sources
RTOTS	other state taxes—consists of fiduciary, inheritance, estate, mining, conservation, prepaid, and fish taxes; million $	ADR, Revenue Sources
RTPIF	federal income taxes paid out of Alaskan resident personal income; million $	BEA - disposable personal income data
RTSS	school tax; million $	ADA, Annual Financial Report
RTVS	ad valorem taxes consisting of insurance premium tax and electric telephone company revenue tax; million $	ADA, Annual Financial Report and ADR, Revenue Sources

Variable	Definition; Units	Historical Data Source[a]
SANCSA	payments to Alaska Natives by state government under ANCSA; million $	-
SEXDIV	non-Native sex division at birth; percent	Alaska Department of Health and Social Services
SLGEXP	total combined state and local government expenditures; million $	-
SURINFi	non-Native infant survival rates; percent	Alaska Department of Health and Social Services
Sij	non-Native survival rate for cohort ij	Alaska Department of Health and Social Services
TCRED	individual tax credit beginning after 12/31/77; $	-
THG	total gallons of highway gasoline sold in the state (does not include off-highway gallon sales); million gallons	ADR, monthly motor vehicle tax forms
TOURIST	number of tourist visitors to Alaska; thousands	Alaska Department of Health and Social Services
TP	period over which civilian household formation rates trend; years	-
TPTV	total highway motor vehicles operating in the state (passenger and truck); thousand	Department of Public Safety, Motor Vehicle Division
TXBASE	change in the floor of personal income tax rate schedule; units	-
TXCRPC	state personal income tax credit adjustment (percentage of tax liability);	-
TXPTXX	adjustment to withold from state expenditures a portion of any personal income tax reduction; percent	-
TXRT	percentage change in state personal income tax rate; percentage	-
U.AK.US	ratio of unemployment rates in Alaska and the U.S. average	-
UNEMP	average annual Alaska unemployment; thousand	ADL

Variable	Definition; Units	Historical Data Source[a]
UUS	US unemployment rate; percent	U.S. Department of Labor, Bureau of Labor Statistics
VAEX	value of a personal exemption on personal income tax; $	IRS, Statistics of Income
VAEX1	initial value for personal exemption; $	-
WEALTH	four-year average of real per capita income; 1967 U.S. $	-
WEUS	average weekly wage & salary earnings in U.S.; $	U.S. Department of Labor, Bureau of Labor Statistics
WEUS1	initial value for average weekly wage and salary earnings in United States; $	-
WR.AK.US	ratio of Alaska to U.S. civilian wage rate	-
WR97	average annual wage rate for nonagricultural wage and salary employment; $	-
WR98	average annual wage rate for nonagricultural wage and salary employment plus military; $	-
WRCNNP	average annual wage rate for non- "enclave" construction wage rate; $	ADL, Statistical Quarterly
WRCNP	average annual wage rate for premium wage (pipeline or "enclave") construction; $	ADL, Statistical Quarterly
WRCU	average annual wage rate for communications and public utilities; $	ADL, Statistical Quarterly
WRGC	average annual wage rate for federal civilian; $	ADL, Statistical Quarterly
WRGMS	annual growth in income per proprietor (input to income distribution model)	-
WRGab	annual growth in real annual wage rate in industry ab (input to income distribution model)	-
WRM91	average annual wage rate for existing (low wage) manufacturing employment; $	ADL, Statistical Quarterly
WRM9P	average annual wage rate for large-project (high wage) manufacturing employment; $	-

Variable	Definition; Units	Historical Data Source[a]
WRSB	average annual wage rate for business services; $	ADL, Statistical Quarterly
WRSNB	average annual wage rate for nonbusiness services; $	ADL, Statistical Quarterly
WRab	average annual wage rate for industry sector ab; $	ADL, Statistical Quarterly
WS97	total wage and salary payments in nonagricultural wage and salary industries; million $	-
WS98	total wage and salary payments in nonagricultural wage and salary industries plus military; million $	-
WS98L	wages and salaries lagged one year (input to income distribution model); million $	-
WSCNP	wages and salary payments in high wage ("enclave") construction; million $	-
WSGC	federal civilian wages and salaries; million $	ADL, Statistical Quarterly
WSGL	local government wages and salaries; million $	ADL, Statistical Quarterly
WSGM	military personnel wages and salaries; million $	BEA, personal income data
WSGS	state government wages and salaries; million $	ADL, Statistical Quarterly
WSGSFY	state government wages and salaries on fiscal year basis; million $	ADL, Statistical Quarterly
WSM9P	wages and salaries paid in high wage exogenous large-project manufacturing; million $	-
WSNA	wages and salaries paid to Natives; million $	-
WSS91	wages and salaries in services net of Native Corporation-related wages; million $	-
WSab	wages and salaries paid in industry ab; ab=CN GA A9 CM DR DW D9 FI GF M9 PU P9 S9 T9; million $	ADL, Statistical Quarterly
X1-X6	variables used to facilitate printing of output of the income distribution model	-
XX98	total real gross state product in wage and salary industries and military; million 1972 U.S. $	-

Variable	Definition; Units	Historical Data Source[a]
XXA9	agriculture-forestry-fisheries real gross state product; million 1972 U.S. $	for construction methodology, see Kresge and Thomas, "Estimating Alaska Gross Product by Industry," Alaska Review of Business and Economic Conditions, Vol. XI, No. 1
XXCN1	endogenous (residentiary plus state government) component of construction real gross state product: million 1972 U.S. $	-
XXCN8	residentiary construction real gross state product; million 1972 U.S. $	-
XXDRNT	state retail trade net of tourism real gross state product; million 1972 $	-
XXM9	manufacturing real gross state product; million 1972 U.S. $	-
XXM91	manufacturing net of large projects real gross state product net of large projects; million 1972 U.S. $	for construction methodologies, see Kresge and Thomas, "Estimating Alaska Gross Product by Industry," Alaska Review of Business and Economic Conditions, Vol. XI, No. 1
XXMX2	exogenous large-project manufacturing real gross state product; million 1972 U.S. $	-
XXS8NT	support services (net of business, tourism, and Native claims) real gross state product; million 1972 U.S. $	-
XXSB	business services real gross state product; million 1972 U.S. $	-
XXTNT	transportation (net of tourism and exogenous components) real gross state product; million 1972 U.S. $	-
XXVACAP	value added in contract construction accounted for by government (state) purchases from the private contracting industry; million 1972 U.S. $	-
XXVHY	value added in construction industry from private contracts for highway construction let by state government; million $	constructed from ADPW worksheets

Variable	Definition; Units	Historical Data Source[a]
XXVNHY	value added in construction industry from private contracts for nonhighway construction let by state government; million $	constructed from ADPW worksheets
XXab	real gross state product in industry ab; ab=A9 CM CN DR DW D9 FI GA GF PU P9 S9 T9; million 1972 U.S. $	for construction methodologies, see Kresge and Thomas, "Estimating Alaska Gross Product by Industry," Alaska Review of Business and Economic Conditions, Vol. XI, No. 1
YR	year	-

APPENDIX G
MAP ECONOMIC MODEL LISTING

Including

1. Fiscal Module
2. Economic Module
3. Population Module
4. Household Module
5. Native Economic Activity
6. Definitional Equations
7. Links to Income Distribution Model
8. Parameter List

MODEL: A83.2

PURPOSE: This model calculates annual statewide economic, fiscal, and demographic output based on user-specified input assumptions.

DATE: May 1983

SYMBOLS

ENDOGENOUS:

ADMSD AEX AGI AHG ATD ATI ATI.TT ATT BALCAP84 BALDF BALGF BALGFCP BALGFP BALPF BAL99 BIU BL CEA9N CECMN CECNN CED9N CEFIN CEGAN CEGFN CEM9N CEPUN CEP9N CES9N CET9N CNNPF1 CNNPF10 CNNPF11 CNNPF12 CNNPF13 CNNPF14 CNNPF15 CNNPF2 CNNPF3 CNNPF4 CNNPF5 CNNPF6 CNNPF7 CNNPF8 CNNPF9 CNNPM1 CNNPM10 CNNPM11 CNNPM12 CNNPM13 CNNPM14 CNNPM15 CNNPM2 CNNPM3 CNNPM4 CNNPM5 CNNPM6 CNNPM7 CNNPM8 CNNPM9 COLA DEBTP82 DF.RSVP DPI DPIRES DPI8 ELBD ELED ELEDCP ELED1 ELNED1 ELPERS EL99 EMAFISH EMA9 EMCM EMCN EMCNRT EMCNX EMCN1 EMDR EMDRNT EMDTOUR EMDW EMD9 EMFI EMGA EMGF EMGL EMGS EMMO EMM9 EMM91 EMPRO EMPROFIS EMPRO1 EMPU EMRATE EMRATN1 EMSB EMSP EMSTOUR EMSUP EMS8NT EMS9 EMS91 EMTCU EMTNT EMTOUR EMTTOUR EMT9 EMT91 EMX EM96 EM97 EM98 EM99 EXANSAV EXCAP EXCAPFR EXCDS EXCDSNT EXCDS4 EXCPS EXCPSFED EXCPSHY EXCPSM EXCPSNH EXDFCON EXDFWITH EXDSS EXEDS EXEDS4 EXGF EXGFBM EXGFCHY EXGFCNH EXGGS EXGGS4 EXHES EXHES4 EXINREC EXJUS EXJUS4 EXLIM EXLIMOK EXNOPS EXNRS EXNRS4 EXOPS EXPFCON EXPPS EXPPS4 EXPRCDS EXPREDS1 EXPRGGS EXPRHES EXPRJUS EXPRNRS EXPRPPS EXPRSSS EXPRTRS EXPRUA EXPR99 EXSAVS EXSSS EXSSS4 EXSUBS EXTRNS EXTRS EXTRS4 EXUA EX99S FAGI FAGII GOBONDL GODT GR GTR IM.BAL IM.BALRV LPTB LPTB1 MIGIN MIGOUT MILPCT NATPF1 NATPF10 NATPF11 NATPF12 NATPF13 NATPF14 NATPF15 NATPF2 NATPF3 NATPF4 NATPF5 NATPF6 NATPF7 NATPF8 NATPF9 NATPM1 NATPM10 NATPM11 NATPM12 NATPM13 NATPM14 NATPM15 NATPM2 NATPM3 NATPM4 NATPM5 NATPM6 NATPM7 NATPM8 NATPM9 NCCAP NCCI NCPI P.DPINN

PDCON PDEXOPS PDRATIO PDRPI PDUSCPI PI PIDIR PIOLI PIPROF
PIPRO1 PIRADJ PISSC PITRAN PITRAN1 PI3 PI8 POP POPC POPGER
POPM POPMIG POPNE POPSKUL PR.BALCP PR.DPINN PR.DPIUS PR.PI
PR.PI3 R.BALCAP R.DPI R.DPI8N R.DPI8X R.WR97 RLMC RLOT RLPT1
RLTCS RLTCS4 RLTEB RLTEB4 RLTEF4 RLTEO RLTEO4 RLTET RLTET4
RLTE99 RLTE994 RLTF RLTMA RLTMA4 RLTMS RLTRS RLTRS4 RLTT9
RLTT94 RLTVS4 RLT99 RMIS RMISRES ROFAS ROFERS ROFOS RSFDN
RSFFS RSFS1 RSGF RSGFBM RSIAS RTAS RTBS2 RTCIS RTCS1 RTIS
RTISC RTISCA1 RTISCA2 RTISCP RTISLOS RTMF RTOTS RTPIF RTSS
RTVS R99S TPTV VAEX WEALTH WEUS WRA9 WRCM WRCN WRCNNP
WRCNP WRDR WRDW WRD9 WRFI WRGA WRGC WRGF WRGL WRGM WRGS
WRM91 WRPU WRP9 WRSB WRSNB WRS9 WRT9 WR98 WSCN WSCNP WSGA
WSGC WSGL WSGM WSGS WSGSFY WS97 WS98 XXA9 XXCM XXCN XXCN1
XXCN8 XXDR XXDRNT XXDW XXD9 XXFI XXGA XXGF XXM91 XXPU XXP9
XXSB XXS8NT XXS9 XXTNT XXT9 XXVHY XXVNHY XX98

CONSTRUCT:

DF.BALDF DF.BALGF DF.BALPF DF.BAL9P DF.BAL99 DF.CABBM DF.EXGF
DF.EXGFB DF.EXGFP DF.GOXBM DF.NPET DF.NRP9S DF.PI DF.PIP
DF.RGFNT DF.RP9S DF.RSEN DF.RSFD DF.RSGF DF.RSGFB DF.RSIDN
DF.RSIGN DF.RSIN DF.RSINN DF.RSIP DF.RSIPN DF.R99S DF.WRG9
DF.WRNS DF.WRSP DF.WSG9 DF.WSNS DF.WSSP DF.WS98 EM.EMCN
EM.EMGA EM.EMGF EM.EMG9 EM.EMNR EM.EMNS EM.EMP9 EM.EMSP
EM.EMSUP EM.EMTCU EX.DSS EX.NPET EX.NRP9 EX.PET EX.RP9S
EX.RSEN EX.RSIN EX.RVNT EX.R99S EXBM.CAB EXBM.END EXBM.FD
EXBM.GR1 EXBM.RV G.BAL9PC G.BAL99 G.EL99 G.EM99 G.EX99S
G.PDRPI G.POP G.PR.DPI G.PR.PI G.R.WR98 G.RNSPC G.RSEN G.SRPC
G.XONRPC IM.BALPC IM.BALR IM.BAL99 IM.BLRPC IM.REV INDEX.DI
INDEX.S1 INDEX.S2 INDEX.WG P.BALGF P.BALPF P.BAL99 P.DPINN1
P.ELED P.ELNED1 P.EL99 P.EXBM P.EXCAP P.EXONTR P.EXOPS
P.EX99S P.GEXP P.GODT P.NPET P.NRP9S P.PI P.PIN P.PINCL
P.PINN P.RLT99 P.RSEN P.RSIN P.RSIP P.RTIS P.RT99 P.R99S
PI.DPI PI.EL99 PI.EXL PI.EXS PI.EXT PI.EX99S PI.GODT PI.RLPT
PI.RL99 PI.RSEN PI.TXL PI.TXS PI.WS98 PIU.PIA POP.AD POP.CIV
POP.GER POP.KID POP.MIL POP.NAT PR.BALG1 PR.BALG2 PR.BALPF
PR.BALP2 PR.BAL99 PR.DPI PR.DPIN PR.ECP PR.ECPN PR.ELED
PR.ELEDC PR.ELNED PR.EL99 PR.EXBM PR.EXCAP PR.EXCDS PR.EXEDS
PR.EXGGS PR.EXHES PR.EXJUS PR.EXNRS PR.EXONT PR.EXOPS PR.EXPPS
PR.EXSSS PR.EXTRS PR.EX99S PR.GEXP PR.GFC PR.GFCN PR.GODT
PR.NCEXP PR.NPET PR.NRP9 PR.PIN PR.PINCL PR.PINN PR.RLT99
PR.RSEN PR.RSIN PR.RSIP PR.RTIS PR.RT99 PR.R99S R.PI R.PIN
R.PINN R.WR98 RL99.PT RL99.RT RN.FED RN.OIL RN.RSEN RN.RSIN
RS.FED RS.OWN RS.PET RS.REC RS.RN RS.RP9S RS.RSEN RS.RSIN
RSBM.B99 RSBM.GF RSBM.PET RSBM.PF RSBM.REN RSBM.RP9 U.AK.US
WR.AK.US

DEFINITION:

ADMDIS ADMREA BALCAB BALCABBM BALLANDS BALOCAL BCRUDE BTHTOT
BTOT CBR CDR CF1 CF10 CF11 CF12 CF13 CF14 CF15 CF2 CF3
CF4 CF5 CF6 CF7 CF8 CF9 CHHF10 CHHF11 CHHF12 CHHF13 CHHF14
CHHF15 CHHF4 CHHF5 CHHF6 CHHF7 CHHF8 CHHF9 CHHM10 CHHM11
CHHM12 CHHM13 CHHM14 CHHM15 CHHM4 CHHM5 CHHM6 CHHM7 CHHM8
CHHM9 CM1 CM10 CM11 CM12 CM13 CM14 CM15 CM2 CM3 CM4 CM5
CM6 CM7 CM8 CM9 CNNTOT DCRUDE DELEMP DTHINF DTHTOT DTOT
EMCU EMG9 EMMX EMNA EMNAT EMNC EMNNC EMNR EMNS EMOCSX
EMRATN EXBUD EXCAPNEW EXCAPREP EXCPSGOB EXEDSNT EXGFCAP
EXGFOPER EXHYCAP EXNHYCP EXOM84 EXONTR EXPFCON1 EXPFNEW
EXPFREIN EXRP84 EXSPLIT HH HHC HHF10 HHF11 HHF12 HHF13
HHF14 HHF15 HHF4 HHF5 HHF6 HHF7 HHF8 HHF9 HHM HHM10 HHM11
HHM12 HHM13 HHM14 HHM15 HHM4 HHM5 HHM6 HHM7 HHM8 HHM9 HHN
HHSIZE HHSIZEC HHSIZEN HH24 HH25.29 HH30.54 HH55 LF LPTBFV
LPTBP9 LPTB1FV NAPF1 NAPF2 NAPF3 NAPF4 NAPF5 NAPF6 NAPF7
NAPM1 NAPM2 NAPM3 NAPM4 NAPM5 NAPM6 NAPM7 NATINC NATTOT
NBTHTOT NCBR NCDR NCEXP NCF1 NCF10 NCF11 NCF12 NCF13 NCF14
NCF15 NCF2 NCF3 NCF4 NCF5 NCF6 NCF7 NCF8 NCF9 NCM1 NCM10
NCM11 NCM12 NCM13 NCM14 NCM15 NCM2 NCM3 NCM4 NCM5 NCM6
NCM7 NCM8 NCM9 NCWS NDTHINF NDTHTOT NEMA9N NEMCMN NEMCNN
NEMD9N NEMFIN NEMGAN NEMGFN NEMM9N NEMPUN NEMP9N NEMS9N
NEMT9N NHHF10 NHHF11 NHHF12 NHHF13 NHHF14 NHHF15 NHHF4 NHHF5
NHHF6 NHHF7 NHHF8 NHHF9 NHHM10 NHHM11 NHHM12 NHHM13 NHHM14
NHHM15 NHHM4 NHHM5 NHHM6 NHHM7 NHHM8 NHHM9 NNATINC NNPF1
NNPF2 NNPF3 NNPF4 NNPF5 NNPF6 NNPF7 NNPM1 NNPM2 NNPM3 NNPM4
NNPM5 NNPM6 NNPM7 NONPET NONRP9S NWSA9N NWSCMN NWSCNN NWSD9N
NWSFIN NWSGAN NWSGFN NWSM9N NWSPUN NWSP9N NWSS9N NWST9N PF
PFN PIL PIN PINN PIN1 PIPE PIPRO PLFDOMC PLFDOMM PLFDOMN
PLFD9 PM PMN POPADS POPCGQ POPF1 POPF10 POPF11 POPF12
POPF13 POPF14 POPF15 POPF2 POPF3 POPF4 POPF5 POPF6 POPF7
POPF8 POPF9 POPGQ POPKIDS POPM1 POPM10 POPM11 POPM12 POPM13
POPM14 POPM15 POPM2 POPM3 POPM4 POPM5 POPM6 POPM7 POPM8
POPM9 POPNGQ POPNI9 PPVAL PRINT PTBP9 RATIO1 RAT1 RLPT
RLTEA RLTEA4 RLTEC RLTEC4 RLTEF RLTOT RLTOT4 RLTVS RL99
RL991 RNAT ROFTS RPBSGF RPRYGF RP7S RP9S RP9SGF RSBM.EXD
RSEN RSENGF RSFDNPXG RSFS RSGFGAP RSGFRS RSID RSIDNET RSIG
RSIGNET RSIN RSINNET RSIP RSIPGF RSIPNET RTBS RTBS1 RTCS
RTISCA RT99 R99SNT R99SON SLGEXP THG UNEMP WRCU WRGCN WRGCU
WRGD9 WRGFI WRGGA WRGGC WRGMS WRGM9 WRGP9 WRGS9 WRGT9 WRM9
WRM9P WR97 WSA9 WSCM WSD9 WSFI WSGF WSM9 WSM9P WSNA WSPU
WSP9 WSS9 WSS91 WST9 WS98L XXM9 XXVACAP X1 X2 X3 X4 X5 X6

EXOGENOUS:

ANCSA BADD BALDF1 BALGF1 BALPF1 BAL991 BASEMCNX BASEPOP
BASEXCAP BASEXGF BASEXOPS BASPDRPI BIU1 D.80DEC6 D61.66
D61.68 D61.69 D61.70 D61.72 D61.73 D61.74 D61.75 D61.76
D61.77 D64.65 D69 D71.00 D71.73 D72 D75 D77.00 D79 D81.00
EMNATX EXCAP1 EXCPSHY1 EXCPSNH1 EXDSSX EXGFCHY1 EXGFCNH1
EXOPS1 GODTX LPTRAT NCBP NCRP PCNC1 PCNC2 PCNC3 PCOLART
PDUSCPI1 PIPADJ PR.DPIU1 P9PTPER RNATX RTISXX SANCSA TCRED
TXBASE TXCRPC TXPTXX TXRT VAEX1 WEUS1 YR

POLICY:

EMAGRI EMCNX1 EMCNX2 EMFISH EMGC EMGM EMMX1 EMMX2 EMP9
EMT9X EXBOND EXDFPCNT EXDF1 EXPFBAK EXPFCONX EXPFDIST EXPF1
EXPRPER EXSAVX EXSPCAP EXSPLITX EXSUBS1 GRDIRPU GREXCAP
GREXOPS GRRPCEX GRRWEUS GRSSCP GRUSCPI RLPTX RLTFPX RLTX
RPBS RPPS RPRY RPTS RP9X RSFDNPX RSFDNX RTCSPX RTCSX
TOURIST UUS XXMX2

COEFFICIENT:

CMIG1 CMIG2 CMIG3 CMIG4 C1A C1B C1C C10A C10B C10C C100A
C100B C100C C101A C101B C102A C102B C102C C102D C102F C103A
C103B C103C C104A C104B C105A C105B C105C C106A C106B C107A
C107B C11A C11B C12A C12B C13A C13B C14A C14B C14C C15A
C15B C16A C16B C16C C16D C16E C17A C17B C18A C18B C19A
C19B C2A C2B C20A C20B C21A C21B C21C C22A C22B C23A C23B
C23C C23D C24A C24B C25A C25B C26A C26B C26C C27A C27B
C27C C28A C28B C28C C29A C29B C3A C3B C30A C30B C31A C31B
C32A C32B C33A C33B C34A C34B C34C C35A C35B C36A C36B
C36C C36D C36F C37A C37B C38A C38B C39A C39B C4A C4B C40A
C40B C41A C41B C42A C42B C43A C43B C43C C44A C44B C44C
C44D C45A C45B C45C C45D C46A C46B C47A C47B C48A C48B
C49A C49B C5A C5B C50A C50B C51A C51B C52A C52B C53A C53B
C53C C53D C53F C54A C54B C54C C54D C54E C55A C55B C55C
C56A C56B C57A C57B C57C C58A C58B C59A C59B C59C C59D
C59E C59F C6A C6B C60A C60B C60C C61A C61B C62A C62B C62C
C62D C62F C63A C63B C64A C64B C64C C64D C64E C65A C65B
C66A C66B C66C C66D C66E C66F C67A C67B C67C C68A C68B
C68C C68D C69A C69B C7A C7B C70A C70B C70C C70D C70F C71A
C71B C71C C71D C71E C72A C72B C72C C72D C73A C73B C73C
C74A C74B C74C C74D C74F C75A C75B C76A C76B C76C C76D
C76E C77A C77B C78A C78B C78C C78D C78E C78F C79A C79B
C79D C79E C79F C8A C8B C80A C80B C80C C81A C81B C82A C82B
C82C C82D C82F C83A C83C C83D C83E C84A C84B C84C C84D
C85A C85B C86A C86B C86C C86D C86E C86F C87A C87B C88A
C88B C88C C88D C88E C88F C88G C89A C9A C9B C90A C90B C91A
C91B C92A C92B C92C C92F C93A C93B C94A C94B C95A C95B
C95C C95D C95F C96A C96B C97A C97B C98A C98B C99A C99B

PARAMETER:

AFTOT CPGQF1 CPGQF10 CPGQF11 CPGQF12 CPGQF13 CPGQF14 CPGQF15
CPGQF2 CPGQF3 CPGQF4 CPGQF5 CPGQF6 CPGQF7 CPGQF8 CPGQF9
CPGQM1 CPGQM10 CPGQM11 CPGQM12 CPGQM13 CPGQM14 CPGQM15 CPGQM2
CPGQM3 CPGQM4 CPGQM5 CPGQM6 CPGQM7 CPGQM8 CPGQM9 EXANNU
EXCAPIMP EXCAPOLD EXEL1 EXEL2 EXEL3 EXEL4 EXEL5 EXEL6
EXLIM82 EXOMCOST EXOPSIMP EXRLOP6 EXRLOP7 EXRLOP8 EXRL1 EXRL2
EXRL3 EXRL4 EXRL4OP EXRL5 FERT10 FERT11 FERT4 FERT5 FERT6
FERT7 FERT8 FERT9 G1 G10 G11 G12 G13 G14 G15 G2 G3 G4
G5 G6 G7 G8 G9 HHRF10 HHRF11 HHRF12 HHRF13 HHRF14 HHRF15
HHRF4 HHRF5 HHRF6 HHRF7 HHRF8 HHRF9 HHRM10 HHRM11 HHRM12
HHRM13 HHRM14 HHRM15 HHRM4 HHRM5 HHRM6 HHRM7 HHRM8 HHRM9
LFPART MDPF1 MDPF10 MDPF11 MDPF12 MDPF13 MDPF14 MDPF15 MDPF2

MDPF3 MDPF4 MDPF5 MDPF6 MDPF7 MDPF8 MDPF9 MDPM1 MDPM10
MDPM11 MDPM12 MDPM13 MDPM14 MDPM15 MDPM2 MDPM3 MDPM4 MDPM5
MDPM6 MDPM7 MDPM8 MDPM9 MDTOT MF1 MF10 MF11 MF12 MF13 MF14
MF15 MF2 MF3 MF4 MF5 MF6 MF7 MF8 MF9 MHHF10 MHHF11 MHHF12
MHHF13 MHHF14 MHHF15 MHHF5 MHHF6 MHHF7 MHHF8 MHHF9 MHHM10
MHHM11 MHHM12 MHHM13 MHHM14 MHHM15 MHHM5 MHHM6 MHHM7 MHHM8
MHHM9 MILF1 MILF10 MILF11 MILF12 MILF13 MILF14 MILF15 MILF2
MILF3 MILF4 MILF5 MILF6 MILF7 MILF8 MILF9 MILM1 MILM10
MILM11 MILM12 MILM13 MILM14 MILM15 MILM2 MILM3 MILM4 MILM5
MILM6 MILM7 MILM8 MILM9 MILRAT MM1 MM10 MM11 MM12 MM13
MM14 MM15 MM2 MM3 MM4 MM5 MM6 MM7 MM8 MM9 NFERT10 NFERT11
NFERT4 NFERT5 NFERT6 NFERT7 NFERT8 NFERT9 NHHRF10 NHHRF11
NHHRF12 NHHRF13 NHHRF14 NHHRF15 NHHRF4 NHHRF5 NHHRF6 NHHRF7
NHHRF8 NHHRF9 NHHRM10 NHHRM11 NHHRM12 NHHRM13 NHHRM14 NHHRM15
NHHRM4 NHHRM5 NHHRM6 NHHRM7 NHHRM8 NHHRM9 NMF1 NMF10 NMF11
NMF12 NMF13 NMF14 NMF15 NMF2 NMF3 NMF4 NMF5 NMF6 NMF7 NMF8
NMF9 NMM1 NMM10 NMM11 NMM12 NMM13 NMM14 NMM15 NMM2 NMM3
NMM4 NMM5 NMM6 NMM7 NMM8 NMM9 NPGQF1 NPGQF10 NPGQF11
NPGQF12 NPGQF13 NPGQF14 NPGQF15 NPGQF2 NPGQF3 NPGQF4 NPGQF5
NPGQF6 NPGQF7 NPGQF8 NPGQF9 NPGQM1 NPGQM10 NPGQM11 NPGQM12
NPGQM13 NPGQM14 NPGQM15 NPGQM2 NPGQM3 NPGQM4 NPGQM5 NPGQM6
NPGQM7 NPGQM8 NPGQM9 NRCF10 NRCF11 NRCF12 NRCF13 NRCF14
NRCF15 NRCF4 NRCF5 NRCF6 NRCF7 NRCF8 NRCF9 NRCM10 NRCM11
NRCM12 NRCM13 NRCM14 NRCM15 NRCM4 NRCM5 NRCM6 NRCM7 NRCM8
NRCM9 NSEXDIV NSF1 NSF10 NSF11 NSF12 NSF13 NSF14 NSF15 NSF2
NSF3 NSF4 NSF5 NSF6 NSF7 NSF8 NSF9 NSM1 NSM10 NSM11 NSM12
NSM13 NSM14 NSM15 NSM2 NSM3 NSM4 NSM5 NSM6 NSM7 NSM8 NSM9
NSURINFF NSURINFM NTP OEMF1 OEMF10 OEMF11 OEMF12 OEMF13
OEMF14 OEMF15 OEMF2 OEMF3 OEMF4 OEMF5 OEMF6 OEMF7 OEMF8
OEMF9 OEMM1 OEMM10 OEMM11 OEMM12 OEMM13 OEMM14 OEMM15 OEMM2
OEMM3 OEMM4 OEMM5 OEMM6 OEMM7 OEMM8 OEMM9 PADJ PAD1 PAD2
PARLVFV PARNONGF PBLTBL PBTRATE PCINDA PCIVPY PCNCSV PCNCSV1
PCNCWS PCNC4 PCWS1 PCYNA1 PC12N PC12RN PC13C PC39A PC39B
PDRPIBAS PECIG PERNA1 PERNA2 PERNA3 PESLT PESLTC PFISH1
PIDIST PNTGR POPMGQ PRINT2 PTOURB PTOURD PTOURE PTOURS
PTOURT PTRTS PWRBASE P1 P2 P3 P4 P5 P6 RCF10 RCF11 RCF12
RCF13 RCF14 RCF15 RCF4 RCF5 RCF6 RCF7 RCF8 RCF9 RCM10
RCM11 RCM12 RCM13 RCM14 RCM15 RCM4 RCM5 RCM6 RCM7 RCM8
RCM9 ROR RORANGRO RORCPDEP RORCRF RORDISK RORNC RORPDF
RORPPF SEXDIV SF1 SF10 SF11 SF12 SF13 SF14 SF15 SF2 SF3
SF4 SF5 SF6 SF7 SF8 SF9 SM1 SM10 SM11 SM12 SM13 SM14
SM15 SM2 SM3 SM4 SM5 SM6 SM7 SM8 SM9 SURINFF SURINFM TP

EQUATIONS

National Variables

1: PR.DPIUS = IF YR LT 1982 THEN PR.DPIU1 ELSE PR.DPIUS(-1)*(1+GRDIRPU)

2: PDUSCPI = IF YR LT 1982 THEN PDUSCPI1 ELSE PDUSCPI(-1)*(1+GRUSCPI)

3: WEUS = IF YR LT 1982 THEN WEUS1 ELSE WEUS(-1)*(1+GRUSCPI+GRRWEUS)

4: PDRATIO = IF YR EQ 1980 THEN 1.296 ELSE (IF YR EQ 1981 THEN 1.266 ELSE (IF YR EQ 1982 THEN 1.262 ELSE (IF RTIS(-2)-RTIS(-1) NE 0 AND RTIS(-2) EQ 0 THEN PDRATIO(-1)+C67A*(EMSP-EMSP(-1))/EMSP(-1)+C67B*(EMCNRT/(EM98(-1)/(EM98-EMCNX1)))-C67C ELSE PDRATIO(-1)+C67A*(EMSP-EMSP(-1))/EMSP(-1)+C67B*(EMCNRT/(EM98(-1)/(EM98-EMCNX1))))))

Price Deflators

5: PDRPI = PDRATIO*PDUSCPI

6: PDEXOPS = WSGSFY(-1)/EXOPS(-1)*(WRGA*100/PWRBASE)+(EXOPS(-1)-WSGSFY(-1))/EXOPS(-1)*PDRPI

7: PDCON = C107A+C107B*WRCNNP

Fiscal Module

State Revenues

8: RP7S == RPBS+RPRY+RSFDNPX

9: RP9S == RP7S+RPPS+RPTS+RTCSPX+RP9X

10: RP9SGF == RP9S-EXPF1*RP7S

11: RPBSGF == (1-EXPF1)*RPBS

12: RPRYGF == (1-EXPF1)*RPRY

13: RSFDNPXG == (1-EXPF1)*RSFDNPX

14: DF.RSVP = IF YR LT 1982 THEN 0 ELSE DF.RSVP(-1)+RP9S*(PDRPIBAS/PDRPI)*(1/(1+RORDISK)**(YR-1981))

15: LOG(FAGI) = C21A+C21B*LOG(PI8)+C21C*LOG(EMCNX1+EMP9)

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16:  LOG(FAGII) = C22A+C22B*LOG(PI)

17:  COLA = (1-1/(1+PCOLART))*WSGC

18:  AGI = FAGI+COLA-WSGM-PC12N*PC12RN*ANCSA*PCNC1

19:  AEX*1000 = C10A+C10B*POPC+C10C*(EMCNX1+EMP9)

20:  ATT = C28A+C28B*(EM99-EMGM)+C28C*EMCNX1

21:  LOG(ATD/ATT) = C23A+C23B*LOG(AGI/ATT)+C23C*D69+C23D*D72

22:  VAEX = IF YR LT 1980 THEN VAEX1 ELSE VAEX(-1)*(1+GRUSCPI)

23:  ATI = AGI-AEX*VAEX-ATD

24:  ATI.TT = ATI/ATT

25:  LOG(RTISCA1) = C24A-TXBASE+C24B*(1-TXRT)*LOG(ATI.TT)

26:  LOG(RTISCA2) = C24A+C24B*LOG(ATI.TT)

27:  RTISCA == IF YR GT 1984 THEN (IF EXTRNS+EXTRNS(-1) EQ 0 THEN
     EXRL5*(RTISCA1-TXCRPC*RTISCA1-TCRED/1000)ELSE 0) ELSE (IF YR LT
     1979 THEN RTISCA1-TXCRPC*RTISCA1-TCRED/1000 ELSE 0)

28:  RTISLOS == (RTISCA2-RTISCA)*ATT

29:  RTISC = RTISCA*ATT

30:  RTIS = IF YR EQ 1980 THEN 0 ELSE C25A*RTISC(-1)+C25B*RTISC

31:  RTISCP = C105A+C105B*PI8+C105C*RTISC

32:  LOG(RTPIF/ATT) = C26A+C26B*LOG(FAGII/ATT+TCRED/1000/ATT+
     RTISLOS/ATT)+C26C*D61.68*LOG(FAGII/ATT+TCRED/1000/ATT+RTISLOS/ATT)

33:  DPIRES = C27A+C27B*PI3+C27C*WSCNP

34:  LOG(BL) = C39A+C39B*LOG(XX98-XXP9)

35:  LOG(GR) = C40A+C40B*LOG(XX98)

36:  RTBS1 == (BL+BL(-1))*1000/2*PBTRATE

37:  GTR = GR-BL(-1)*PNTGR*1000

38:  LOG(RTBS2*10**3/BL(-1)) = C29A+C29B*LOG(GTR(-1)*10**3/BL(-1))

39:  RTBS == IF YR GE 1979 THEN RTBS1+RTBS2*PBLTBL ELSE RTBS1+RTBS2
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40:  LOG(RTCS1*100/PDRPI) = C43A+C43C*D64.65+C43B*LOG(EMP9(-1)+
     EMCN(-1)+EMM9(-1)+EMT9(-1)+EMCM(-1)+EMPU(-1))

41:  RTCS == RTCS1+RTCSPX+RTCSX

42:  TPTV = C38A+C38B*POP

43:  LOG(AHG) = C37A+C37B*LOG(PR.PI)

44:  THG == AHG*TPTV

45:  LOG(RTMF) = C46A+C46B*LOG(THG)

46:  LOG(RTVS) = C47A+C47B*LOG(R.DPI8N(-1))

47:  LOG(RTAS) = C48A+C48B*LOG(R.DPI(-1))

48:  LOG(RTCIS) = C49A+C49B*LOG(R.DPI(-1))

49:  RTSS = IF YR GT 1980 THEN 0 ELSE C50A+C50B*(EM99-EMGM)

50:  RTOTS = RTOTS(-1)*(1+GRUSCPI+GRDIRPU)

51:  RT99 == RTIS+RTCS+RPPS+RPTS+RP9X+RTBS+RTMF+RTAS+(1-PECIG)*
     RTCIS+RTVS+RTSS+RTOTS

52:  LOG(ROFAS) = C30A+C30B*LOG(TPTV(-1))

53:  LOG(ROFOS) = C33A+C33B*LOG(PI3(-1))

54:  ROFTS == ROFAS+ROFOS

55:  ROFERS = ROFERS(-1)*(1+GRUSCPI+GRDIRPU)

56:  LOG(RMIS) = C35A+C35B*LOG(PI3(-1))

57:  RSIP == (ROR+GRUSCPI+RORPPF)*BALPF(-1)

58:  RSIPGF == (1-EXPFBAK)*RSIP

59:  RSID == (ROR+GRUSCPI-RORPDF)*BALDF(-1)

60:  RSIG == (ROR+GRUSCPI)*BALGF(-1)

61:  RSIN == (ROR+GRUSCPI)*BAL99(-1)+RORPPF*BALPF(-1)-RORPDF*BALDF(-1)

62:  RSIPNET == (ROR+GRUSCPI-(PDRPI/PDRPI(-1)-1)+RORPPF)*BALPF(-1)

63:  RSIDNET == (ROR+GRUSCPI-(PDRPI/PDRPI(-1)-1)-RORPDF)*BALDF(-1)

64:  RSIGNET == (ROR+GRUSCPI-(PDRPI/PDRPI(-1)-1))*BALGF(-1)
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65:  RSINNET == (ROR+GRUSCPI-(PDRPI/PDRPI(-1)-1))*BAL99+RORPPF*
     BALPF(-1)-RORPDF*BALDF(-1)

66:  RSGFBM = RT99+(1-EXPF1)*RP7S+ROFTS+ROFERS+RSIG+(1-EXPFBAK)*
     RSIP+RMIS+EXDFWITH

67:  RSFDN = IF YR EQ 1982 THEN 187.968 ELSE RSFDNX+RSFDN(-1)*
     (1+GRUSCPI+GRDIRPU)

68:  RMISRES = IF YR EQ 1982 THEN 16.739 ELSE RMISRES(-1)*
     (1+GRUSCPI+GRDIRPU)

69:  RSGFRS == RSFDN+RMISRES

70:  RSGF = RSGFBM+RSGFRS

71:  R99S = RSGF+EXPF1*RP7S+EXPFBAK*RSIP+(RSID-EXDFWITH)-SANCSA

72:  LOG(RSFFS) = C58A+C58B*LOG(POP(-1))

73:  RSFS1 = RSFS1(-1)*(1+GRUSCPI+GRDIRPU)

74:  RSFS == PECIG*RTCIS+RSFFS+RSFS1

75:  RSIAS = IF YR EQ 1982 THEN 31.12 ELSE RSIAS(-1)*(1+GRUSCPI+
     GRDIRPU)

76:  R99SNT == R99S-EXPFCON

77:  R99SON == R99S-RSFDN

78:  NONPET == R99S-RP9S-RSIN

79:  NONRP9S == R99S-RP9S

80:  RSEN == R99S-(RP9S-SANCSA)-RSIN-RSFDN

81:  RSENGF == RSGFBM-RP9SGF-RSIPGF-RSIG

82:  EXPFCON = EXPFBAK*RSIP+EXPF1*RP7S+EXPFCONX

83:  EXPFNEW == EXPF1*RP7S

84:  EXPFREIN == EXPFBAK*RSIP

85:  EXPFCON1 == EXPFCON-EXPFCONX

86:  EXDFCON = IF RSGFBM GT EXGFBM THEN EXDF1*(RSGFBM-EXGFBM)+
     (RSID-EXDFWITH) ELSE RSID-EXDFWITH

87:  EXDFWITH = EXDFPCNT*RSIDNET
```

State Expenditures

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 88:  EXLIM = IF YR EQ 1982 THEN EXLIM82 ELSE EXLIM82*
      (PDRPI/PDRPIBAS)*(POP/430)

 89:  EXLIMOK = IF YR LT 1985 THEN EXLIM ELSE (IF RSGFBM-EXDSS-EXTRNS+
      BALGF(-1) GT EXLIM THEN EXLIM ELSE RSGFBM-EXDSS-EXTRNS)

 90:  RSGFGAP == EXLIM-EXLIMOK

 91:  EXSPLIT == IF YR LT 1985 THEN 0.67 ELSE (IF RSGFGAP GT 0 AND
      RSGFGAP(-1) GT 0 THEN EXSPLITX ELSE (IF RSGFGAP GT 0 THEN
      0.67+(EXSPLITX-0.67)/2 ELSE 0.67))

 92:  EXOPS = IF YR LE 1983 THEN EXOPS1 ELSE EXRL5*(EXLIMOK*EXSPLIT+
      EXINREC+RSFDN+RMISRES+RSFS+RSIAS)+EXRL1*(EXOPS(-1)*(1+(EXEL1*(POP
      (-1)/POP(-2)-1)+EXEL2*(PDEXOPS(-1)/PDEXOPS(-2)-1)+EXEL3*(PR.PI3
      (-1)/PR.PI3(-2)-1)+EXEL4*(PI(-1)/PI(-2)-1)+EXEL5*(PI3(-1)/PI3(-2)-
      1)+EXEL6*((POP(-1)-EMCNX1(-1))/(POP(-2)-EMCNX1(-2))-1)))+EXRLOP6*
      BALGFCP(-1)*(BALGFP(-1)/EXGF(-1)))+EXRLOP7*(R99S(-1)-EXNOPS(-1)-
      EXSAVS)+EXRLOP8*(R99S(-1)-EXNOPS(-1)-EXANSAV)+EXRL3*(1+GRRPCEX)*
      (EXOPS(-1)/POP(-1)/PDEXOPS(-1)*POP*PDEXOPS)+EXRL2*EXOPS(-1)*
      (1+GREXOPS)+EXRL4*(BASEXOPS+EXOPSIMP*(PDEXOPS*(POP-BASEPOP-
      EXRL4OP*(EMCNX1-BASEMCNX))))

 93:  EXANSAV = RP9S+RSIN-EXANNU*(1+RORANGRO)**(YR-1980)

 94:  EXSAVS = EXSAVX+EXPFCON+TXPTXX*RTISLOS

 95:  LOG(EXJUS4) = C20A+C20B*LOG(EXOPS)

 96:  LOG(EXPPS4) = C91A+C91B*LOG(EXOPS)

 97:  LOG(EXNRS4) = C93A+C93B*LOG(EXOPS)

 98:  LOG(EXHES4) = C94A+C94B*LOG(EXOPS)

 99:  LOG(EXSSS4) = C96A+C96B*LOG(EXOPS)

100:  LOG(EXEDS4) = C19A+C19B*LOG(EXOPS)

101:  LOG(EXCDS4) = C97A+C97B*LOG(EXOPS)

102:  LOG(EXTRS4) = C98A+C98B*LOG(EXOPS)

103:  LOG(EXGGS4) = C99A+C99B*LOG(EXOPS)

104:  RATIO1 == EXOPS/(EXEDS4+EXSSS4+EXHES4+EXNRS4+EXPPS4+EXJUS4+
      EXCDS4+RLTX+EXTRS4+EXGGS4)

105:  EXUA = IF YR EQ 1982 THEN 197.7 ELSE EXUA(-1)*(EXOPS/EXOPS(-1))
```

106: EXEDS = RATIO1*EXEDS4

107: EXSSS = RATIO1*EXSSS4

108: EXHES = RATIO1*EXHES4

109: EXNRS = RATIO1*EXNRS4

110: EXPPS = RATIO1*EXPPS4

111: EXJUS = RATIO1*EXJUS4

112: EXTRS = RATIO1*EXTRS4

113: EXGGS = RATIO1*EXGGS4

114: EXCDS = RATIO1*(EXCDS4+RLTX)

115: RLTE99 = RLTE994*RATIO1

116: EXEDSNT == EXEDS-RLTE99

117: RLTT9 = RLTT94*RATIO1

118: RLTRS = RLTRS4*RATIO1

119: EXCDSNT = EXCDS-RLTT9-RLTRS-RLTX

120: EXPRCDS = C7A+C7B*EXCDSNT

121: EXPREDS1 = C1A+C1B*EXEDSNT+C1C*D61.75*EXEDSNT

122: EXPRSSS = C2A+C2B*EXSSS

123: EXPRUA = C32A+C32B*EXUA

124: EXPRHES = C3A+C3B*EXHES

125: EXPRNRS = C4A+C4B*EXNRS

126: EXPRPPS = C5A+C5B*EXPPS

127: EXPRGGS = C8A+C8B*EXGGS

128: EXPRJUS = C6A+C6B*EXJUS

129: EXPRTRS = C9A+C9B*EXTRS

130: EXPR99 = EXPRPER*(EXPREDS1+EXPRSSS+EXPRHES+EXPRNRS+EXPRPPS+
EXPRJUS+(+EXPRCDS)+EXPRGGS+EXPRTRS+EXPRUA)

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131:  WSGSFY = PCWS1*EXPR99

132:  LOG(WSGS) = C55A+C55B*LOG(WSGSFY)+C55C*D75

133:  EXTRNS = IF YR LT 1981 THEN 0 ELSE (IF YR EQ 1982 THEN 425 ELSE
      RSIP*(1-EXPFBAK)*EXPFDIST)

134:  EXINREC = C17A+C17B*(EXOPS-RLT99)

135:  EXSUBS = IF YR LT 1988 THEN EXSUBS1 ELSE (IF EXRL5 EQ 1 THEN (IF
      RSGFBM(-1)+RSGFBM(-2)-1 LT EXGFBM(-1)+EXGFBM(-2) OR EXSUBS(-1)
      EQ 0 THEN 0 ELSE EXLIMOK*(0.5*(1-EXSPLIT))) ELSE
      EXSUBS(-1)*(1+GRUSCPI))

136:  EXCAP = IF YR LT 1984 THEN EXCAP1 ELSE EXRL5*(EXLIMOK*
      (1-EXSPLIT)-EXSUBS)/(1-EXBOND)+EXRL3*((1+GRSSCP)*PR.BALCP(-1)*POP/
      1000-R.BALCAP(-1)*(1/(1+RORCPDEP)))/(100/PDCON)+EXRL2*(EXCAP(-1)*
      (1+GREXCAP))+EXRL4*(BASEXCAP+EXCAPIMP*(PDCON*(POP-BASEPOP-EXRL4OP*
      (EMCNX1-BASEMCNX))))+EXRL1*(EXCAP(-1)*(1+EXEL1*(POP(-1)/POP(-2)-
      1)+EXEL2*(PDCON(-1)/PDCON(-2)-1)+EXEL3*(PR.PI3(-1)/PR.PI3(-2)-1)+
      EXEL4*(PI(-1)/PI(-2)-1)+EXEL5*(PI3(-1)/PI3(-2)-1)+EXEL6*((POP(-1)-
      EMCNX1(-1))/(POP(-2)-EMCNX1(-2))-1)))

137:  EXGFCHY = IF YR LT 1984 THEN EXGFCHY1 ELSE 0.6*EXCAP*(1-EXBOND)

138:  EXGFCNH = IF YR LT 1984 THEN EXGFCNH1 ELSE 0.4*EXCAP*(1-EXBOND)

139:  EXCPSHY = IF YR LT 1984 THEN EXCPSHY1 ELSE 0.25*EXCAP*EXBOND

140:  EXCPSNH = IF YR LT 1984 THEN EXCPSNH1 ELSE 0.75*EXCAP*EXBOND

141:  EXHYCAP == EXGFCHY+EXCPSHY

142:  EXNHYCP == EXGFCNH+EXCPSNH

143:  EXGFCAP == EXGFCHY+EXGFCNH

144:  EXCAPFR = EXCAPFR(-1)*(EXCAP/EXCAP(-1))

145:  EXCPS = EXCPSHY+EXCPSNH

146:  XXVHY = C41A+C41B*(EXHYCAP+EXHYCAP(-1))

147:  XXVNHY = C42A+C42B*(EXNHYCP(-1)+EXSPCAP(-1)-EXCAPFR(-2)+
      EXNHYCP+EXSPCAP-EXCAPFR(-1))

148:  XXVACAP == (XXVHY+XXVNHY)/(PDCON/100)

149:  EXDSS = IF YR LT 1983 THEN EXDSSX ELSE EXDSSX+RORCRF*DEBTP82(-1)
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150:  EXCPSFED = IF YR EQ 1982 THEN 105.021 ELSE EXCPSFED(-1)*
      (1+GRUSCPI)

151:  EXCPSGOB == EXCPS-EXCPSFED

152:  EXCPSM = IF YR LT 1983 THEN 0 ELSE EXCPSGOB

153:  DEBTP82 = IF YR LT 1983 THEN 0 ELSE
      DEBTP82(-1)+EXCPSGOB-EXCPSM(-20)

154:  GODT = IF YR LT 1983 THEN GODTX ELSE GODTX+EXCPSM(-19)*0.05+
      EXCPSM(-18)*0.1+EXCPSM(-17)*0.15+EXCPSM(-16)*0.2+EXCPSM(-15)*0.25+
      EXCPSM(-14)*0.3+EXCPSM(-13)*0.35+EXCPSM(-12)*0.4+EXCPSM(-11)*0.45+
      EXCPSM(-10)*0.5+EXCPSM(-9)*0.55+EXCPSM(-8)*0.6+EXCPSM(-7)*0.65+
      EXCPSM(-6)*0.7+EXCPSM(-5)*0.75+EXCPSM(-4)*0.8+EXCPSM(-3)*0.85+
      EXCPSM(-2)*0.9+EXCPSM(-1)*0.95+EXCPSGOB

155:  EXGF = EXOPS+EXTRNS+EXSUBS+EXSPCAP+EXDSS-EXINREC+EXGFCAP-
      RSFS-RSIAS

156:  EX99S = EXOPS+EXTRNS+EXSUBS+EXSPCAP+EXDSS+EXCAP+PARNONGF*EXUA

157:  EXGFBM = EXGF+EXPFCONX-RSFDN-RMISRES

158:  EXNOPS = EX99S-EXOPS

159:  EXBUD == EXOPS+EXDSS+PARNONGF*EXUA

160:  EXGFOPER == EXGFBM-EXTRNS-EXGFCAP-EXSUBS-EXSPCAP-EXPFCONX

161:  EXONTR == EXOPS+EXDSS-RLTE99-RLTT9-RLTRS-RLTMS-RLTX

162:  BALCAB == R99S-EXGF

163:  BALCABBM == RSGFBM-EXGFBM

164:  BAL99 = IF YR LT 1982 THEN BAL991 ELSE (IF YR EQ 1982 THEN 3612
      ELSE BAL99(-1)+R99S-EXGF)

165:  BALGF = IF YR LT 1982 THEN BALGF1 ELSE BAL99-BALPF-BALDF

166:  BALDF = IF YR LT 1983 THEN BALDF1 ELSE BALDF(-1)+EXDFCON

167:  BALPF = IF YR LT 1983 THEN BALPF1 ELSE BALPF(-1)+EXPFCON

168:  BALGFP = IF BALGF LT 0 THEN 0 ELSE BALGF

169:  BALGFCP = IF BALGF-BALGF(-1) GT 0 THEN BALGF-BALGF(-1) ELSE 0

170:  R.BALCAP = R.BALCAP(-1)*(1/(1+RORCPDEP))+EXCAP*100/PDCON
```

171: PR.BALCP = R.BALCAP*1000/POP

172: EXCAPREP == IF YR LT 1984 THEN 0 ELSE RORCPDEP*BALCAP84(-1)+
EXCAPOLD*(PDRPI/PDRPIBAS)

173: EXCAPNEW == IF YR LT 1984 THEN 0 ELSE EXCAP-EXCAPREP

174: BALCAP84 = IF YR LT 1984 THEN 0 ELSE BALCAP84(-1)*PDRPI/
PDRPI(-1)+EXCAPNEW

175: EXOM84 == BALCAP84(-1)*EXOMCOST

176: EXRP84 == RORCPDEP*BALCAP84(-1)

Local Revenues

177: LOG(LPTB1) = C57A+C57B*LOG(PI3(-1))+C57C*D71.00

178: LPTB1FV == LPTB1*1/PARLVFV

179: PTBP9 == RPPS*(1/PTRTS)

180: LPTBP9 == P9PTPER*PTBP9

181: LPTB = LPTB1+LPTBP9*LPTRAT

182: LPTBFV == LPTB1FV+LPTBP9

183: PPVAL == LPTB1FV+PTBP9

184: RLPT1 = C18A+C18B*LPTB

185: RLPT == RLPT1+RLPTX

186: LOG(RLOT*1000/POP(-1)) = C31A+C31B*LOG(PI(-1)*1000/POP(-1))

187: RLTCS4 = IF YR GT 1981 THEN 0 ELSE PESLTC*RTCS1

188: RLTVS4 = C63A+C63B*RTVS

189: RLTOT4 == PESLT*RTOTS

190: RLTMA4 = IF YR LT 1982 THEN 0 ELSE
RLTMA(-1)/PDRPI(-1)/POP(-1)*POP*PDRPI

191: RLTT94 = RLTVS4+RLTOT4+RLTCS4+RLTMA4

192: RLTRS4 = RLTRS(-1)*(1+GRUSCPI+GRDIRPU)

```
193:  RLTMS = IF YR EQ 1981 THEN 50.887 ELSE (IF EXSUBS EQ 0 THEN 0
      ELSE RLTMS(-1)*(1+GRUSCPI+GRDIRPU))

194:  RLTEC4 == PECIG*RTCIS

195:  ADMDIS == PAD1*POPSKUL(-1)

196:  ADMREA == PAD2*POPSKUL(-1)

197:  ADMSD = ADMDIS+ADMREA

198:  BIU = IF YR LT 1980 THEN BIU1 ELSE BIU(-1)*(1+GRUSCPI)

199:  RLTEF4 = C36A+C36F*D81.00+D71.00*C36B+BIU*C36C+C36D*ADMSD

200:  RLTET4 = (POP/POP(-1)+PDRPI/PDRPI(-1)-1)*RLTET(-1)

201:  RLTEO4 = RLTEO(-1)*(1+GRUSCPI+GRDIRPU)

202:  RLTEA4 == RLTEC4+RLTEF4+RLTET4+RLTEO4

203:  RLTEB4 = IF YR EQ 1980 THEN 7.5 ELSE
      RLTEB(-1)*(1+GRUSCPI+GRDIRPU)

204:  RLTE994 = RLTEA4+RLTEB4

205:  RLTCS = RLTCS4*RATIO1

206:  RLTVS == RLTVS4*RATIO1

207:  RLTOT == RLTOT4*RATIO1

208:  RLTMA = RLTMA4*RATIO1

209:  RLTEC == RLTEC4*RATIO1

210:  RLTEF == RLTEF4*RATIO1

211:  RLTET = RLTET4*RATIO1

212:  RLTEO = RLTEO4*RATIO1

213:  RLTEA == RLTEA4*RATIO1

214:  RLTEB = RLTEB4*RATIO1

215:  RLT99 = RLTT9+RLTRS+RLTE99+RLTMS+RLTX
```

Local Expenditures

216: ELED1 = C11A+C11B*PI3(-1)

217: ELED = RLTE99+ELED1

218: ELBD = C14A+C14C*D61.77*GOBONDL(-1)+C14B*GOBONDL(-1)

219: ELNED1/PDRPI = C16A+C16E*D81.00+C16D*R.DPI8N(-1)+
C16B*D71.00*R.DPI8N(-1)+C16C*WEALTH(-1)*POP(-1)

220: EL99 = ELED+ELNED1+ELBD+RLTX+RLTFPX+RLTMS

221: RLTF = RLTF(-1)*(1+GRUSCPI+GRDIRPU)

222: RL991 == RLPT+RLOT+RLT99+RLTF+RLTFPX

223: RLMC = EL99-RL991-(GOBONDL-GOBONDL(-1))

224: RL99 == RL991+RLMC

225: ELEDCP = C15A+C15B*ELED

226: ELPERS = C12A+C12B*(EL99-ELEDCP-ELBD)

227: WSGL = C13A+PC13C*D81.00+C13B*(ELPERS+ELPERS(-1))

228: GOBONDL = GOBONDL(-1)*(1+GRUSCPI+GRDIRPU)

229: SLGEXP == EX99S+EL99-RLT99

230: BALOCAL == RL99-(EL99-ELBD)

231: BALLANDS == BALOCAL+BALCAB

Economic Module

Personal Income

232: PIDIR = C51A+C51B*(DPI+DPI(-1)+DPI(-2)+DPI(-3)+DPI(-4))

233: PITRAN1 = IF YR EQ 1981 THEN 500.245 ELSE PITRAN1(-1)/
POPGER(-1)*(1+GRUSCPI)*POPGER

234: PITRAN/PDRPI = IF YR GT 1980 THEN PITRAN1/PDRPI+EXTRNS/PDRPI
ELSE C34A+C34B*POP+C34C*D61.72+EXTRNS/PDRPI

235: PIOLI = C44A+C44D*D61.75+C44B*(WS98-WSCNP)+C44C*WSCNP(-1)

236: PISSC = C106A+C106B*(WS98-WSCNP)

237: PIPRO1*100/PDRPI = C45A+C45B*EMPRO1+C45C*D61.66+C45D*D79

238: PIPROF = EMPROFIS*(4.523*(PDRPI/340))

239: PIPRO == PIPRO1+PIPROF

240: PI8 = WS98+PIOLI+PIPRO-PISSC+PIDIR+PITRAN

241: NCCI = PC12N*(1-PCNC1)*ANCSA+(1-PCNC2)*NCRP+(1-PCNC3)*RORNC*NCCAP(-1)

242: NCCAP = PCNCSV*NCCI+NCCAP(-1)+PCNCSV1*(1-PCNC4)*NCBP

243: NCEXP == (1-PCNCSV)*NCCI+(1-PCNCSV1)*(1-PCNC4)*NCBP

244: NCWS == PCNCWS*NCEXP

245: NCPI = PC12N*PC12RN*PCNC1*ANCSA+PC12RN*PCNC2*NCRP+PC12RN*PCNC3*RORNC*NCCAP(-1)+PC12RN*PCNC4*NCBP

246: PIRADJ*100/PDRPI = C103A+C103B*EMCNX1+C103C*EM97

247: PI = PI8-PIRADJ

248: PI3 = PI-PI/WS98*WRCNP*EMCNX1/1000

249: R.PI == PI*100./PDRPI

250: P.PI == PI*1000./POP

251: PR.PI3 = PI3*100/PDRPI*1000/(POP-EMCNX1)

252: PR.PI = R.PI*1000./POP

253: WEALTH = (PR.PI+PR.PI(-1)+PR.PI(-2)+PR.PI(-3))/4

254: DPI = PI-RTPIF-RTISCP-DPIRES+RTISXX

255: DPI8 = DPI+PIRADJ

256: R.DPI = 100.*DPI/PDRPI

257: PR.DPI == R.DPI*1000/POP

258: R.DPI8N = DPI8*100/PDRPI-R.DPI8X

259: R.DPI8X = DPI8/PI8*WRCNP*EMCNX1/10/PDRPI

Sectoral Activity

```
260:  EMCNRT = IF EMCNX1/4 LT EMCNX1(-1) THEN 0 ELSE EMCNX1/
      (EM98-EMCNX1)

261:  PIPE == IF EMCNX1-EMCNX1(-1) GT 5 THEN 1 ELSE 0

262:  XXCN8 = C54A+C54B*R.DPI8N+C54C*R.DPI8X+C54D*R.DPI8X(-1)+
      C54E*D64.65

263:  XXCN1 = XXCN8+XXVACAP

264:  LOG(EMCN1) = C56A+C56B*LOG(XXCN1)

265:  EMCNX = EMCNX1+EMCNX2

266:  EMCN = EMCN1+EMCNX

267:  XXCN = EMCN/EMCN1*XXCN1

268:  LOG(WRCNNP/PDRPI) =
      C59A+C59F*D.80DEC6+C59B*LOG(WEUS/PDUSCPI)+C59C*LOG(1+EMCNRT)+
      C59D*LOG(1+EMCNRT(-1))+C59E*LOG(1+EMCNRT(-2))

269:  WRCNP = WRCNNP*PIPADJ

270:  WSCN = (EMCN1+EMCNX2)*WRCNNP/1000+EMCNX1*WRCNP/1000

271:  WRCN = WSCN/EMCN*1000

272:  WSCNP = EMCNX1*WRCNP/1000

273:  LOG(XXP9) = C52A+C52B*LOG(EMP9)

274:  LOG(WRP9/PDRPI) = C53A+C53F*D.80DEC6+C53D*D61.76+C53B*
      LOG(WEUS/PDUSCPI)+C53C*LOG(1+EMCNRT)

275:  WSP9 == EMP9*WRP9/1000

276:  EMMO = C60A+C60B*R.DPI8N+C60C*D61.77

277:  EMM91 = EMMO+EMMX2

278:  LOG(XXM91) = C61A+C61B*LOG(EMM91)

279:  XXM9 == XXM91+XXMX2

280:  EMMX == EMMX1+EMMX2

281:  EMM9 = EMMO+EMMX
```

282: LOG(WRM91/PDRPI) = C62A+C62F*D.80DEC6+C62B*LOG(WEUS/PDUSCPI)+
C62C*LOG(1+EMCNRT)+C62D*LOG(1+EMCNRT(-1))

283: WRM9P == WRM91*PADJ

284: WSM9 == (EMMO+EMMX2)*WRM91/1000+EMMX1*WRM9P/1000

285: WSM9P == EMMX1*WRM9P/1000

286: WRM9 == WSM9/EMM9*1000

287: XXTNT = C64A+C64B*R.DPI8X+C64D*R.DPI8X*R.DPI8X(-1)+C64C*
R.DPI8N+C64E*D71.73

288: LOG(EMTNT) = C65A+C65B*LOG(XXTNT)

289: EMTTOUR = PTOURT*EMTOUR

290: EMT91 = EMTNT+EMTTOUR

291: EMT9 = EMT91+EMT9X

292: XXT9 = XXTNT*(EMT9/EMTNT)

293: LOG(WRT9/PDRPI) = C66A+C66F*D.80DEC6+C66D*D61.76+C66B*LOG(WEUS/
PDUSCPI)+C66C*LOG(1+EMCNRT)+C66E*LOG(1+EMCNRT(-1))

294: WST9 == EMT9*WRT9/1000.

295: XXCM = C68A+C68B*R.DPI8N(-1)+C68C*D61.74+C68D*WEALTH(-1)*POP(-1)

296: LOG(EMCM) = C69A+C69B*LOG(XXCM)

297: LOG(WRCM/PDRPI) = C70A+C70F*D.80DEC6+C70B*LOG(WEUS/PDUSCPI)+
C70C*LOG(1+EMCNRT(-2))+C70D*LOG(1+EMCNRT(-1))

298: WSCM == EMCM*WRCM/1000.

299: XXPU = C72A+C72B*R.DPI8N(-1)+C72C*R.DPI8X+C72D*R.DPI8N(-2)

300: LOG(EMPU) = C73A+C73C*PIPE(-1)+C73B*LOG(XXPU)

301: LOG(WRPU/PDRPI) = C74A+C74F*D.80DEC6+C74B*LOG(WEUS/PDUSCPI)+
C74C*LOG(1+EMCNRT(-2))+C74D*LOG(1+EMCNRT(-1))

302: WSPU == EMPU*WRPU/1000.

303: XXDW = C71A+C71B*R.DPI8N+C71C*R.DPI8X+C71D*R.DPI8X(-1)*
R.DPI8X+C71E*WEALTH(-1)*POP(-1)

304: XXDRNT = C76A+C76B*R.DPI8N+C76C*R.DPI8X+C76D*R.DPI8N(-1)+
C76E*R.DPI8X(-1)

305: LOG(EMDW) = C77A+C77B*LOG(XXDW)

306: LOG(EMDRNT) = C75A+C75B*LOG(XXDRNT)

307: EMDR = EMDRNT+EMDTOUR

308: LOG(WRDW/PDRPI) = C78A+C78F*D.80DEC6+C78B*LOG(WEUS/PDUSCPI)+
C78C*LOG(1+EMCNRT)+C78D*LOG(1+EMCNRT(-1))+C78E*LOG(1+EMCNRT(-2))

309: LOG(WRDR/PDRPI) = C79A+C79F*D.80DEC6+C79B*LOG(WEUS/PDUSCPI)+
(+C79D)*LOG(1+EMCNRT(-1))+C79E*LOG(1+EMCNRT(-2))

310: EMDTOUR = PTOURD*EMTOUR

311: EMD9 = EMDRNT+EMDW+EMDTOUR

312: WSD9 == (EMDRNT+EMDTOUR)*WRDR/1000+EMDW*WRDW/1000

313: WRD9 = WSD9/EMD9*1000

314: XXD9 = (XXDW+XXDRNT)/(EMDW+EMDRNT)*EMD9

315: XXDR = XXD9-XXDW

316: XXFI = C80A+C80C*D71.73+C80B*WEALTH(-1)*POP(-1)

317: LOG(EMFI) = C81A+C81B*LOG(XXFI)

318: LOG(WRFI/PDRPI) = C82A+C82F*D.80DEC6+C82B*LOG(WEUS/PDUSCPI)+
C82D*LOG(1+EMCNRT)+C82C*LOG(1+EMCNRT(-1))

319: WSFI == EMFI*WRFI/1000.

320: XXS8NT = C84A+C84B*R.DPI8N+C84C*R.DPI8X(-1)+C84D*
WEALTH(-1)*POP(-1)

321: XXSB = C83A+(+C83C)*R.DPI8X+C83D*R.DPI8X(-1)+C83E*
WEALTH(-1)*POP(-1)

322: LOG(EMS8NT) = C85A+C85B*LOG(XXS8NT)

323: LOG(EMSB) = C87A+C87B*LOG(XXSB)

324: LOG(WRSNB/PDRPI) = C86A+C86F*D.80DEC6+C86B*LOG(WEUS/PDUSCPI)+
C86C*LOG(1+EMCNRT)+C86D*LOG(1+EMCNRT(-1))+C86E*LOG(1+EMCNRT(-2))

325: LOG(WRSB/PDRPI) = C88A+C88F*D.80DEC6+C88E*D61.70+C88B*LOG(WEUS/
PDUSCPI)+C88C*LOG(1+EMCNRT)+C88D*LOG(1+EMCNRT(-1))+C88G*LOG
(1+EMCNRT(-2))

```
326:  EMSTOUR = PTOURS*EMTOUR

327:  EMS91 = EMSB+EMS8NT+EMSTOUR

328:  WSS91 == (EMS8NT+EMSTOUR)*WRSNB/1000+EMSB*WRSB/1000

329:  WSS9 == WSS91+NCWS

330:  EMS9 = EMS91+NCWS/(WRS9*1000)

331:  WRS9 = WSS91/EMS91*1000

332:  XXS9 = (XXS8NT+XXSB)/(EMS8NT+EMSB)*EMS9

333:  EMGF = EMGM+EMGC

334:  LOG(XXGF) = C101A+C101B*LOG(EMGF)

335:  LOG(WRGC/PDRPI) = C89A+LOG(WEUS/PDUSCPI)

336:  WRGM = WRGC*PCIVPY

337:  WSGC = WRGC*EMGC/1000

338:  WSGM = WRGM*EMGM/1000

339:  WSGF == WSGC+WSGM

340:  WRGF = WSGF/EMGF*1000

341:  LOG(WRGS/PDRPI) = IF C92A+C92F*D.80DEC6+C92B*LOG(WEUS/PDUSCPI)+
      C92C*D61.73 LT LOG(WRGS(-1)/PDRPI(-1)) THEN
      LOG(WRGS(-1)/PDRPI(-1)) ELSE C92A+C92F*D.80DEC6+C92B*
      LOG(WEUS/PDUSCPI)+C92C*D61.73

342:  EMGS = WSGS/WRGS*1000

343:  LOG(WRGL/PDRPI) = IF C102A+C102F*D.80DEC6+C102D*D61.69+C102C*
      LOG(1+EMCNRT)+C102B*LOG(WEUS/PDUSCPI) LT LOG(WRGL(-1)/PDRPI(-1))
      THEN LOG(WRGL(-1)/PDRPI(-1)) ELSE C102A+C102F*D.80DEC6+C102D*
      D61.69+C102C*LOG(1+EMCNRT)+C102B*LOG(WEUS/PDUSCPI)

344:  EMGL = WSGL/WRGL*1000

345:  EMGA = EMGS+EMGL

346:  WSGA = WSGS+WSGL

347:  WRGA = WSGA/EMGA*1000

348:  LOG(XXGA) = C104A+C104B*LOG(EMGA)
```

```
349:  EMA9 = EMAFISH+EMAGRI+PC39A*D77.00+PC39B*EMMX2

350:  XXA9 = C90A+C90B*(EMA9+EMPROFIS)

351:  LOG(WRA9/PDRPI) = C95A+C95F*D.80DEC6+C95B*LOG(WEUS/PDUSCPI)+
      C95C*LOG(1+EMCNRT)+C95D*LOG(1+EMCNRT(-1))

352:  WSA9 == EMA9*WRA9/1000.

353:  EM98 = EMP9+EMCN+EMM9+EMT9+EMCM+EMPU+EMD9+EMFI+EMS9+
      EMGF+EMGA+EMA9

354:  EM97 = EM98-EMGM

355:  WS98 = (WRP9*EMP9+WRCN*EMCN+WRM9*EMM9+WRT9*EMT9+WRCM*
      EMCM+WRPU*EMPU+WRD9*EMD9+WRFI*EMFI+WRS9*EMS9+WRGF*
      EMGF+WRGA*EMGA+WRA9*EMA9)/1000.

356:  WS97 = WS98-WSGM

357:  WR98 = WS98*1000/EM98

358:  WR97 == WS97*1000/EM97

359:  LOG(EMPRO1) = C100A+C100C*D61.66+C100B*LOG(EM98)

360:  EMPROFIS = PFISH1*EMFISH

361:  EMAFISH = (1-PFISH1)*EMFISH

362:  EMPRO = EMPRO1+EMPROFIS

363:  EM99 == EM98+EMPRO

364:  EM96 = EM99-EMGM

365:  EMX = EMCNX+EMP9

366:  EMOCSX == EMP9+EMT9X+EMCNX1+EMCNX2+EMMX1

367:  EMCU == EMCM+EMPU

368:  WRCU == (WSCM+WSPU)/EMCU*1000

369:  EMNC == EMS9-EMS91

370:  EMTCU = EMT9+EMCM+EMPU

371:  EMSUP = EMD9+EMFI+EMS9

372:  EMSP = EMTCU+EMSUP
```

373: EMG9 == EMGF+EMGA

374: EMNR == EM99-EMSP-EMG9-EMCN-EMP9

375: EMNS == EM99-EMSP-EMG9

376: LOG(EMTOUR) = PTOURB+PTOURE*LOG(TOURIST)

377: XX98 = XXP9+XXCN+XXM9+XXT9+XXCM+XXPU+XXD9+XXFI+XXS9+
XXGF+XXGA+XXA9

Population Module

Civilian Non-Native Population

378: CM2 == G2*SM2*CNNPM2(-1)+(1-G1)*CNNPM1(-1)*SM1

379: CF2 == G2*SF2*CNNPF2(-1)+(1-G1)*CNNPF1(-1)*SF1

380: CM3 == G3*SM3*CNNPM3(-1)+(1-G2)*CNNPM2(-1)*SM2

381: CF3 == G3*SF3*CNNPF3(-1)+(1-G2)*CNNPF2(-1)*SF2

382: CM4 == G4*SM4*CNNPM4(-1)+(1-G3)*CNNPM3(-1)*SM3

383: CF4 == G4*SF4*CNNPF4(-1)+(1-G3)*CNNPF3(-1)*SF3

384: CM5 == G5*SM5*CNNPM5(-1)+(1-G4)*CNNPM4(-1)*SM4

385: CF5 == G5*SF5*CNNPF5(-1)+(1-G4)*CNNPF4(-1)*SF4

386: CM6 == G6*SM6*CNNPM6(-1)+(1-G5)*CNNPM5(-1)*SM5

387: CF6 == G6*SF6*CNNPF6(-1)+(1-G5)*CNNPF5(-1)*SF5

388: CM7 == G7*SM7*CNNPM7(-1)+(1-G6)*CNNPM6(-1)*SM6

389: CF7 == G7*SF7*CNNPF7(-1)+(1-G6)*CNNPF6(-1)*SF6

390: CM8 == G8*SM8*CNNPM8(-1)+(1-G7)*CNNPM7(-1)*SM7

391: CF8 == G8*SF8*CNNPF8(-1)+(1-G7)*CNNPF7(-1)*SF7

392: CM9 == G9*SM9*CNNPM9(-1)+(1-G8)*CNNPM8(-1)*SM8

393: CF9 == G9*SF9*CNNPF9(-1)+(1-G8)*CNNPF8(-1)*SF8

394: CM10 == G10*SM10*CNNPM10(-1)+(1-G9)*CNNPM9(-1)*SM9

395: CF10 == G10*SF10*CNNPF10(-1)+(1-G9)*CNNPF9(-1)*SF9

```
396:  CM11 == G11*SM11*CNNPM11(-1)+(1-G10)*CNNPM10(-1)*SM10

397:  CF11 == G11*SF11*CNNPF11(-1)+(1-G10)*CNNPF10(-1)*SF10

398:  CM12 == G12*SM12*CNNPM12(-1)+(1-G11)*CNNPM11(-1)*SM11

399:  CF12 == G12*SF12*CNNPF12(-1)+(1-G11)*CNNPF11(-1)*SF11

400:  CM13 == G13*SM13*CNNPM13(-1)+(1-G12)*CNNPM12(-1)*SM12

401:  CF13 == G13*SF13*CNNPF13(-1)+(1-G12)*CNNPF12(-1)*SF12

402:  CM14 == G14*SM14*CNNPM14(-1)+(1-G13)*CNNPM13(-1)*SM13

403:  CF14 == G14*SF14*CNNPF14(-1)+(1-G13)*CNNPF13(-1)*SF13

404:  CM15 == G15*SM15*CNNPM15(-1)+(1-G14)*CNNPM14(-1)*SM14

405:  CF15 == G15*SF15*CNNPF15(-1)+(1-G14)*CNNPF14(-1)*SF14

406:  BTHTOT == CF4*FERT4+CF5*FERT5+CF6*FERT6+CF7*FERT7+CF8*FERT8+
      CF9*FERT9+CF10*FERT10+CF11*FERT11-BADD

407:  CM1 == SEXDIV*BTHTOT*SURINFM

408:  CF1 == (1-SEXDIV)*BTHTOT*SURINFF

409:  DTHINF == BTHTOT-CM1-CF1

410:  DTHTOT == DTHINF+CM15(-1)*(1-SM15)+CF15(-1)*(1-SF15)+CM14(-1)*
      (1-SM14)+CF14(-1)*(1-SF14)+CM13(-1)*(1-SM13)+CF13(-1)*(1-SF13)+
      CM12(-1)*(1-SM12)+CF12(-1)*(1-SF12)+CM11(-1)*(1-SM11)+CF11(-1)*
      (1-SF11)+CM10(-1)*(1-SM10)+CF10(-1)*(1-SF10)+CM9(-1)*(1-SM9)+
      CF9(-1)*(1-SF9)+CM8(-1)*(1-SM8)+CF8(-1)*(1-SF8)+CM7(-1)*(1-SM7)+
      CF7(-1)*(1-SF7)+CM6(-1)*(1-SM6)+CF6(-1)*(1-SF6)+CM5(-1)*(1-SM5)+
      CF5(-1)*(1-SF5)+CM4(-1)*(1-SM4)+CF4(-1)*(1-SF4)+CM3(-1)*(1-SM3)+
      CF3(-1)*(1-SF3)+CM2(-1)*(1-SM2)+CF2(-1)*(1-SF2)+CM1(-1)*(1-SM1)+
      CF1(-1)*(1-SF1)

411:  NATINC == BTHTOT-DTHTOT

412:  CNNPM10 = CM10*(1+OEMM10)+MIGIN*MM10

413:  CNNPF10 = CF10*(1+OEMF10)+MIGIN*MF10

414:  CNNPM11 = CM11*(1+OEMM11)+MIGIN*MM11

415:  CNNPF11 = CF11*(1+OEMF11)+MIGIN*MF11

416:  CNNPM12 = CM12*(1+OEMM12)+MIGIN*MM12
```

417: CNNPF12 = CF12*(1+OEMF12)+MIGIN*MF12

418: CNNPM13 = CM13*(1+OEMM13)+MIGIN*MM13

419: CNNPF13 = CF13*(1+OEMF13)+MIGIN*MF13

420: CNNPM14 = CM14*(1+OEMM14)+MIGIN*MM14

421: CNNPF14 = CF14*(1+OEMF14)+MIGIN*MF14

422: CNNPM15 = CM15*(1+OEMM15)+MIGIN*MM15

423: CNNPF15 = CF15*(1+OEMF15)+MIGIN*MF15

424: CNNPM1 = CM1*(1+OEMM1)+MIGIN*MM1

425: CNNPF1 = CF1*(1+OEMF1)+MIGIN*MF1

426: CNNPM2 = CM2*(1+OEMM2)+MIGIN*MM2

427: CNNPF2 = CF2*(1+OEMF2)+MIGIN*MF2

428: CNNPM3 = CM3*(1+OEMM3)+MIGIN*MM3

429: CNNPF3 = CF3*(1+OEMF3)+MIGIN*MF3

430: CNNPM4 = CM4*(1+OEMM4)+MIGIN*MM4

431: CNNPF4 = CF4*(1+OEMF4)+MIGIN*MF4

432: CNNPM5 = CM5*(1+OEMM5)+MIGIN*MM5

433: CNNPF5 = CF5*(1+OEMF5)+MIGIN*MF5

434: CNNPM6 = CM6*(1+OEMM6)+MIGIN*MM6

435: CNNPF6 = CF6*(1+OEMF6)+MIGIN*MF6

436: CNNPM7 = CM7*(1+OEMM7)+MIGIN*MM7

437: CNNPF7 = CF7*(1+OEMF7)+MIGIN*MF7

438: CNNPM8 = CM8*(1+OEMM8)+MIGIN*MM8

439: CNNPF8 = CF8*(1+OEMF8)+MIGIN*MF8

440: CNNPM9 = CM9*(1+OEMM9)+MIGIN*MM9

441: CNNPF9 = CF9*(1+OEMF9)+MIGIN*MF9

442: CNNTOT == CNNPM15+CNNPF15+CNNPM14+CNNPF14+CNNPM13+CNNPF13+CNNPM12+CNNPF12+CNNPM11+CNNPF11+CNNPM10+CNNPF10+CNNPM9+CNNPF9+CNNPM8+CNNPF8+CNNPM7+CNNPF7+CNNPM6+CNNPF6+CNNPM5+CNNPF5+CNNPM4+CNNPF4+CNNPM3+CNNPF3+CNNPM2+CNNPF2+CNNPM1+CNNPF1

Native Population

443: NCM2 == G2*NSM2*NATPM2(-1)+(1-G1)*NATPM1(-1)*NSM1

444: NCF2 == G2*NSF2*NATPF2(-1)+(1-G1)*NATPF1(-1)*NSF1

445: NCM3 == G3*NSM3*NATPM3(-1)+(1-G2)*NATPM2(-1)*NSM2

446: NCF3 == G3*NSF3*NATPF3(-1)+(1-G2)*NATPF2(-1)*NSF2

447: NCM4 == G4*NSM4*NATPM4(-1)+(1-G3)*NATPM3(-1)*NSM3

448: NCF4 == G4*NSF4*NATPF4(-1)+(1-G3)*NATPF3(-1)*NSF3

449: NCM5 == G5*NSM5*NATPM5(-1)+(1-G4)*NATPM4(-1)*NSM4

450: NCF5 == G5*NSF5*NATPF5(-1)+(1-G4)*NATPF4(-1)*NSF4

451: NCM6 == G6*NSM6*NATPM6(-1)+(1-G5)*NATPM5(-1)*NSM5

452: NCF6 == G6*NSF6*NATPF6(-1)+(1-G5)*NATPF5(-1)*NSF5

453: NCM7 == G7*NSM7*NATPM7(-1)+(1-G6)*NATPM6(-1)*NSM6

454: NCF7 == G7*NSF7*NATPF7(-1)+(1-G6)*NATPF6(-1)*NSF6

455: NCM8 == G8*NSM8*NATPM8(-1)+(1-G7)*NATPM7(-1)*NSM7

456: NCF8 == G8*NSF8*NATPF8(-1)+(1-G7)*NATPF7(-1)*NSF7

457: NCM9 == G9*NSM9*NATPM9(-1)+(1-G8)*NATPM8(-1)*NSM8

458: NCF9 == G9*NSF9*NATPF9(-1)+(1-G8)*NATPF8(-1)*NSF8

459: NCM10 == G10*NSM10*NATPM10(-1)+(1-G9)*NATPM9(-1)*NSM9

460: NCF10 == G10*NSF10*NATPF10(-1)+(1-G9)*NATPF9(-1)*NSF9

461: NCM11 == G11*NSM11*NATPM11(-1)+(1-G10)*NATPM10(-1)*NSM10

462: NCF11 == G11*NSF11*NATPF11(-1)+(1-G10)*NATPF10(-1)*NSF10

463: NCM12 == G12*NSM12*NATPM12(-1)+(1-G11)*NATPM11(-1)*NSM11

464: NCF12 == G12*NSF12*NATPF12(-1)+(1-G11)*NATPF11(-1)*NSF11

465: NCM13 == G13*NSM13*NATPM13(-1)+(1-G12)*NATPM12(-1)*NSM12

466: NCF13 == G13*NSF13*NATPF13(-1)+(1-G12)*NATPF12(-1)*NSF12

467: NCM14 == G14*NSM14*NATPM14(-1)+(1-G13)*NATPM13(-1)*NSM13

468: NCF14 == G14*NSF14*NATPF14(-1)+(1-G13)*NATPF13(-1)*NSF13

469: NCM15 == G15*NSM15*NATPM15(-1)+(1-G14)*NATPM14(-1)*NSM14

470: NCF15 == G15*NSF15*NATPF15(-1)+(1-G14)*NATPF14(-1)*NSF14

471: NBTHTOT == NCF4*NFERT4+NCF5*NFERT5+NCF6*NFERT6+NCF7*NFERT7+
NCF8*NFERT8+NCF9*NFERT9+NCF10*NFERT10+NCF11*NFERT11+BADD

472: NCM1 == NSEXDIV*NBTHTOT*NSURINFM

473: NCF1 == (1-NSEXDIV)*NBTHTOT*NSURINFF

474: NATPM1 = NCM1*(1+NMM1)

475: NATPF1 = NCF1*(1+NMF1)

476: NATPM2 = NCM2*(1+NMM2)

477: NATPF2 = NCF2*(1+NMF2)

478: NATPM3 = NCM3*(1+NMM3)

479: NATPF3 = NCF3*(1+NMF3)

480: NATPM4 = NCM4*(1+NMM4)

481: NATPF4 = NCF4*(1+NMF4)

482: NATPM5 = NCM5*(1+NMM5)

483: NATPF5 = NCF5*(1+NMF5)

484: NATPM6 = NCM6*(1+NMM6)

485: NATPF6 = NCF6*(1+NMF6)

486: NATPM7 = NCM7*(1+NMM7)

487: NATPF7 = NCF7*(1+NMF7)

488: NATPM8 = NCM8*(1+NMM8)

489: NATPF8 = NCF8*(1+NMF8)

490: NATPM9 = NCM9*(1+NMM9)

491: NATPF9 = NCF9*(1+NMF9)

492: NATPM10 = NCM10*(1+NMM10)

493: NATPF10 = NCF10*(1+NMF10)

494: NATPM11 = NCM11*(1+NMM11)

495: NATPF11 = NCF11*(1+NMF11)

496: NATPM12 = NCM12*(1+NMM12)

497: NATPF12 = NCF12*(1+NMF12)

498: NATPM13 = NCM13*(1+NMM13)

499: NATPF13 = NCF13*(1+NMF13)

500: NATPM14 = NCM14*(1+NMM14)

501: NATPF14 = NCF14*(1+NMF14)

502: NATPM15 = NCM15*(1+NMM15)

503: NATPF15 = NCF15*(1+NMF15)

504: NDTHINF == NBTHTOT-NCM1-NCF1

505: NDTHTOT == NDTHINF+NCM15(-1)*(1-NSM15)+NCF15(-1)*(1-NSF15)+
NCM14(-1)*(1-NSM14)+NCF14(-1)*(1-NSF14)+NCM13(-1)*(1-NSM13)+
NCF13(-1)*(1-NSF13)+NCM12(-1)*(1-NSM12)+NCF12(-1)*(1-NSF12)+
NCM11(-1)*(1-NSM11)+NCF11(-1)*(1-NSF11)+NCM10(-1)*(1-NSM10)+
NCF10(-1)*(1-NSF10)+NCM9(-1)*(1-NSM9)+NCF9(-1)*(1-NSF9)+
NCM8(-1)*(1-NSM8)+NCF8(-1)*(1-NSF8)+NCM7(-1)*(1-NSM7)+NCF7(-1)*
(1-NSF7)+NCM6(-1)*(1-NSM6)+NCF6(-1)*(1-NSF6)+NCM5(-1)*(1-NSM5)+
NCF5(-1)*(1-NSF5)+NCM4(-1)*(1-NSM4)+NCF4(-1)*(1-NSF4)+NCM3(-1)*
(1-NSM3)+NCF3(-1)*(1-NSF3)+NCM2(-1)*(1-NSM2)+NCF2(-1)*(1-NSF2)+
NCM1(-1)*(1-NSM1)+NCF1(-1)*(1-NSF1)

506: NATTOT == NATPM15+NATPF15+NATPM14+NATPF14+NATPM13+NATPF13+
NATPM12+NATPF12+NATPM11+NATPF11+NATPM10+NATPF10+NATPM9+NATPF9+
NATPM8+NATPF8+NATPM7+NATPF7+NATPM6+NATPF6+NATPM5+NATPF5+NATPM4+
NATPF4+NATPM3+NATPF3+NATPM2+NATPF2+NATPM1+NATPF1

507: POPNE = POPNE(-1)*NATTOT/NATTOT(-1)

508: NNATINC == NBTHTOT-NDTHTOT

```
509:  MIGOUT = OEMM1*CM1+OEMM2*CM2+OEMM3*CM3+OEMM4*CM4+OEMM5*CM5+
      OEMM6*CM6+OEMM7*CM7+OEMM8*CM8+OEMM9*CM9+OEMM10*CM10+OEMM11*
      CM11+OEMM12*CM12+OEMM13*CM13+OEMM14*CM14+OEMM15*CM15+OEMF1*
      CF1+OEMF2*CF2+OEMF3*CF3+OEMF4*CF4+OEMF5*CF5+OEMF6*CF6+OEMF7*
      CF7+OEMF8*CF8+OEMF9*CF9+OEMF10*CF10+OEMF11*CF11+OEMF12*CF12+
      OEMF13*CF13+OEMF14*CF14+OEMF15*CF15+NMM1*NCM1+NMM2*NCM2+NMM3*
      NCM3+NMM4*NCM4+NMM5*NCM5+NMM6*NCM6+NMM7*NCM7+NMM8*NCM8+NMM9*
      NCM9+NMM10*NCM10+NMM11*NCM11+NMM12*NCM12+NMM13*NCM13+NMM14*
      NCM14+NMM15*NCM15+NMF1*NCF1+NMF2*NCF2+NMF3*NCF3+NMF4*NCF4+
      NMF5*NCF5+NMF6*NCF6+NMF7*NCF7+NMF8*NCF8+NMF9*NCF9+NMF10*NCF10+
      NMF11*NCF11+NMF12*NCF12+NMF13*NCF13+NMF14*NCF14+NMF15*NCF15

510:  MIGIN = POPMIG-MIGOUT

511:  POPM = EMGM/MILRAT

512:  MILPCT = POPM/AFTOT

513:  POP = CNNTOT+NATTOT+MILPCT*(AFTOT+MDTOT)

514:  POPC = POP-POPM
```

Military Population

```
515:  POPM1 == CNNPM1+MILPCT*MILM1+NATPM1

516:  POPM2 == CNNPM2+MILPCT*MILM2+NATPM2

517:  POPM3 == CNNPM3+MILPCT*MILM3+NATPM3

518:  POPM4 == CNNPM4+MILPCT*MILM4+NATPM4

519:  POPM5 == CNNPM5+MILPCT*MILM5+NATPM5

520:  POPM6 == CNNPM6+MILPCT*MILM6+NATPM6

521:  POPM7 == CNNPM7+MILPCT*MILM7+NATPM7

522:  POPM8 == CNNPM8+MILPCT*MILM8+NATPM8

523:  POPM9 == CNNPM9+MILPCT*MILM9+NATPM9

524:  POPM10 == CNNPM10+MILPCT*MILM10+NATPM10

525:  POPM11 == CNNPM11+MILPCT*MILM11+NATPM11

526:  POPM12 == CNNPM12+MILPCT*MILM12+NATPM12

527:  POPM13 == CNNPM13+MILPCT*MILM13+NATPM13
```

```
528:  POPM14 == CNNPM14+MILPCT*MILM14+NATPM14

529:  POPM15 == CNNPM15+MILPCT*MILM15+NATPM15

530:  POPF1 == CNNPF1+MILPCT*MILF1+NATPF1

531:  POPF2 == CNNPF2+MILPCT*MILF2+NATPF2

532:  POPF3 == CNNPF3+MILPCT*MILF3+NATPF3

533:  POPF4 == CNNPF4+MILPCT*MILF4+NATPF4

534:  POPF5 == CNNPF5+MILPCT*MILF5+NATPF5

535:  POPF6 == CNNPF6+MILPCT*MILF6+NATPF6

536:  POPF7 == CNNPF7+MILPCT*MILF7+NATPF7

537:  POPF8 == CNNPF8+MILPCT*MILF8+NATPF8

538:  POPF9 == CNNPF9+MILPCT*MILF9+NATPF9

539:  POPF10 == CNNPF10+MILPCT*MILF10+NATPF10

540:  POPF11 == CNNPF11+MILPCT*MILF11+NATPF11

541:  POPF12 == CNNPF12+MILPCT*MILF12+NATPF12

542:  POPF13 == CNNPF13+MILPCT*MILF13+NATPF13

543:  POPF14 == CNNPF14+MILPCT*MILF14+NATPF14

544:  POPF15 == CNNPF15+MILPCT*MILF15+NATPF15

545:  BTOT == BTHTOT+NBTHTOT

546:  DTOT == DTHTOT+NDTHTOT

547:  POPNI9 == BTOT-DTOT

548:  NCBR == NBTHTOT/NATTOT*1000

549:  NCDR == NDTHTOT/NATTOT*1000

550:  CBR == BTHTOT/CNNTOT*1000

551:  CDR == DTHTOT/CNNTOT*1000

552:  BCRUDE == BTOT/(CNNTOT+NATTOT)*1000

553:  DCRUDE == DTOT/(CNNTOT+NATTOT)*1000
```

554: POPSKUL == POPM3+POPM4+POPM5+POPF3+POPF4+POPF5

555: POPKIDS == POPSKUL+POPM1+POPM2+POPF1+POPF2-POPM5-POPF5

556: POPGER = POPM15+POPF15

557: POPADS == POP-POPKIDS-POPGER

558: POP.AD == POPADS/POP

559: POP.KID == POPKIDS/POP

560: POP.GER == POPGER/POP

561: POP.MIL == MILPCT*(AFTOT+MDTOT)/POP

562: POP.NAT == NATTOT/POP

563: POP.CIV == CNNTOT/POP

564: PLFDOMC == CNNPM5+CNNPM6+CNNPM7+CNNPM8+CNNPM9+CNNPM10+
CNNPM11+11+CNNPM12+CNNPM13+CNNPM14+CNNPF5+CNNPF6+CNNPF7+
CNNPF8+CNNPF9+CNNPF10+CNNPF11+CNNPF12+CNNPF13+CNNPF14

565: PLFDOMN == NATPM5+NATPM6+NATPM7+NATPM8+NATPM9+NATPM10+
NATPM11+NATPM12+NATPM13+NATPM14+NATPF5+NATPF6+NATPF7
+NATPF8+NATPF9+NATPF10+NATPF11+NATPF12+NATPF13+NATPF14

566: PLFDOMM == MILPCT*(MILM5+MILM6+MILM7+MILM8+MILM9+MILM10+
MILM11+MILM12+MILM13+MILM14+MILF5+MILF6+MILF7+MILF8+MILF9+
MILF10+MILF11+MILF12+MILF13+MILF14-AFTOT)

567: PLFD9 == PLFDOMC+PLFDOMN+PLFDOMM

568: LF == LFPART*PLFD9

569: UNEMP == LF-EM96

570: U.AK.US == UNEMP/LF/UUS

571: DELEMP == EM96-EM96(-1)

572: WR.AK.US == LOG(R.WR97)-LOG(WEUS*100/PDUSCPI)-(LOG(R.WR97(-1))-
LOG(WEUS(-1)*100/PDUSCPI(-1)))

573: POPMIG = CMIG1+CMIG2*1/U.AK.US(-1)+CMIG3*WR.AK.US(-1)+
CMIG4*DELEMP

Household Module

```
574:  CHHM4 == IF YR LT 1980 THEN 1 ELSE CNNPM4*(1-CPGQM4)*
      (HHRM4+RCM4/TP*(YR-1980))

575:  NHHM4 == IF YR LT 1980 THEN 1 ELSE NATPM4*(1-NPGQM4)*
      (NHHRM4+NRCM4/NTP*(YR-1980))

576:  HHM4 == CHHM4+NHHM4

577:  CHHM5 == IF YR LT 1980 THEN 1 ELSE CNNPM5*(1-CPGQM5)*
      (HHRM5+RCM5/TP*(YR-1980))

578:  NHHM5 == IF YR LT 1980 THEN 1 ELSE NATPM5*(1-NPGQM5)*
      (NHHRM5+NRCM5/NTP*(YR-1980))

579:  HHM5 == CHHM5+NHHM5+MHHM5*MILPCT

580:  CHHM6 == IF YR LT 1980 THEN 1 ELSE CNNPM6*(1-CPGQM6)*
      (HHRM6+RCM6/TP*(YR-1980))

581:  NHHM6 == IF YR LT 1980 THEN 1 ELSE NATPM6*(1-NPGQM6)*
      (NHHRM6+NRCM6/NTP*(YR-1980))

582:  HHM6 == CHHM6+NHHM6+MHHM6*MILPCT

583:  CHHM7 == IF YR LT 1980 THEN 1 ELSE CNNPM7*(1-CPGQM7)*
      (HHRM7+RCM7/TP*(YR-1980))

584:  NHHM7 == IF YR LT 1980 THEN 1 ELSE NATPM7*(1-NPGQM7)*
      (NHHRM7+NRCM7/NTP*(YR-1980))

585:  HHM7 == CHHM7+NHHM7+MHHM7*MILPCT

586:  CHHM8 == IF YR LT 1980 THEN 1 ELSE CNNPM8*(1-CPGQM8)*
      (HHRM8+RCM8/TP*(YR-1980))

587:  NHHM8 == IF YR LT 1980 THEN 1 ELSE NATPM8*(1-NPGQM8)*
      (NHHRM8+NRCM8/NTP*(YR-1980))

588:  HHM8 == CHHM8+NHHM8+MHHM8*MILPCT

589:  CHHM9 == IF YR LT 1980 THEN 1 ELSE CNNPM9*(1-CPGQM9)*
      (HHRM9+RCM9/TP*(YR-1980))

590:  NHHM9 == IF YR LT 1980 THEN 1 ELSE NATPM9*(1-NPGQM9)*
      (NHHRM9+NRCM9/NTP*(YR-1980))

591:  HHM9 == CHHM9+NHHM9+MHHM9*MILPCT
```

```
592:  CHHM10 == IF YR LT 1980 THEN 1 ELSE CNNPM10*(1-CPGQM10)*
      (HHRM10+RCM10/TP*(YR-1980))

593:  NHHM10 == IF YR LT 1980 THEN 1 ELSE NATPM10*(1-NPGQM10)*
      (NHHRM10+NRCM10/NTP*(YR-1980))

594:  HHM10 == CHHM10+NHHM10+MHHM10*MILPCT

595:  CHHM11 == IF YR LT 1980 THEN 1 ELSE CNNPM11*(1-CPGQM11)*
      (HHRM11+RCM11/TP*(YR-1980))

596:  NHHM11 == IF YR LT 1980 THEN 1 ELSE NATPM11*(1-NPGQM11)*
      (NHHRM11+NRCM11/NTP*(YR-1980))

597:  HHM11 == CHHM11+NHHM11+MHHM11*MILPCT

598:  CHHM12 == IF YR LT 1980 THEN 1 ELSE CNNPM12*(1-CPGQM12)*
      (HHRM12+RCM12/TP*(YR-1980))

599:  NHHM12 == IF YR LT 1980 THEN 1 ELSE NATPM12*(1-NPGQM12)*
      (NHHRM12+NRCM12/NTP*(YR-1980))

600:  HHM12 == CHHM12+NHHM12+MHHM12*MILPCT

601:  CHHM13 == IF YR LT 1980 THEN 1 ELSE CNNPM13*(1-CPGQM13)*
      (HHRM13+RCM13/TP*(YR-1980))

602:  NHHM13 == IF YR LT 1980 THEN 1 ELSE NATPM13*(1-NPGQM13)*
      (NHHRM13+NRCM13/NTP*(YR-1980))

603:  HHM13 == CHHM13+NHHM13+MHHM13*MILPCT

604:  CHHM14 == IF YR LT 1980 THEN 1 ELSE CNNPM14*(1-CPGQM14)*
      (HHRM14+RCM14/TP*(YR-1980))

605:  NHHM14 == IF YR LT 1980 THEN 1 ELSE NATPM14*(1-NPGQM14)*
      (NHHRM14+NRCM14/NTP*(YR-1980))

606:  HHM14 == CHHM14+NHHM14+MHHM14*MILPCT

607:  CHHM15 == IF YR LT 1980 THEN 1 ELSE CNNPM15*(1-CPGQM15)*
      (HHRM15+RCM15/TP*(YR-1980))

608:  NHHM15 == IF YR LT 1980 THEN 1 ELSE NATPM15*(1-NPGQM15)*
      (NHHRM15+NRCM15/NTP*(YR-1980))

609:  HHM15 == CHHM15+NHHM15+MHHM15*MILPCT

610:  CHHF4 == IF YR LT 1980 THEN 1 ELSE CNNPF4*(1-CPGQF4)*
      (HHRF4+RCF4/TP*(YR-1980))
```

```
611:  NHHF4 == IF YR LT 1980 THEN 1 ELSE NATPF4*(1-NPGQF4)*
      (NHHRF4+NRCF4/NTP*(YR-1980))

612:  HHF4 == CHHF4+NHHF4

613:  CHHF5 == IF YR LT 1980 THEN 1 ELSE CNNPF5*(1-CPGQF5)*
      (HHRF5+RCF5/TP*(YR-1980))

614:  NHHF5 == IF YR LT 1980 THEN 1 ELSE NATPF5*(1-NPGQF5)*
      (NHHRF5+NRCF5/NTP*(YR-1980))

615:  HHF5 == CHHF5+NHHF5+MHHF5*MILPCT

616:  CHHF6 == IF YR LT 1980 THEN 1 ELSE CNNPF6*(1-CPGQF6)*
      (HHRF6+RCF6/TP*(YR-1980))

617:  NHHF6 == IF YR LT 1980 THEN 1 ELSE NATPF6*(1-NPGQF6)*
      (NHHRF6+NRCF6/NTP*(YR-1980))

618:  HHF6 == CHHF6+NHHF6+MHHF6*MILPCT

619:  CHHF7 == IF YR LT 1980 THEN 1 ELSE CNNPF7*(1-CPGQF7)*
      (HHRF7+RCF7/TP*(YR-1980))

620:  NHHF7 == IF YR LT 1980 THEN 1 ELSE
      NATPF7*(1-NPGQF7)*(NHHRF7+NRCF7/NTP*(YR-1980))

621:  HHF7 == CHHF7+NHHF7+MHHF7*MILPCT

622:  CHHF8 == IF YR LT 1980 THEN 1 ELSE CNNPF8*(1-CPGQF8)*
      (HHRF8+RCF8/TP*(YR-1980))

623:  NHHF8 == IF YR LT 1980 THEN 1 ELSE NATPF8*(1-NPGQF8)*
      (NHHRF8+NRCF8/NTP*(YR-1980))

624:  HHF8 == CHHF8+NHHF8+MHHF8*MILPCT

625:  CHHF9 == IF YR LT 1980 THEN 1 ELSE CNNPF9*(1-CPGQF9)*
      (HHRF9+RCF9/TP*(YR-1980))

626:  NHHF9 == IF YR LT 1980 THEN 1 ELSE NATPF9*(1-NPGQF9)*
      (NHHRF9+NRCF9/NTP*(YR-1980))

627:  HHF9 == CHHF9+NHHF9+MHHF9*MILPCT

628:  CHHF10 == IF YR LT 1980 THEN 1 ELSE CNNPF10*(1-CPGQF10)*
      (HHRF10+RCF10/TP*(YR-1980))

629:  NHHF10 == IF YR LT 1980 THEN 1 ELSE NATPF10*(1-NPGQF10)*
      (NHHRF10+NRCF10/NTP*(YR-1980))
```

```
630:  HHF10 == CHHF10+NHHF10+MHHF10*MILPCT

631:  CHHF11 == IF YR LT 1980 THEN 1 ELSE CNNPF11*(1-CPGQF11)*
      (HHRF11+RCF11/TP*(YR-1980))

632:  NHHF11 == IF YR LT 1980 THEN 1 ELSE NATPF11*(1-NPGQF11)*
      (NHHRF11+NRCF11/NTP*(YR-1980))

633:  HHF11 == CHHF11+NHHF11+MHHF11*MILPCT

634:  CHHF12 == IF YR LT 1980 THEN 1 ELSE CNNPF12*(1-CPGQF12)*
      (HHRF12+RCF12/TP*(YR-1980))

635:  NHHF12 == IF YR LT 1980 THEN 1 ELSE NATPF12*(1-NPGQF12)*
      (NHHRF12+NRCF12/NTP*(YR-1980))

636:  HHF12 == CHHF12+NHHF12+MHHF12*MILPCT

637:  CHHF13 == IF YR LT 1980 THEN 1 ELSE CNNPF13*(1-CPGQF13)*
      (HHRF13+RCF13/TP*(YR-1980))

638:  NHHF13 == IF YR LT 1980 THEN 1 ELSE NATPF13*(1-NPGQF13)*
      (NHHRF13+NRCF13/NTP*(YR-1980))

639:  HHF13 == CHHF13+NHHF13+MHHF13*MILPCT

640:  CHHF14 == IF YR LT 1980 THEN 1 ELSE CNNPF14*(1-CPGQF14)*
      (HHRF14+RCF14/TP*(YR-1980))

641:  NHHF14 == IF YR LT 1980 THEN 1 ELSE NATPF14*(1-NPGQF14)*
      (NHHRF14+NRCF14/NTP*(YR-1980))

642:  HHF14 == CHHF14+NHHF14+MHHF14*MILPCT

643:  CHHF15 == IF YR LT 1980 THEN 1 ELSE CNNPF15*(1-CPGQF15)*
      (HHRF15+RCF15/TP*(YR-1980))

644:  NHHF15 == IF YR LT 1980 THEN 1 ELSE NATPF15*(1-NPGQF15)*
      (NHHRF15+NRCF15/NTP*(YR-1980))

645:  HHF15 == CHHF15+NHHF15+MHHF15*MILPCT

646:  HH == HHM4+HHM5+HHM6+HHM7+HHM8+HHM9+HHM10+HHM11+HHM12+HHM13+
      HHM14+HHM15+HHF4+HHF5+HHF6+HHF7+HHF8+HHF9+HHF10+HHF11+HHF12+
      HHF13+HHF14+HHF15
```

647: POPCGQ == CNNPM1*CPGQM1+CNNPM2*CPGQM2+CNNPM3*CPGQM3+CNNPM4*CPGQM4+CNNPM5*CPGQM5+CNNPM6*CPGQM6+CNNPM7*CPGQM7+CNNPM8*CPGQM8+CNNPM9*CPGQM9+CNNPM10*CPGQM10+CNNPM11*CPGQM11+CNNPM12*CPGQM12+CNNPM13*CPGQM13+CNNPM14*CPGQM14+CNNPM15*CPGQM15+CNNPF1*CPGQF1+CNNPF2*CPGQF2+CNNPF3*CPGQF3+CNNPF4*CPGQF4+CNNPF5*CPGQF5+CNNPF6*CPGQF6+CNNPF7*CPGQF7+CNNPF8*CPGQF8+CNNPF9*CPGQF9+CNNPF10*CPGQF10+CNNPF11*CPGQF11+CNNPF12*CPGQF12+CNNPF13*CPGQF13+CNNPF14*CPGQF14+CNNPF15*CPGQF15

648: POPNGQ == NATPM1*NPGQM1+NATPM2*NPGQM2+NATPM3*NPGQM3+NATPM4*NPGQM4+NATPM5*NPGQM5+NATPM6*NPGQM6+NATPM7*NPGQM7+NATPM8*NPGQM8+NATPM9*NPGQM9+NATPM10*NPGQM10+NATPM11*NPGQM11+NATPM12*NPGQM12+NATPM13*NPGQM13+NATPM14*NPGQM14+NATPM15*NPGQM15+NATPF1*NPGQF1+NATPF2*NPGQF2+NATPF3*NPGQF3+NATPF4*NPGQF4+NATPF5*NPGQF5+NATPF6*NPGQF6+NATPF7*NPGQF7+NATPF8*NPGQF8+NATPF9*NPGQF9+NATPF10*NPGQF10+NATPF11*NPGQF11+NATPF12*NPGQF12+NATPF13*NPGQF13+NATPF14*NPGQF14+NATPF15*NPGQF15

649: HHC == CHHM4+CHHM5+CHHM6+CHHM7+CHHM8+CHHM9+CHHM10+CHHM11+CHHM12+CHHM13+CHHM14+CHHM15+CHHF4+CHHF5+CHHF6+CHHF7+CHHF8+CHHF9+CHHF10+CHHF11+CHHF12+CHHF13+CHHF14+CHHF15

650: HHN == NHHM4+NHHM5+NHHM6+NHHM7+NHHM8+NHHM9+NHHM10+NHHM11+NHHM12+NHHM13+NHHM14+NHHM15+NHHF4+NHHF5+NHHF6+NHHF7+NHHF8+NHHF9+NHHF10+NHHF11+NHHF12+NHHF13+NHHF14+NHHF15

651: HHM == MILPCT*(MHHM5+MHHM6+MHHM7+MHHM8+MHHM9+MHHM10+MHHM11+MHHM12+MHHM13+MHHM14+MHHM15+MHHF5+MHHF6+MHHF7+MHHF8+MHHF9+MHHF10+MHHF11+MHHF12+MHHF13+MHHF14+MHHF15)

652: HHSIZEN == (NATTOT-POPNGQ)/HHN

653: HHSIZEC == (CNNTOT-POPCGQ)/HHC

654: HHSIZE == (POP-POPNGQ-POPCGQ-MILPCT*POPMGQ)/HH

655: POPGQ == POPNGQ+POPCGQ+POPMGQ

656: HH24 == HHF4+HHF5+HHF6+HHM4+HHM5+HHM6

657: HH25.29 == HHF7+HHM7

658: HH30.54 == HHF8+HHF9+HHF10+HHF11+HHF12+HHM8+HHM9+HHM10+HHM11+HHM12

659: HH55 == HHF13+HHF14+HHF15+HHM13+HHM14+HHM15

Native Economic Activity

```
660:  EMNAT == EMNATX

661:  RNAT == RNATX

662:  EMRATE = EM96/POPC

663:  EMRATN1 = (1+PERNA1*(EMRATE-EMRATE(-1))/EMRATE(-1))*EMRATN1(-1)+
      PERNA2*(EMRATE-EMRATN1(-1))

664:  EMNA == IF PIDIST EQ 1 THEN EMNAT(-1)*POPNE ELSE EMRATN1*
      POPNE+PERNA3*EMNC

665:  EMNNC == EM99-EMGM-EMNA

666:  EMRATN == EMNA/POPNE

667:  CEA9N = (1-PCINDA)*CEA9N(-1)+PCINDA*(EMA9/
      (EM96-EMPRO-PERNA3*EMNC))

668:  CEP9N = (1-PCINDA)*CEP9N(-1)+PCINDA*(EMP9/
      (EM96-EMPRO-PERNA3*EMNC))

669:  CECNN = (1-PCINDA)*CECNN(-1)+PCINDA*(EMCN/
      (EM96-EMPRO-PERNA3*EMNC))

670:  CEM9N = (1-PCINDA)*CEM9N(-1)+PCINDA*(EMM9/
      (EM96-EMPRO-PERNA3*EMNC))

671:  CET9N = (1-PCINDA)*CET9N(-1)+PCINDA*(EMT9/
      (EM96-EMPRO-PERNA3*EMNC))

672:  CECMN = (1-PCINDA)*CECMN(-1)+PCINDA*(EMCM/
      (EM96-EMPRO-PERNA3*EMNC))

673:  CEPUN = (1-PCINDA)*CEPUN(-1)+PCINDA*(EMPU/
      (EM96-EMPRO-PERNA3*EMNC))

674:  CED9N = (1-PCINDA)*CED9N(-1)+PCINDA*(EMD9/
      (EM96-EMPRO-PERNA3*EMNC))

675:  CEFIN = (1-PCINDA)*CEFIN(-1)+PCINDA*(EMFI/
      (EM96-EMPRO-PERNA3*EMNC))

676:  CES9N = (1-PCINDA)*CES9N(-1)+PCINDA*((EMS9-PERNA3*EMNC)/
      (EM96-EMPRO-PERNA3*EMNC))

677:  CEGFN = (1-PCINDA)*CEGFN(-1)+PCINDA*((EMGF-EMGM)/
      (EM96-EMPRO-PERNA3*EMNC))
```

```
678:  CEGAN = (1-PCINDA)*CEGAN(-1)+PCINDA*(EMGA/
      (EM96-EMPRO-PERNA3*EMNC))

679:  NEMA9N == CEA9N*(EMNA-PERNA3*EMNC)

680:  NWSA9N == WRA9*NEMA9N/1000

681:  NEMP9N == CEP9N*(EMNA-PERNA3*EMNC)

682:  NWSP9N == WRP9*NEMP9N/1000

683:  NEMCNN == CECNN*(EMNA-PERNA3*EMNC)

684:  NWSCNN == WRCN*NEMCNN/1000

685:  NEMM9N == CEM9N*(EMNA-PERNA3*EMNC)

686:  NWSM9N == WRM9*NEMM9N/1000

687:  NEMT9N == CET9N*(EMNA-PERNA3*EMNC)

688:  NWST9N == WRT9*NEMT9N/1000

689:  NEMCMN == CECMN*(EMNA-PERNA3*EMNC)

690:  NWSCMN == WRCM*NEMCMN/1000

691:  NEMPUN == CEPUN*(EMNA-PERNA3*EMNC)

692:  NWSPUN == WRPU*NEMPUN/1000

693:  NEMD9N == CED9N*(EMNA-PERNA3*EMNC)

694:  NWSD9N == WRD9*NEMD9N/1000

695:  NEMFIN == CEFIN*(EMNA-PERNA3*EMNC)

696:  NWSFIN == WRFI*NEMFIN/1000

697:  NEMS9N == CES9N*(EMNA-PERNA3*EMNC)+PERNA3*EMNC

698:  NWSS9N == WRS9*NEMS9N/1000

699:  NEMGFN == CEGFN*(EMNA-PERNA3*EMNC)

700:  NWSGFN == WRGF*NEMGFN/1000

701:  NEMGAN == CEGAN*(EMNA-PERNA3*EMNC)

702:  NWSGAN == WRGA*NEMGAN/1000
```

703: WSNA == NWSA9N+NWSP9N+NWSCNN+NWSM9N+NWST9N+NWSCMN+NWSPUN+
NWSD9N+NWSFIN+NWSS9N+NWSGFN+NWSGAN

704: PIN1 == PCYNA1*((PI-NCPI)/WS98)*WSNA

705: PIN == IF PIDIST EQ 1 THEN RNAT(-1)*PI ELSE PIN1+NCPI

706: PINN == PI-PIN

707: R.PIN == PIN*100/PDRPI

708: R.PINN == PINN*100/PDRPI

709: P.PIN == PIN*1000/POPNE

710: P.PINCL == NCPI*1000/POPNE

711: P.PINN == PINN*1000/(POP-POPNE)

712: PR.PIN == R.PIN*1000/POPNE

713: PR.NCEXP == NCEXP/POPNE/PDRPI*100000

714: PR.PINCL == PR.PIN+PR.NCEXP

715: PR.PINN == R.PINN*1000/(POP-POPNE)

716: RAT1 == PINN/(PI-PC12N*PC12RN*PCNC1*ANCSA)

717: P.DPINN = 1000*(PINN-RAT1*(DPIRES+RTPIF+RTISCP))/(POP-POPNE)

718: P.DPINN1 == 1000*(PIN-PC12N*PC12RN*PCNC1*ANCSA-(1-RAT1)*
(DPIRES+RTPIF+RTISCP))/POPNE

719: PR.DPINN = P.DPINN*100/PDRPI

720: PR.DPIN == P.DPINN1*100/PDRPI+PC12N*PC12RN*PCNC1*ANCSA/
POPNE*100000/PDRPI

Definitional Equations

721: R.WR98 == WR98*100/PDRPI

722: R.WR97 = WR97*100/PDRPI

723: P.EX99S == EX99S*1000./POP

724: P.EXCAP == EXCAP*1000/POP

725: P.EXOPS == EXOPS*1000/POP

```
726:  P.EXONTR == EXONTR*1000./POP

727:  P.EXBM == EXGFBM*1000/POP

728:  P.R99S == R99S*1000./POP

729:  P.RTIS == RTIS*1000./POP

730:  P.RT99 == RT99*1000./POP

731:  P.EL99 == EL99*1000./POP

732:  P.ELED == ELED*1000./POP

733:  P.ELNED1 == ELNED1*1000/POP

734:  P.RLT99 == RLT99*1000./POP

735:  P.GEXP == SLGEXP*1000/POP

736:  P.BAL99 == BAL99*1000/POP

737:  P.BALPF == BALPF*1000/POP

738:  P.BALGF == BALGF*1000/POP

739:  P.RSIN == RSIN*1000/POP

740:  P.RSIP == RSIP*1000/POP

741:  P.NRP9S == NONRP9S*1000/POP

742:  P.RSEN == RSEN*1000/POP

743:  P.NPET == NONPET*1000/POP

744:  P.GODT == GODT*1000/POP

745:  PR.EX99S == P.EX99S*100/PDRPI

746:  PR.EXONT == P.EXONTR*100/PDEXOPS

747:  PR.EXBM == EXGFBM*10**5/PDEXOPS/POP

748:  PR.EXCAP == P.EXCAP*100/PDCON

749:  PR.EXOPS == P.EXOPS*100/PDEXOPS

750:  PR.R99S == P.R99S*100/PDRPI

751:  PR.RTIS == P.RTIS*100/PDRPI
```

752: PR.RT99 == P.RT99*100/PDRPI

753: PR.EL99 == P.EL99*100/PDRPI

754: PR.ELED == P.ELED*100/PDRPI

755: PR.ELNED == P.ELNED1*100/PDRPI

756: PR.GEXP == P.GEXP*100/PDRPI

757: PR.GFC == EXGFCHY*10**5/PDRPI/POP

758: PR.ECP == EXCPSHY*10**5/PDRPI/POP

759: PR.GFCN == EXGFCNH*10**5/PDRPI/POP

760: PR.ECPN == EXCPSNH*10**5/PDRPI/POP

761: PR.EXEDS == EXEDS*10**5/PDEXOPS/POP

762: PR.EXSSS == EXSSS*10**5/PDEXOPS/POP

763: PR.EXHES == EXHES*10**5/PDEXOPS/POP

764: PR.EXNRS == EXNRS*10**5/PDEXOPS/POP

765: PR.EXPPS == EXPPS*10**5/PDEXOPS/POP

766: PR.EXJUS == EXJUS*10**5/PDEXOPS/POP

767: PR.EXCDS == EXCDS*10**5/PDEXOPS/POP

768: PR.EXTRS == EXTRS*10**5/PDEXOPS/POP

769: PR.EXGGS == EXGGS*10**5/PDEXOPS/POP

770: PR.RLT99 == RLT99*10**5/PDRPI/POP

771: PR.ELEDC == ELEDCP*10**5/PDRPI/POP

772: PR.BAL99 == P.BAL99*(100/PDRPI)

773: PR.BALPF == P.BALPF*(100/PDRPI)

774: PR.BALG1 == P.BALGF*(100/PDRPI)

775: PR.BALP2 == P.BALPF*(100/PDEXOPS)

776: PR.BALG2 == P.BALGF*(100/PDEXOPS)

777: PR.RSIN == P.RSIN*(100/PDRPI)

```
778:  PR.RSIP == P.RSIP*(100/PDRPI)

779:  PR.NRP9 == P.NRP9S*(100/PDRPI)

780:  PR.NPET == P.NPET*(100/PDRPI)

781:  PR.RSEN == P.RSEN*(100/PDRPI)

782:  PR.GODT == P.GODT*(100/PDRPI)

783:  PI.TXS == RT99/PI

784:  PI.EXS == EXGF/PI

785:  PI.TXL == (RL99-RLT99-RLTF)/PI

786:  PI.EXL == (EL99-(GOBONDL-GOBONDL(-1)))/PI

787:  PI.EXT == (EXGF+(EL99-(GOBONDL-GOBONDL(-1)))-RLT99)/PI

788:  PI.RSEN == RSEN/PI

789:  PI.GODT == GODT/PI

790:  PI.EX99S == EX99S/PI

791:  PI.EL99 == EL99/PI

792:  PI.RL99 == RL99/PI

793:  PI.RLPT == RLPT/PI

794:  PI.WS98 == WS98/PI

795:  PI.DPI == DPI/PI

796:  RL99.PT == RLPT/RL99

797:  RL99.RT == RLT99/RL99

798:  RS.FED == RSFDN/R99S

799:  RS.RP9S == RP9S/R99S

800:  RS.RSIN == RSIN/R99S

801:  RS.RSEN == RSEN/R99S

802:  RS.PET == (RP9S+RSIN)/R99S

803:  RS.OWN == R99SON/R99S
```

804: RS.REC == (RSIN+RSEN)/R99S

805: RS.RN == R99SNT/R99S

806: RSBM.RP9 == RP9SGF/RSGFBM

807: RSBM.PET == (RP9SGF+RSIG+RSID+(1-EXPFBAK)*RSIP)/RSGFBM

808: RSBM.EXD == EXDSS/RSGFBM

809: RSBM.GF == RSIG/RSGFBM

810: RSBM.B99 == (RSIG+RSID+RSIPGF)/RSGFBM

811: RSBM.PF == RSIPGF/RSGFBM

812: RSBM.REN == RSENGF/RSGFBM

813: RN.FED == RSFDN/R99SNT

814: RN.OIL == (RP9S-EXPFCON)/R99SNT

815: RN.RSIN == RSIN/R99SNT

816: RN.RSEN == RSEN/R99SNT

817: EX.R99S == R99S/EXGF

818: EX.NRP9 == (RSEN+RSIN+RSFDN)/EXGF

819: EX.RSIN == RSIN/EXGF

820: EX.RP9S == 1-EX.NRP9

821: EX.NPET == NONPET/EXGF

822: EX.PET == 1-EX.NPET

823: EX.RSEN == RSEN/EXGF

824: EX.RVNT == R99SNT/EXGF

825: EX.DSS == EXDSS/EXGF

826: EXBM.RV == RSGFBM/EXGFBM

827: EXBM.CAB == BALCABBM/EXGFBM

828: EXBM.FD == BAL99/EXGFBM

829: EXBM.GR1 == (RSGFBM+EXPFCON-EXPFBAK*RSIP-RP9S)/EXGFBM

830: EXBM.END == EXDFWITH/EXGFBM

831: DF.RSFD == RSFDN*PDRPIBAS/PDRPI

832: DF.RP9S == RP9S*PDRPIBAS/PDRPI

833: DF.RSGF == RSGF*PDRPIBAS/PDRPI

834: DF.RSGFB == RSGFBM*PDRPIBAS/PDRPI

835: DF.R99S == R99S*PDRPIBAS/PDRPI

836: DF.RSEN == RSEN*PDRPIBAS/PDRPI

837: DF.RSIN == RSIN*PDRPIBAS/PDRPI

838: DF.EXGF == EXGF*PDRPIBAS/PDRPI

839: DF.EXGFB == EXGFBM*PDRPIBAS/PDRPI

840: DF.CABBM == BALCABBM*PDRPIBAS/PDRPI

841: DF.GOXBM == (EXGFBM-EXGFCAP)*376.536/PDEXOPS

842: DF.NRP9S == NONRP9S*PDRPIBAS/PDRPI

843: DF.BAL99 == BAL99*PDRPIBAS/PDRPI

844: DF.BALDF == BALDF*PDRPIBAS/PDRPI

845: DF.BALGF == BALGF*PDRPIBAS/PDRPI

846: DF.NPET == NONPET*PDRPIBAS/PDRPI

847: DF.RSIP == RSIP*PDRPIBAS/PDRPI

848: DF.BALPF == BALPF*PDRPIBAS/PDRPI

849: DF.RGFNT == R99SNT*PDRPIBAS/PDRPI

850: DF.RSIPN == RSIPNET*PDRPIBAS/PDRPI

851: DF.RSIDN == RSIDNET*PDRPIBAS/PDRPI

852: DF.RSIGN == RSIGNET*PDRPIBAS/PDRPI

853: DF.RSINN == RSINNET*PDRPIBAS/PDRPI

854: DF.PI == PI*PDRPIBAS/PDRPI

855: DF.WS98 == WS98*PDRPIBAS/PDRPI

856: DF.WSG9 == (WSGS+WSGL+WSGC+WSGM)*PDRPIBAS/PDRPI

857: DF.WSSP == (WST9+WSCM+WSPU+WSD9+WSFI+WSS9)*PDRPIBAS/PDRPI

858: DF.WSNS == (WSA9+WSM9+WSCN+WSP9)*PDRPIBAS/PDRPI

859: DF.WRG9 == DF.WSG9*1000/EMG9

860: DF.WRSP == DF.WSSP*1000/EMSP

861: DF.WRNS == DF.WSNS*1000/(EMA9+EMM9+EMCN+EMP9)

862: DF.BAL9P == DF.BAL99*1000/POP

863: DF.EXGFP == DF.EXGF*1000/POP

864: DF.PIP == DF.PI*1000/POP

865: IM.REV == (EXGF/PDRPI/POP-BASEXGF/BASPDRPI/BASEPOP)*PDRPI*POP

866: IM.BALRV = IM.BAL(-1)*(ROR+RORPPF)+IM.REV

867: IM.BAL = IF YR EQ 1977 THEN 0 ELSE IM.BAL(-1)+IM.BALRV

868: IM.BAL99 == BAL99+IM.BAL

869: IM.BALPC == IM.BAL*1000/POP

870: IM.BALR == IM.BAL*100/PDRPI

871: IM.BLRPC == IM.BALR*1000/POP

872: EM.EMTCU == EMTCU/EM99

873: EM.EMSUP == EMSUP/EM99

874: EM.EMSP == EMSP/EM99

875: EM.EMG9 == EMG9/EM99

876: EM.EMGA == EMGA/EM99

877: EM.EMGF == EMGF/EM99

878: EM.EMCN == EMCN/EM99

879: EM.EMP9 == EMP9/EM99

880: EM.EMNR == EMNR/EM99

881: EM.EMNS == EMNS/EM99

882: G.PR.PI == PR.PI/PR.PI(-1)

883: G.PR.DPI == PR.DPI/PR.DPI(-1)

884: G.RSEN == RSEN/RSEN(-1)

885: G.EX99S == EX99S/EX99S(-1)

886: G.EL99 == EL99/EL99(-1)

887: G.PDRPI == PDRPI/PDRPI(-1)

888: G.XONRPC == PR.EXONT/PR.EXONT(-1)

889: G.POP == POP/POP(-1)

890: G.EM99 == EM99/EM99(-1)

891: G.SRPC == PR.EX99S/PR.EX99S(-1)

892: G.RNSPC == P.RSEN/P.RSEN(-1)

893: G.BAL99 == BAL99/BAL99(-1)

894: G.BAL9PC == P.BAL99/P.BAL99(-1)

895: G.R.WR98 == R.WR98/R.WR98(-1)

896: PIU.PIA == PR.DPINN/PR.DPIUS

897: INDEX.DI == PR.DPI/PR.DPIUS

898: INDEX.WG == R.WR97/(WEUS*52*100/PDUSCPI)

899: INDEX.S1 == EMSUP/R.DPI

900: INDEX.S2 == EMTCU/R.DPI

Income Distribution Model Links

901: NNPM1 == CNNPM5+MILPCT*MDPM5

902: NNPM2 == CNNPM6+MILPCT*MDPM6

903: NNPM3 == CNNPM7+CNNPM8+MILPCT*(MDPM7+MDPM8)

904: NNPM4 == CNNPM9+CNNPM10+MILPCT*(MDPM9+MDPM10)

905: NNPM5 == CNNPM11+CNNPM12+MILPCT*(MDPM11+MDPM12)

906: NNPM6 == CNNPM13+CNNPM14+MILPCT*(MDPM13+MDPM14)

907: NNPM7 == CNNPM15+MILPCT*MDPM15

908: NNPF1 == CNNPF5+MILPCT*MDPF5

909: NNPF2 == CNNPF6+MILPCT*MDPF6

910: NNPF3 == CNNPF7+CNNPF8+MILPCT*(MDPF7+MDPF8)

911: NNPF4 == CNNPF9+CNNPF10+MILPCT*(MDPF9+MDPF10)

912: NNPF5 == CNNPF11+CNNPF12+MILPCT*(MDPF11+MDPF12)

913: NNPF6 == CNNPF13+CNNPF14+MILPCT*(MDPF13+MDPF14)

914: NNPF7 == CNNPF15+MILPCT*MDPF15

915: NAPM1 == NATPM5

916: NAPM2 == NATPM6

917: NAPM3 == NATPM7+NATPM8

918: NAPM4 == NATPM9+NATPM10

919: NAPM5 == NATPM11+NATPM12

920: NAPM6 == NATPM13+NATPM14

921: NAPM7 == NATPM15

922: NAPF1 == NATPF5

923: NAPF2 == NATPF6

924: NAPF3 == NATPF7+NATPF8

925: NAPF4 == NATPF9+NATPF10

926: NAPF5 == NATPF11+NATPF12

927: NAPF6 == NATPF13+NATPF14

928: NAPF7 == NATPF15

929: PF == CNNPF1+CNNPF2+CNNPF3+CNNPF4+MILPCT*(MDPF1+MDPF2+
MDPF3+MDPF4)

930: PM == CNNPM1+CNNPM2+CNNPM3+CNNPM4+MILPCT*(MDPM1+MDPM2+
MDPM3+MDPM4)

```
931:  PFN == NATPF1+NATPF2+NATPF3+NATPF4

932:  PMN == NATPM1+NATPM2+NATPM3+NATPM4

933:  WRGMS == (PI8-WS98)/(EMPRO*PDRPI)/((PI8(-1)-WS98(-1))/
      (EMPRO(-1)*PDRPI(-1)))

934:  WRGP9 == WRP9/PDRPI/(WRP9(-1)/PDRPI(-1))

935:  WRGCN == WRCN/PDRPI/(WRCN(-1)/PDRPI(-1))

936:  WRGM9 == WRM9/PDRPI/(WRM9(-1)/PDRPI(-1))

937:  WRGT9 == WRT9/PDRPI/(WRT9(-1)/PDRPI(-1))

938:  WRGCU == WRCU/PDRPI/(WRCU(-1)/PDRPI(-1))

939:  WRGD9 == WRD9/PDRPI/(WRD9(-1)/PDRPI(-1))

940:  WRGFI == WRFI/PDRPI/(WRFI(-1)/PDRPI(-1))

941:  WRGS9 == WRS9/PDRPI/(WRS9(-1)/PDRPI(-1))

942:  WRGGC == WRGC/PDRPI/(WRGC(-1)/PDRPI(-1))

943:  WRGGA == WRGA/PDRPI/(WRGA(-1)/PDRPI(-1))

944:  PRINT == PRINT2

945:  X1 == P1

946:  X2 == P2

947:  X3 == P3

948:  X4 == P4

949:  X5 == P5

950:  X6 == P6

951:  WS98L == WS98(-1)

952:  PIL == PI(-1)
```

PARAMETER LIST:

A83.2 CONSTANT FILE FOR MODEL A83.2 OF THE ALASKAN ECONOMY. CREATED BY THE INSTITUTE OF SOCIAL AND ECONOMIC RESEARCH OF THE UNIVERSITY OF ALASKA UNDER THE MAN IN THE ARCTIC PROGRAM FUNDED BY THE NATIONAL SCIENCE FOUNDATION. REGRESSION COEFFICIENTS HAVE THE PREFIX C FOLLOWED BY A NUMBER. THIS FILE WAS CREATED MAY 1983.

CMIG1	-12.6876	CMIG2	14.1206	CMIG3	49.2216
CMIG4	0.95671	CPGQF1	0.	CPGQF10	0.0036
CPGQF11	0.0092	CPGQF12	0.0051	CPGQF13	0.0093
CPGQF14	0.0032	CPGQF15	0.0751	CPGQF2	0.0045
CPGQF3	0.0032	CPGQF4	0.0031	CPGQF5	0.004
CPGQF6	0.0238	CPGQF7	0.004	CPGQF8	0.0022
CPGQF9	0.0011	CPGQM1	0.	CPGQM10	0.0369
CPGQM11	0.0392	CPGQM12	0.0265	CPGQM13	0.0266
CPGQM14	0.0268	CPGQM15	0.0648	CPGQM2	0.0071
CPGQM3	0.0046	CPGQM4	0.0044	CPGQM5	0.0435
CPGQM6	0.0729	CPGQM7	0.0238	CPGQM8	0.0166
CPGQM9	0.0278	C1A	0.42666	C1B	0.050183
C1C	0.371052	C10A	16.9371	C10B	0.895141
C10C	6.97821	C100A	-4.35555	C100B	1.25095
C100C	-0.993033	C101A	5.58779	C101B	0.162732
C102A	4.0938	C102B	1.95194	C102C	1.68094
C102D	-0.089862	C102F	0.243258	C103A	-20.3494
C103B	15.8847	C103C	0.712195	C104A	2.28334
C104B	0.967574	C105A	1.01698	C105B	0.013219
C105C	0.73757	C106A	-19.3534	C106B	0.069511
C107A	-46.6199	C107B	0.014517	C11A	-4.74734
C11B	0.024928	C12A	7.83103	C12B	0.520103
C13A	-8.45346	C13B	0.683069	C13C	-80.
C14A	-0.885606	C14B	0.173656	C14C	-0.11048
C15A	-8.30542	C15B	0.293671	C16A	0.074055
C16B	0.000307	C16C	1.567790E-06	C16D	-0.001325
C16E	0.433666	C17A	-10.9796	C17B	0.119691
C18A	-3.66471	C18B	0.015655	C19A	-1.18305
C19B	1.03791	C2A	1.50943	C2B	0.274289
C20A	-2.68296	C20B	1.01735	C21A	0.363308
C21B	0.930152	C21C	0.042017	C22A	-0.918589
C22B	1.08552	C23A	-2.75748	C23B	1.34193
C23C	0.930092	C23D	0.430625	C24A	-3.45059
C24B	1.19903	C25A	0.468259	C25B	0.527066
C26A	-1.76919	C26B	1.00396	C26C	-0.118769
C27A	-6.66783	C27B	0.011282	C27C	-0.00875
C28A	80.1874	C28B	1.09189	C28C	3.14996
C29A	-3.76782	C29B	0.802622	C3A	2.7822
C3B	0.246103	C30A	-4.09671	C30B	1.19138
C31A	-6.94273	C31B	1.25147	C32A	-1.8791

C32B	0.663336	C33A	-5.44841	C33B	0.896499
C34A	0.197424	C34B	0.002957	C34C	-0.629312
C35A	-1.791	C35B	0.570399	C36A	-41.7079
C36B	-117.753	C36C	7.69046	C36D	0.982345
C36E	-10.3654	C36F	81.4021	C37A	-5.65507
C37B	0.66256	C38A	-189.355	C38B	1.07998
C39A	-5.90571	C39B	1.17929	C4A	-1.6632
C4B	0.672086	C40A	-10.2398	C40B	2.44783
C41A	-4.96533	C41B	0.261135	C42A	0.925213
C42B	0.171959	C43A	-4.35327	C43B	1.71165
C43C	-0.357641	C44A	16.699	C44B	0.063707
C44C	0.032434	C44D	-40.2662	C45A	9.0322
C45B	7.29399	C45C	18.7679	C45D	-21.7906
C46A	-1.82278	C46B	0.907323	C47A	-10.7859
C47B	1.80202	C48A	-4.54331	C48B	0.917921
C49A	-3.70367	C49B	0.726188	C5A	0.106732
C5B	0.596163	C50A	0.379274	C50B	0.010411
C51A	-48.4838	C51B	0.030347	C52A	3.21093
C52B	1.28862	C53A	4.7921	C53B	3.05381
C53C	3.83615	C53D	-0.272543	C53F	0.320275
C54A	20.3019	C54B	0.058467	C54C	0.201308
C54D	0.098856	C54E	11.6116	C55A	0.169745
C55B	0.978561	C55C	0.043843	C56A	-2.32004
C56B	0.949211	C57A	-1.3362	C57B	1.26857
C57C	0.042129	C58A	-18.3431	C58B	3.27405
C59A	4.64174	C59B	2.00986	C59C	2.67656
C59D	0.949676	C59E	1.43667	C59F	0.28503
C6A	-0.757478	C6B	0.648296	C60A	0.917411
C60B	0.001215	C60C	-0.630477	C61A	2.3273
C61B	1.18434	C62A	4.1444	C62B	1.5729
C62C	0.901649	C62D	0.706814	C62F	0.15724
C63A	-0.088472	C63B	0.144498	C64A	3.83502
C64B	0.204201	C64C	0.125501	C64D	-0.000633
C64E	-12.3188	C65A	-1.78308	C65B	0.771752
C66A	4.37672	C66B	1.79364	C66C	5.75206
C66D	-0.253902	C66E	-0.897404	C66F	0.148826
C67A	-0.3	C67B	0.616529	C67C	-0.060264
C68A	41.1756	C68B	-0.123466	C68C	-30.7457
C68D	0.000198	C69A	-1.99105	C69B	0.653562
C7A	0.908821	C7B	0.209675	C70A	4.5201
C70B	0.723184	C70C	1.22075	C70D	1.43879
C70F	0.177801	C71A	-4.27825	C71B	0.016818
C71C	0.148471	C71D	-0.000295	C71E	5.268135E-05
C72A	3.76867	C72B	0.011235	C72C	0.013736
C72D	0.025526	C73A	-3.01609	C73B	0.830038
C73C	-0.04871	C74A	4.5073	C74B	0.723184
C74C	1.22075	C74D	1.43879	C74F	0.177801
C75A	-2.37192	C75B	1.00465	C76A	-12.5389

C76B	0.091021	C76C	0.074783	C76D	0.083284
C76E	-0.101428	C77A	-2.35546	C77B	0.876998
C78A	4.34562	C78B	0.721975	C78C	1.69244
C78D	0.147584	C78E	0.580875	C78F	0.075217
C79A	3.8395	C79B	0.610186	C79D	0.960349
C79E	-0.914682	C79F	-0.043145	C8A	1.14384
C8B	0.455656	C80A	-50.1523	C80B	0.000242
C80C	-15.8894	C81A	-3.62853	C81B	0.982042
C82A	3.97093	C82B	1.89818	C82C	0.757899
C82D	0.604912	C82F	0.19859	C83A	-4.91663
C83C	0.139142	C83D	0.039764	C83E	3.431574E-05
C84A	-26.9112	C84B	0.046802	C84C	-0.05933
C84D	9.732653E-05	C85A	-2.2771	C85B	1.00835
C86A	3.77964	C86B	1.3643	C86C	2.78304
C86D	-0.238086	C86E	2.13938	C86F	0.229349
C87A	-2.41837	C87B	1.00842	C88A	3.89635
C88B	0.678502	C88C	9.34441	C88D	-0.243981
C88E	0.244176	C88F	0.216381	C88G	4.52672
C89A	4.2468	C9A	-0.629811	C9B	0.556154
C90A	18.0517	C90B	13.5415	C91A	-5.36404
C91B	1.24213	C92A	4.28374	C92B	2.40477
C92C	-0.23483	C92F	0.299248	C93A	-2.52615
C93B	0.965943	C94A	-2.81492	C94B	1.01315
C95A	3.9771	C95B	1.5729	C95C	0.901649
C95D	0.706814	C95F	0.15724	C96A	-2.89633
C96B	1.11355	C97A	-4.63823	C97B	1.26652
C98A	-1.02656	C98B	0.83204	C99A	-1.31799
C99B	0.817804	EXANNU	800.	EXCAPIMP	0.1432
EXCAPOLD	100.	EXEL1	1.	EXEL2	1.
EXEL3	1.	EXEL4	0.	EXEL5	0.
EXEL6	0.	EXLIM82	2500.	EXOMCOST	0.15
EXOPSIMP	7.678	EXRLOP6	0.	EXRLOP7	0.
EXRLOP8	0.	EXRL1	0.	EXRL2	0.
EXRL3	0.	EXRL4	0.	EXRL4OP	0.
EXRL5	1.	FERT10	0.0043	FERT11	0.
FERT4	0.0004	FERT5	0.0516	FERT6	0.1436
FERT7	0.12	FERT8	0.0697	FERT9	0.0223
G1	0.	G10	0.8	G11	0.8
G12	0.8	G13	0.8	G14	0.8
G15	1.	G2	0.75	G3	0.8
G4	0.8	G5	0.8	G6	0.8
G7	0.8	G8	0.8	G9	0.8
HHRF10	0.216	HHRF11	0.224	HHRF12	0.223
HHRF13	0.262	HHRF14	0.32	HHRF15	0.466
HHRF4	0.009	HHRF5	0.036	HHRF6	0.201
HHRF7	0.234	HHRF8	0.237	HHRF9	0.215
HHRM10	0.914	HHRM11	0.943	HHRM12	0.931

HHRM13	0.923	HHRM14	0.922	HHRM15	0.884
HHRM4	0.001	HHRM5	0.063	HHRM6	0.56
HHRM7	0.742	HHRM8	0.836	HHRM9	0.905
LFPART	0.78045	MDPF1	1.013	MDPF10	1.121
MDPF11	0.253	MDPF12	0.253	MDPF13	0.109
MDPF14	0.036	MDPF15	0.036	MDPF2	2.424
MDPF3	3.834	MDPF4	2.749	MDPF5	1.881
MDPF6	4.088	MDPF7	2.713	MDPF8	2.605
MDPF9	1.338	MDPM1	0.796	MDPM10	0.
MDPM11	0.	MDPM12	0.	MDPM13	0.
MDPM14	0.	MDPM15	0.	MDPM2	2.894
MDPM3	3.871	MDPM4	2.894	MDPM5	1.302
MDPM6	0.	MDPM7	0.036	MDPM8	0.
MDPM9	0.	MDTOT	25.131	MF1	0.01
MF10	0.026	MF11	0.015	MF12	0.003
MF13	0.006	MF14	0.003	MF15	0.001
MF2	0.04	MF3	0.054	MF4	0.022
MF5	0.026	MF6	0.096	MF7	0.076
MF8	0.064	MF9	0.029	MHHF10	0.015
MHHF11	0.006	MHHF12	0.008	MHHF13	0.002
MHHF14	0.002	MHHF15	0.012	MHHF5	0.006
MHHF6	0.068	MHHF7	0.102	MHHF8	0.039
MHHF9	0.028	MHHM10	0.794	MHHM11	0.206
MHHM12	0.119	MHHM13	0.038	MHHM14	0.014
MHHM15	0.006	MHHM5	0.074	MHHM6	2.165
MHHM7	3.44	MHHM8	2.802	MHHM9	1.863
MILF1	0.732	MILF10	0.816	MILF11	0.12
MILF12	0.125	MILF13	0.043	MILF14	0.019
MILF15	0.057	MILF2	2.854	MILF3	2.727
MILF4	1.718	MILF5	1.279	MILF6	3.291
MILF7	3.254	MILF8	2.379	MILF9	1.001
MILM1	0.727	MILM10	0.777	MILM11	0.178
MILM12	0.125	MILM13	0.038	MILM14	0.019
MILM15	0.015	MILM2	2.607	MILM3	2.947
MILM4	1.867	MILM5	2.481	MILM6	7.219
MILM7	4.262	MILM8	2.931	MILM9	1.846
MILRAT	1.	MM1	0.01	MM10	0.035
MM11	0.017	MM12	0.003	MM13	0.008
MM14	0.003	MM15	0.001	MM2	0.04
MM3	0.054	MM4	0.022	MM5	0.038
MM6	0.079	MM7	0.099	MM8	0.079
MM9	0.041	NCHHRF10	1.037	NCHHRF11	1.022
NFERT4	0.0003	NFERT5	0.1083	NFERT6	0.2381
NFERT7	0.1857	NFERT8	0.1188	NFERT9	0.0484
NHHRF10	0.227	NHHRF11	0.267	NHHRF12	0.267
NHHRF13	0.297	NHHRF14	0.33	NHHRF15	0.503
NHHRF4	0.	NHHRF5	0.026	NHHRF6	0.127

NHHRF7	0.188	NHHRF8	0.219	NHHRF9	0.227
NHHRM10	0.807	NHHRM11	0.864	NHHRM12	0.864
NHHRM13	0.893	NHHRM14	0.925	NHHRM15	0.888
NHHRM4	0.003	NHHRM5	0.025	NHHRM6	0.257
NHHRM7	0.539	NHHRM8	0.691	NHHRM9	0.807
NMF1	0.	NMF10	0.	NMF11	0.
NMF12	0.	NMF13	0.	NMF14	0.
NMF15	0.	NMF2	0.	NMF3	0.
NMF4	0.	NMF5	0.	NMF6	0.
NMF7	0.	NMF8	0.	NMF9	0.
NMM1	0.	NMM10	0.	NMM11	0.
NMM12	0.	NMM13	0.	NMM14	0.
NMM15	0.	NMM2	0.	NMM3	0.
NMM4	0.	NMM5	0.	NMM6	0.
NMM7	0.	NMM8	0.	NMM9	0.
NPGQF1	0.	NPGQF10	0.0029	NPGQF11	0.0092
NPGQF12	0.0112	NPGQF13	0.0128	NPGQF14	0.0103
NPGQF15	0.051	NPGQF2	0.0026	NPGQF3	0.0059
NPGQF4	0.0055	NPGQF5	0.024	NPGQF6	0.0284
NPGQF7	0.0118	NPGQF8	0.0092	NPGQF9	0.0057
NPGQM1	0.	NPGQM10	0.0288	NPGQM11	0.0258
NPGQM12	0.0181	NPGQM13	0.0233	NPGQM14	0.035
NPGQM15	0.0417	NPGQM2	0.0041	NPGQM3	0.0058
NPGQM4	0.0053	NPGQM5	0.0376	NPGQM6	0.0692
NPGQM7	0.0405	NPGQM8	0.0314	NPGQM9	0.0224
NRCF10	-0.002	NRCF11	-0.035	NRCF12	-0.035
NRCF13	-0.028	NRCF14	-0.061	NRCF15	0.033
NRCF4	0.	NRCF5	0.	NRCF6	0.064
NRCF7	0.072	NRCF8	0.028	NRCF9	-0.002
NRCM10	0.12	NRCM11	0.076	NRCM12	0.076
NRCM13	0.016	NRCM14	-0.016	NRCM15	0.05
NRCM4	0.	NRCM5	0.	NRCM6	0.108
NRCM7	0.187	NRCM8	0.186	NRCM9	0.12
NSEXDIV	0.513	NSF1	0.99891	NSF10	0.99366
NSF11	0.99733	NSF12	0.9871	NSF13	0.987
NSF14	0.984	NSF15	0.9689	NSF2	0.99891
NSF3	0.99945	NSF4	0.99972	NSF5	0.99684
NSF6	0.9971	NSF7	0.99639	NSF8	0.99611
NSF9	0.99558	NSM1	0.99864	NSM10	0.99018
NSM11	0.99413	NSM12	0.9892	NSM13	0.9788
NSM14	0.9665	NSM15	0.9368	NSM2	0.99864
NSM3	0.99922	NSM4	0.99868	NSM5	0.9933
NSM6	0.99	NSM7	0.9914	NSM8	0.99566
NSM9	0.9899	NSURINFF	1.	NSURINFM	1.
NTP	40.	OEMF1	-0.1077	OEMF10	-0.0726
OEMF11	-0.0449	OEMF12	-0.0709	OEMF13	-0.0441
OEMF14	-0.096	OEMF15	-0.0141	OEMF2	-0.1077
OEMF3	-0.1076	OEMF4	-0.0517	OEMF5	-0.051

OEMF6	-0.0452	OEMF7	-0.0879	OEMF8	-0.0742
OEMF9	-0.0656	OEMM1	-0.1017	OEMM10	-0.0638
OEMM11	-0.0326	OEMM12	-0.0561	OEMM13	-0.0507
OEMM14	-0.0178	OEMM15	-0.0178	OEMM2	-0.1017
OEMM3	-0.1037	OEMM4	-0.0479	OEMM5	-0.0498
OEMM6	-0.0533	OEMM7	-0.0998	OEMM8	-0.0977
OEMM9	-0.0935	PADJ	1.5	PAD1	0.7
PAD2	0.082	PARLVFV	0.919	PARNONGF	0.2
PBLTBL	0.13	PCINDA	0.1	PCIVPY	0.65
PCNCSV	0.5	PCNCSV1	1.	PCNCWS	0.25
PCNC4	0.	PCWS1	0.9	PCYNA1	1.01545
PC12N	0.922	PC12RN	0.833	PC13C	-55.
PC39A	0.5	PC39B	0.003	PDRPIBAS	364.23
PECIG	0.625	PERNA1	0.	PERNA2	0.005
PERNA3	1.	PESLT	0.4	PESLTC	0.1
PFISH1	0.97	PIDIST	0.	PNTGR	0.02
POPMGQ	9.443	PRINT2	0.	PTOURB	-4.75
PTOURD	0.4	PTOURE	1.	PTOURS	0.4
PTOURT	0.2	PTRTS	0.02	PWRBASE	5473.
P1	0.	P2	0.	P3	0.
P4	1.	P5	1.	P6	1.
RCF10	0.009	RCF11	0.008	RCF12	0.009
RCF13	0.007	RCF14	-0.051	RCF15	0.097
RCF4	0.	RCF5	0.	RCF6	-0.008
RCF7	0.026	RCF8	0.01	RCF9	0.01
RCM10	0.013	RCM11	-0.003	RCM12	0.009
RCM13	-0.014	RCM14	-0.013	RCM15	0.054
RCM4	0.	RCM5	0.	RCM6	-0.195
RCM7	-0.016	RCM8	0.041	RCM9	0.022
ROR	0.02	RORANGRO	0.08	RORCPDEP	0.03
RORCRF	0.08	RORDISK	0.02	RORNC	0.07
RORPDF	0.	RORPPF	0.01	SEXDIV	0.518
SF1	0.99933	SF10	0.99829	SF11	0.99726
SF12	0.99646	SF13	0.99211	SF14	0.9897
SF15	0.9659	SF2	0.99933	SF3	0.99993
SF4	0.99992	SF5	0.99958	SF6	0.9995
SF7	0.99935	SF8	0.99923	SF9	0.99896
SM1	0.99913	SM10	0.996	SM11	0.99501
SM12	0.99224	SM13	0.98708	SM14	0.97938
SM15	0.93795	SM2	0.99913	SM3	0.99986
SM4	0.99957	SM5	0.99864	SM6	0.99762
SM7	0.99748	SM8	0.99746	SM9	0.99812
SURINFF	1.	SURINFM	1.	TP	30.

APPENDIX H

ISER MAP ALASKA ECONOMIC MODEL

STOCHASTIC EQUATIONS FOR
ECONOMIC AND FISCAL MODULES

Institute of Social
and Economic Research
MAP Documentation
May 1983

APPENDIX H
ISER MAP ALASKA ECONOMIC MODEL

This appendix shows the coefficients and regression statistics for each stochastic equation in the economic and fiscal modules of the ISER MAP Alaska Economic Model (version A83.2).

Each equation is first printed, followed by the summary statistics and, finally, the coefficient values. Abbreviations have the following notations:

NOB	Number of observations
NOVAR	Number of variables
RANGE	Range of observations
RSQ	R squared
CRSQ	Corrected R squared
F(i/j)	F test
SER	Standard error of regression
DW(i)	Durbin Watsin test
COND(x)	Condition number of x matrix (for monitoring least squares solution algorithm)
SSR	Sum of squared residuals
COEF	Coefficient value
ST ER	Standard error of coefficient
T-STAT	T Statistic

```
4:  PDRATIO = PDRATIO(-1)+C67A*(EMSP-EMSP(-1))/EMSP(-1)+C67B*(EMCNX1/
EM98(-1))+C67C*D80


NOB = 19      NOVAR = 3
RANGE =  1962 TO 1980
RSQ =   0.92621      CRSQ =    0.91699      F(2/16) =   100.420
SER =   0.0153       SSR = 3.738E-03        DW(0) =  1.64      COND(X) =
    2.21


COEF              VALUE            ST ER           T-STAT

C67A            -0.10202          0.04678        -2.18088
C67B             0.61653          0.15164         4.06577
C67C            -0.06026          0.01532        -3.93418




7:  PDCON = C107A+C107B*WRCNNP


NOB = 20      NOVAR = 2
RANGE =  1961 TO 1980
RSQ =   0.99987      CRSQ =    0.99987      F(1/18) =  1.43E+05
SER =   1.5924       SSR =     45.646       DW(0) =  0.97      COND(X) =
    4.95


COEF              VALUE            ST ER           T-STAT

C107A          -46.61990          0.91687       -50.84700
C107B            0.01452      3.84526E-05       377.53600




15:  LOG(FAGI) = C21A+C21B*LOG(PI8)+C21C*LOG(EMCNX1+EMP9)


NOB = 16      NOVAR = 3
RANGE =  1961 TO 1976
RSQ =   0.99827      CRSQ =    0.998        F(2/13) =  3741.180
SER =   0.0275       SSR = 9.815E-03        DW(0) =  1.55      COND(X) =
   72.63


COEF              VALUE            ST ER           T-STAT

C21A             0.36331          0.20550         1.76795
C21B             0.93015          0.03099        30.01790
C21C             0.04202          0.02088         2.01253
```

16 : LOG(FAGII) = C22A+C22B*LOG(FI)

NOB = 20 NOVAR = 2
RANGE = 1961 TO 1980
RSQ = 0.998 CRSQ = 0.99789 F(1/18) = 8969.980
SER = 0.0368 SSR = 2.443E-02 DW(0) = 2.43 COND(X) = 20.65

COEF	VALUE	ST ER	T-STAT
C22A	-0.91859	0.08523	-10.77750
C22B	1.08552	0.01146	94.70880

19 : AEX*1000 = C10A+C10B*POPC+C10C*(EMCNX1+EMP9)

NOB = 16 NOVAR = 3
RANGE = 1961 TO 1976
RSQ = 0.97065 CRSQ = 0.96614 F(2/13) = 214.994
SER = 16.2836 SSR = 3447.010 DW(0) = 2.19 COND(X) = 20.95

COEF	VALUE	ST ER	T-STAT
C10A	16.93710	34.72310	0.48777
C10B	0.89514	0.14540	6.15625
C10C	6.97821	1.33067	5.24415

20 : ATT = C28A+C28B*(EM99-EMGM)+C28C*EMCNX1

NOB = 19 NOVAR = 3
RANGE = 1961 TO 1979
RSQ = 0.99476 CRSQ = 0.9941 F(2/16) = 1518.330
SER = 4.5696 SSR = 334.103 DW(0) = 2.81 COND(X) = 7.27

COEF	VALUE	ST ER	T-STAT
C28A	80.18740	3.35025	23.93470
C28B	1.09189	0.03070	35.56360
C28C	3.14996	0.27770	11.34320

21: LOG(ATD/ATT) = C23A+C23B*LOG(AGI/ATT)+C23C*D69+C23D*D72

```
NOB = 16       NOVAR = 4
RANGE =  1961 TO 1976
RSQ =    0.94457      CRSQ =    0.93072      F(3/12) =     68.169
SER =    0.1680       SSR =      0.339       DW(0) =  1.50      COND(X) =
     9.20
```

COEF	VALUE	ST ER	T-STAT
C23A	-2.75748	0.18568	-14.85040
C23B	1.34193	0.10579	12.68440
C23C	0.93009	0.17391	5.34818
C23D	0.43063	0.17515	2.45858

26: LOG(RTISCA2) = C24A+C24B*LOG(ATI.TT)

```
NOB = 16       NOVAR = 2
RANGE =  1961 TO 1976
RSQ =    0.97107      CRSQ =    0.969        F(1/14) =    469.867
SER =    0.0985       SSR =      0.136       DW(0) =  1.57      COND(X) =
     6.20
```

COEF	VALUE	ST ER	T-STAT
C24A	-3.45059	0.07834	-44.04770
C24B	1.19903	0.05532	21.67630

30: RTIS = IF YR EQ 1980 THEN 0 ELSE C25A*RTISC(-1)+C25B*RTISC

```
NOB = 19       NOVAR = 2
RANGE =  1961 TO 1979
RSQ =    0.97803      CRSQ =    0.97674      F(1/17) =    756.726
SER =    8.8000       SSR =  1316.490       DW(0) =  2.34      COND(X) =
     7.19
```

COEF	VALUE	ST ER	T-STAT
C25A	0.46826	0.09575	4.89051
C25B	0.52707	0.08996	5.85858

31: RTISCF = C105A+C105B*FI8+C105C*RTISC

NOB = 20 NOVAR = 3
RANGE = 1961 TO 1980
RSQ = 0.99238 CRSQ = 0.99148 F(2/17) = 1106.550
SER = 5.7689 SSR = 565.767 DW(0) = 2.45 COND(X) = 5.40

COEF	VALUE	ST ER	T-STAT
C105A	1.01698	2.18267	0.46593
C105B	0.01322	0.00119	11.07110
C105C	0.73757	0.03581	20.59760

32: LOG(RTPIF/ATT) = C26A+C26B*LOG(FAGII/ATT+TCRED/1000/ATT+RTISLOS/ATT)+C26C*D61.68*LOG(FAGII/ATT+TCRED/1000/ATT+RTISLOS/ATT)

NOB = 19 NOVAR = 3
RANGE = 1961 TO 1979
RSQ = 0.99351 CRSQ = 0.9927 F(2/16) = 1225.390
SER = 0.0499 SSR = 3.986E-02 DW(0) = 1.57 COND(X) = 14.47

COEF	VALUE	ST ER	T-STAT
C26A	-1.76919	0.08018	-22.06600
C26B	1.00396	0.03795	26.45370
C26C	-0.11877	0.03094	-3.83920

33: DPIRES = C27A+C27B*PI3+C27C*WSCNP

NOB = 20 NOVAR = 3
RANGE = 1961 TO 1980
RSQ = 0.97549 CRSQ = 0.97261 F(2/17) = 338.350
SER = 2.5946 SSR = 114.447 DW(0) = 1.26 COND(X) = 3.

COEF	VALUE	ST ER	T-STAT
C27A	-6.05350	1.01043	-5.99103
C27B	0.01107	4.32765E-04	25.58420
C27C	-0.00870	0.00239	-3.63518

34 : LOG(BL) = C39A+C39B*LOG(XX98-XXP9)

NOB = 17 NOVAR = 2
RANGE = 1961 TO 1977
RSQ = 0.97163 CRSQ = 0.96974 F(1/15) = 513.808
SER = 0.0722 SSR = 7.817E-02 DW(0) = 0.85 COND(X) = 4'

COEF	VALUE	ST ER	T-STAT
C39A	-6.96721	0.42986	-16.20800
C39B	1.32915	0.05864	22.66700

35 : LOG(GR) = C40A+C40B*LOG(XX98)

NOB = 17 NOVAR = 2
RANGE = 1961 TO 1977
RSQ = 0.9871 CRSQ = 0.98624 F(1/15) = 1147.740
SER = 0.1018 SSR = 0.155 DW(0) = 1.33 COND(X) = 48

COEF	VALUE	ST ER	T-STAT
C40A	-12.50600	0.60181	-20.78070
C40B	2.76494	0.08161	33.87790

38 : LOG(RTBS2*10**3/BL(-1)) = C29A+C29B*LOG(GTR(-1)*10**3/BL(-1))

NOB = 16 NOVAR = 2
RANGE = 1962 TO 1977
RSQ = 0.88051 CRSQ = 0.87198 F(1/14) = 103.166
SER = 0.1492 SSR = 0.311 DW(0) = 1.50 COND(X) =
50.09

COEF	VALUE	ST ER	T-STAT
C29A	-3.76782	0.93422	-4.03314
C29B	0.80262	0.07902	10.15700

40 : LOG(RTCS1*100/PDRPI) = C43A+C43C*D64.65+C43B*LOG(EMP9(-1)+EMCN(-1)+EMM9(-1)+EMT9(-1)+EMCM(-1)+EMPU(-1))

NOB = 20 NOVAR = 3
RANGE = 1962 TO 1981
RSQ = 0.96592 CRSQ = 0.96191 F(2/17) = 240.894
SER = 0.1507 SSR = 0.386 DW(0) = 1.65 COND(X) = 18.94

COEF	VALUE	ST ER	T-STAT
C43A	-4.35327	0.31079	-14.00690
C43C	-0.35764	0.12116	-2.95191
C43B	1.71165	0.08980	19.06040

42 : TPTV = C38A+C38B*POP

NOB = 19 NOVAR = 2
RANGE = 1961 TO 1979
RSQ = 0.97676 CRSQ = 0.97539 F(1/17) = 714.451
SER = 10.4952 SSR = 1872.550 DW(0) = 1.12 COND(X) = 10.73

COEF	VALUE	ST ER	T-STAT
C38A	-189.35500	13.03360	-14.52820
C38B	1.07998	0.04040	26.72920

43: LOG(AHG) = C37A+C37B*LOG(PR.PI)

NOB = 11 NOVAR = 2
RANGE = 1966 TO 1976
RSQ = 0.7315 CRSQ = 0.70166 F(1/9) = 24.519
SER = 0.0829 SSR = 6.186E-02 DW(0) = 1.51 COND(X) = 86.02

COEF	VALUE	ST ER	T-STAT
C37A	-5.65507	1.07530	-5.25904
C37B	0.66256	0.13381	4.95165

45: LOG(RTMF) = C46A+C46B*LOG(THG)

NOB = 11 NOVAR = 2
RANGE = 1966 TO 1976
RSQ = 0.98679 CRSQ = 0.98532 F(1/9) = 672.222
SER = 0.0479 SSR = 2.061E-02 DW(0) = 0.86 COND(X) = 22.67

COEF	VALUE	ST ER	T-STAT
C46A	-1.82278	0.16384	-11.12510
C46B	0.90732	0.03500	25.92720

46: LOG(RTVS) = C47A+C47B*LOG(R.DPI8N(-1))

NOB = 19 NOVAR = 2
RANGE = 1962 TO 1980
RSQ = 0.97077 CRSQ = 0.96905 F(1/17) = 564.507
SER = 0.1373 SSR = 0.320 DW(0) = 0.55 COND(X) = 32.26

COEF	VALUE	ST ER	T-STAT
C47A	-10.78590	0.50842	-21.21440
C47B	1.80202	0.07584	23.75930

47: LOG(RTAS) = C48A+C48B*LOG(R.DPI(-1))

NOB = 19 NOVAR = 2
RANGE = 1962 TO 1980
RSQ = 0.98924 CRSQ = 0.98861 F(1/17) = 1563.080
SER = 0.0422 SSR = 3.024E-02 DW(0) = 1.35 COND(X) = 31.86

COEF	VALUE	ST ER	T-STAT
C48A	-4.54331	0.15432	-29.44060
C48B	0.91792	0.02322	39.53530

48 : LOG(RTCIS) = C49A+C49B*LOG(R.DPI(-1))

NOB = 19 NOVAR = 2
RANGE = 1962 TO 1980
RSQ = 0.98 CRSQ = 0.97882 F(1/17) = 832.910
SER = 0.0457 SSR = 3.552E-02 DW(0) = 2.39 COND(X) = 31.86

COEF	VALUE	ST ER	T-STAT
C49A	-3.70367	0.16725	-22.14490
C49B	0.72619	0.02516	28.85990

49 : RTSS = IF YR GT 1980 THEN 0 ELSE C50A+C50B*(EM99-EMGM)

NOB = 19 NOVAR = 2
RANGE = 1962 TO 1980
RSQ = 0.97716 CRSQ = 0.97582 F(1/17) = 727.364
SER = 0.1108 SSR = 0.209 DW(0) = 1.29 COND(X) = 5.62

COEF	VALUE	ST ER	T-STAT
C50A	-0.31682	0.07375	-4.29562
C50B	0.01545	5.72778E-04	26.96970

52 : LOG(ROFAS) = C30A+C30B*LOG(TPTV(-1))

NOB = 19 NOVAR = 2
RANGE = 1962 TO 1980
RSQ = 0.96111 CRSQ = 0.95882 F(1/17) = 420.083
SER = 0.1060 SSR = 0.191 DW(0) = 1.10 COND(X) = 23.67

COEF	VALUE	ST ER	T-STAT
C30A	-4.09671	0.28830	-14.20960
C30B	1.19138	0.05813	20.49580

53 : LOG(ROFOS) = C33A+C33B*LOG(PI3(-1))

NOB = 19 NOVAR = 2
RANGE = 1962 TO 1980
RSQ = 0.98893 CRSQ = 0.98828 F(1/17) = 1519.150
SER = 0.0651 SSR = 7.199E-02 DW(0) = 1.73 COND(X) = 22.57

COEF	VALUE	ST ER	T-STAT
C33A	-5.44841	0.16877	-32.28220
C33B	0.89650	0.02300	38.97610

56 : LOG(RMIS) = C35A+C35B*LOG(PI3(-1))

NOB = 17 NOVAR = 2
RANGE = 1962 TO 1964, 1968 TO 1981
RSQ = 0.59386 CRSQ = 0.56678 F(1/15) = 21.933
SER = 0.3427 SSR = 1.761 DW(1) = 0.93 COND(X) = 21

COEF	VALUE	ST ER	T-STAT
C35A	-1.79100	0.91547	-1.95638
C35B	0.57040	0.12180	4.68325

72 : LOG(RSFFS) = C58A+C58B*LOG(POP(-1))

NOB = 18 NOVAR = 2
RANGE = 1963 TO 1980
RSQ = 0.9391 CRSQ = 0.93529 F(1/16) = 246.718
SER = 0.1580 SSR = 0.399 DW(0) = 0.98 COND(X) = 64.47

COEF	VALUE	ST ER	T-STAT
C58A	-18.34310	1.20056	-15.27880
C58B	3.27405	0.20844	15.70730

95: LOG(EXJUS4) = C20A+C20B*LOG(EXOPS)

NOB = 20 NOVAR = 2
RANGE = 1962 TO 1981
RSQ = 0.99519 CRSQ = 0.99493 F(1/18) = 3726.980
SER = 0.0713 SSR = 9.162E-02 DW(0) = 1.14 COND(X) = 12.06

COEF	VALUE	ST ER	T-STAT
C20A	-2.68296	0.09689	-27.69200
C20B	1.01735	0.01666	61.04880

96: LOG(EXPPS4) = C91A+C91B*LOG(EXOPS)

NOB = 20 NOVAR = 2
RANGE = 1962 TO 1981
RSQ = 0.98271 CRSQ = 0.98175 F(1/18) = 1023.320
SER = 0.1662 SSR = 0.497 DW(0) = 1.05 COND(X) = 12.06

COEF	VALUE	ST ER	T-STAT
C91A	-5.36404	0.22575	-23.76100
C91B	1.24213	0.03883	31.98930

97: LOG(EXNRS4) = C93A+C93B*LOG(EXOPS)

NOB = 20 NOVAR = 2
RANGE = 1962 TO 1981
RSQ = 0.99079 CRSQ = 0.99028 F(1/18) = 1936.610
SER = 0.0940 SSR = 0.159 DW(0) = 0.81 COND(X) = 12.06

COEF	VALUE	ST ER	T-STAT
C93A	-2.52615	0.12761	-19.79540
C93B	0.96594	0.02195	44.00690

```
98:  LOG(EXHES4) = C94A+C94B*LOG(EXOPS)


NOB = 20      NOVAR = 2
RANGE =  1962 TO 1981
RSQ =    0.97559      CRSQ =    0.97423      F(1/18) =    719.325
SER =    0.1617       SSR =      0.471       DW(0) =  0.45      COND(X) =
   12.06


COEF             VALUE             ST ER           T-STAT

C94A           -2.81492          0.21962        -12.81710
C94B            1.01315          0.03778         26.82020



99:  LOG(EXSSS4) = C96A+C96B*LOG(EXOPS)


NOB = 20      NOVAR = 2
RANGE =  1962 TO 1981
RSQ =    0.98987      CRSQ =    0.9893       F(1/18) =   1758.210
SER =    0.1137       SSR =      0.233       DW(0) =  1.07      COND(X) =
   12.06


COEF             VALUE             ST ER           T-STAT

C96A           -2.89633          0.15440        -18.75900
C96B            1.11355          0.02656         41.93110



100:  LOG(EXEDS4) = C19A+C19B*LOG(EXOPS)


NOB = 20      NOVAR = 2
RANGE =  1962 TO 1981
RSQ =    0.99519      CRSQ =    0.99492      F(1/18) =   3721.010
SER =    0.0728       SSR = 9.551E-02        DW(0) =  1.12      COND(X) =
   12.06


COEF             VALUE             ST ER           T-STAT

C19A           -1.18305          0.09892        -11.95930
C19B            1.03791          0.01701         60.99980
```

101: LOG(EXCDS4) = C97A+C97B*LOG(EXOPS)

NOB = 20 NOVAR = 2
RANGE = 1962 TO 1981
RSQ = 0.98103 CRSQ = 0.97997 F(1/18) = 930.686
SER = 0.1777 SSR = 0.569 DW(0) = 1.50 COND(X) = 12.06

COEF	VALUE	ST ER	T-STAT
C97A	-4.63823	0.24137	-19.21660
C97B	1.26652	0.04152	30.50710

102: LOG(EXTRS4) = C98A+C98B*LOG(EXOPS)

NOB = 20 NOVAR = 2
RANGE = 1962 TO 1981
RSQ = 0.99756 CRSQ = 0.99743 F(1/18) = 7372.610
SER = 0.0415 SSR = 3.098E-02 DW(0) = 1.37 COND(X) = 12.06

COEF	VALUE	ST ER	T-STAT
C98A	-1.02656	0.05634	-18.22140
C98B	0.83204	0.00969	85.86340

103: LOG(EXGGS4) = C99A+C99B*LOG(EXOPS)

NOB = 20 NOVAR = 2
RANGE = 1962 TO 1981
RSQ = 0.91646 CRSQ = 0.91182 F(1/18) = 197.461
SER = 0.2492 SSR = 1.117 DW(0) = 1.73 COND(X) = 12.06

COEF	VALUE	ST ER	T-STAT
C99A	-1.31799	0.33836	-3.89527
C99B	0.81780	0.05820	14.05200

120: EXPRCDS = C7A+C7B*EXCDSNT

NOB = 20 NOVAR = 2
RANGE = 1962 TO 1981
RSQ = 0.84914 CRSQ = 0.84076 F(1/18) = 101.318
SER = 1.0883 SSR = 21.320 DW(0) = 1.05 COND(X) = 1.96

COEF	VALUE	ST ER	T-STAT
C7A	0.90882	0.30060	3.02337
C7B	0.20968	0.02083	10.06570

121: EXPREDS1 = C1A+C1B*EXEDSNT+C1C*D61.75*EXEDSNT

NOB = 17 NOVAR = 3
RANGE = 1965 TO 1981
RSQ = 0.98143 CRSQ = 0.97878 F(2/14) = 369.990
SER = 1.5340 SSR = 32.945 DW(0) = 1.80 COND(X) = 4.64

COEF	VALUE	ST ER	T-STAT
C1A	0.42666	0.89349	0.47752
C1B	0.05018	0.00503	9.97479
C1C	0.37105	0.01375	26.98410

122: EXPRSSS = C2A+C2B*EXSSS

NOB = 20 NOVAR = 2
RANGE = 1962 TO 1981
RSQ = 0.97794 CRSQ = 0.97671 F(1/18) = 797.781
SER = 2.0905 SSR = 78.666 DW(0) = 0.74 COND(X) = 2.62

COEF	VALUE	ST ER	T-STAT
C2A	1.50943	0.70182	2.15075
C2B	0.27429	0.00971	28.24500

```
123:  EXPRUA = C32A+C32B*EXUA


NOB = 11      NOVAR = 2
RANGE =  1971 TO 1981
RSQ =    0.96844     CRSQ =    0.96493     F(1/9) =    276.161
SER =    6.8793      SSR =    425.920      DW(0) =  1.40      COND(X) =
    3.61


COEF              VALUE             ST ER             T-STAT

C32A            -1.87910          4.03380           -0.46584
C32B             0.66334          0.03992           16.61810


124:  EXPRHES = C3A+C3B*EXHES


NOB = 20      NOVAR = 2
RANGE =  1962 TO 1981
RSQ =    0.96456     CRSQ =    0.96259     F(1/18) =    489.935
SER =    1.6653      SSR =     49.918      DW(0) =  1.05      COND(X) =
    2.37


COEF              VALUE             ST ER             T-STAT

C3A              2.78220          0.51996            5.35074
C3B              0.24610          0.01112           22.13450


125:  EXPRNRS = C4A+C4B*EXNRS


NOB = 20      NOVAR = 2
RANGE =  1962 TO 1981
RSQ =    0.99589     CRSQ =    0.99567     F(1/18) =   4366.430
SER =    1.2941      SSR =     30.143      DW(0) =  0.75      COND(X) =
    2.57


COEF              VALUE             ST ER             T-STAT

C4A             -1.66320          0.42822           -3.88402
C4B              0.67209          0.01017           66.07890
```

126: EXPRPPS = C5A+C5B*EXPPS

NOB = 20 NOVAR = 2
RANGE = 1962 TO 1981
RSQ = 0.99484 CRSQ = 0.99455 F(1/18) = 3471.220
SER = 0.4924 SSR = 4.363 DW(0) = 1.51 COND(X) = 2.41

COEF	VALUE	ST ER	T-STAT
C5A	0.10673	0.15566	0.68568
C5B	0.59616	0.01012	58.91700

127: EXPRGGS = C8A+C8B*EXGGS

NOB = 20 NOVAR = 2
RANGE = 1962 TO 1981
RSQ = 0.95541 CRSQ = 0.95293 F(1/18) = 385.656
SER = 3.5722 SSR = 229.688 DW(0) = 0.87 COND(X) = 2.73

COEF	VALUE	ST ER	T-STAT
C8A	1.14384	1.23748	0.92433
C8B	0.45566	0.02320	19.63810

128: EXPRJUS = C6A+C6B*EXJUS

NOB = 20 NOVAR = 2
RANGE = 1962 TO 1981
RSQ = 0.99766 CRSQ = 0.99753 F(1/18) = 7683.690
SER = 1.0478 SSR = 19.763 DW(0) = 0.62 COND(X) = 2.66

COEF	VALUE	ST ER	T-STAT
C6A	-0.75748	0.35603	-2.12758
C6B	0.64830	0.00740	87.65660

129: EXPRTRS = C9A+C9B*EXTRS

NOB = 20   NOVAR = 2
RANGE = 1962 TO 1981
RSQ = 0.99855   CRSQ = 0.99847   F(1/18) = 1.24E+04
SER = 0.9717   SSR = 16.995   DW(0) = 0.85   COND(X) = 2.97

COEF	VALUE	ST ER	T-STAT
C9A	-0.62981	0.35909	-1.75393
C9B	0.55615	0.00499	111.37100

132: LOG(WSGS) = C55A+C55B*LOG(WSGSFY)+C55C*D75

NOB = 16   NOVAR = 3
RANGE = 1965 TO 1980
RSQ = 0.99791   CRSQ = 0.99759   F(2/13) = 3104.200
SER = 0.0335   SSR = 1.456E-02   DW(0) = 2.17   COND(X) = 15.49

COEF	VALUE	ST ER	T-STAT
C55A	0.16975	0.06303	2.69326
C55B	0.97856	0.01264	77.39190
C55C	0.04384	0.03509	1.24937

134: EXINREC = C17A+C17B*(EXOPS-RLT99)

NOB = 11   NOVAR = 2
RANGE = 1971 TO 1981
RSQ = 0.87016   CRSQ = 0.85573   F(1/9) = 60.316
SER = 14.4962   SSR = 1891.270   DW(0) = 1.88   COND(X) = 4.21

COEF	VALUE	ST ER	T-STAT
C17A	-10.97960	9.71360	-1.13033
C17B	0.11969	0.01541	7.76636

146 : XXVHY = C41A+C41B*(EXHYCAP+EXHYCAP(-1))

NOB = 12   NOVAR = 2
RANGE = 1964 TO 1975
RSQ =   0.78763   CRSQ =   0.7664   F(1/10) =   37.088
SER =   5.8369   SSR =   340.691   DW(0) = 1.47   COND(X) =
    6.91

COEF	VALUE	ST ER	T-STAT
C41A	-4.96533	5.94174	-0.83567
C41B	0.26113	0.04288	6.08998

147 : XXVNHY = C42A+C42B*(EXNHYCP(-1)+EXSPCAP(-1)-EXCAPFR(-2)+EXNHYCP+
EXSPCAP-EXCAPFR(-1))

NOB = 11   NOVAR = 2
RANGE = 1965 TO 1975
RSQ =   0.86994   CRSQ =   0.85549   F(1/9) =   60.201
SER =   3.5535   SSR =   113.646   DW(0) = 1.94   COND(X) =
    3.69

COEF	VALUE	ST ER	T-STAT
C42A	0.92521	2.11974	0.43648
C42B	0.17196	0.02216	7.75893

177 : LOG(LPTB1) = C57A+C57B*LOG(PI3(-1))+C57C*D71.00

NOB = 19   NOVAR = 3
RANGE = 1963 TO 1981
RSQ =   0.9973   CRSQ =   0.99696   F(2/16) =   2954.450
SER =   0.0490   SSR = 3.844E-02   DW(0) = 2.40   COND(X) =
   45.64

COEF	VALUE	ST ER	T-STAT
C57A	-1.33620	0.20928	-6.38484
C57B	1.26857	0.03084	41.13980
C57C	0.04213	0.04169	1.01042

184 : RLPT1 = C18A+C18B*LPTB

```
NOB = 19       NOVAR = 2
RANGE =  1963 TO 1981
RSQ =    0.99145     CRSQ =    0.99095     F(1/17) =   1971.900
SER =    6.1860      SSR =    650.535      DW(0) =   1.50      COND(X) =
    2.73
```

COEF	VALUE	ST ER	T-STAT
C18A	-3.66471	2.19556	-1.66914
C18B	0.01566	3.52547E-04	44.40600

186 : LOG(RLOT*1000/POP(-1)) = C31A+C31B*LOG(PI(-1)*1000/POP(-1))

```
NOB = 20       NOVAR = 2
RANGE =  1962 TO 1981
RSQ =    0.98831     CRSQ =    0.98767     F(1/18) =   1522.330
SER =    0.0752      SSR =      0.102      DW(0) =   1.74      COND(X) =
   32.26
```

COEF	VALUE	ST ER	T-STAT
C31A	-6.82373	0.27159	-25.12500
C31B	1.23627	0.03169	39.01640

188 : RLTVS4 = C63A+C63B*RTVS

```
NOB = 20       NOVAR = 2
RANGE =  1962 TO 1981
RSQ =    0.85998     CRSQ =    0.85221     F(1/18) =    110.557
SER =    0.2441      SSR =      1.073      DW(0) =   2.39      COND(X) =
    2.92
```

COEF	VALUE	ST ER	T-STAT
C63A	-0.08847	0.08911	-0.99289
C63B	0.14450	0.01374	10.51460

199 : RLTEF4 = C36A+C36F*D81.00+D71.00*C36B+BIU*C36C+C36D*ADMSD

NOB = 19 NOVAR = 5
RANGE = 1963 TO 1981
RSQ = 0.9957 CRSQ = 0.99448 F(4/14) = 811.379
SER = 5.1635 SSR = 373.270 DW(0) = 2.37 COND(X) =
33.96

COEF	VALUE	ST ER	T-STAT
C36A	-41.70790	13.12910	-3.17675
C36F	81.40210	7.04958	11.54710
C36B	-117.75300	9.80848	-12.00520
C36C	7.69046	0.40097	19.17960
C36D	0.98234	0.20856	4.71003

216 : ELED1 = C11A+C11B*PI3(-1)

NOB = 17 NOVAR = 2
RANGE = 1965 TO 1981
RSQ = 0.8627 CRSQ = 0.85354 F(1/15) = 94.246
SER = 14.7509 SSR = 3263.850 DW(0) = 2.34 COND(X) =
3.52

COEF	VALUE	ST ER	T-STAT
C11A	-4.74734	6.80070	-0.69807
C11B	0.02493	0.00257	9.70803

218: ELBD = C14A+C14C*D61.77*GOBONDL(-1)+C14B*GOBONDL(-1)

NOB = 12 NOVAR = 3
RANGE = 1970 TO 1981
RSQ = 0.96021 CRSQ = 0.95137 F(2/9) = 108.607
SER = 11.4753 SSR = 1185.150 DW(0) = 2.52 COND(X) = 6.68

COEF	VALUE	ST ER	T-STAT
C14A	-0.88561	11.03360	-0.08026
C14C	-0.11048	0.02727	-4.05157
C14B	0.17366	0.01804	9.62580

219: ELNED1/PDRPI = C16A+C16E*D81.00+C16D*R.DPI8N(-1)+C16B*D71.00*R.DPI8N(-1)+C16C*WEALTH(-1)*POP(-1)

NOB = 17 NOVAR = 5
RANGE = 1965 TO 1981
RSQ = 0.98777 CRSQ = 0.98369 F(4/12) = 242.263
SER = 0.0559 SSR = 3.748E-02 DW(0) = 2.37 COND(X) = 69.85

COEF	VALUE	ST ER	T-STAT
C16A	0.07405	0.08404	0.88121
C16E	0.43367	0.06199	6.99545
C16D	-0.00132	3.58569E-04	-3.69483
C16B	3.07177E-04	7.31536E-05	4.19908
C16C	1.56779E-06	2.67099E-07	5.86969

225: ELEDCP = C15A+C15B*ELED

NOB = 20 NOVAR = 2
RANGE = 1962 TO 1981
RSQ = 0.82638 CRSQ = 0.81674 F(1/18) = 85.675
SER = 16.3857 SSR = 4832.850 DW(0) = 1.13 COND(X) =
2.79

COEF	VALUE	ST ER	T-STAT
C15A	-8.30542	5.77502	-1.43816
C15B	0.29367	0.03173	9.25607

226: ELPERS = C12A+C12B*(EL99-ELEDCP-ELBD)

NOB = 20 NOVAR = 2
RANGE = 1962 TO 1981
RSQ = 0.98926 CRSQ = 0.98866 F(1/18) = 1657.480
SER = 13.2365 SSR = 3153.680 DW(0) = 2.91 COND(X) =
2.61

COEF	VALUE	ST ER	T-STAT
C12A	7.83103	4.42589	1.76937
C12B	0.52010	0.01278	40.71210

227: WSGL = C13A+C13C*D81.00+C13B*(ELPERS+ELPERS(-1))

NOB = 18 NOVAR = 3
RANGE = 1963 TO 1980
RSQ = 0.99238 CRSQ = 0.99136 F(2/15) = 976.625
SER = 13.0148 SSR = 2540.770 DW(0) = 1.82 COND(X) =
1.0E+75

COEF	VALUE	ST ER	T-STAT
C13A	-8.31784	4.89396	-1.69961
C13C	0.00000	0.00000	0.00000
C13B	0.68222	0.01544	44.19560

232: PIDIR = C51A+C51B*(DPI+DPI(-1)+DPI(-2)+DPI(-3)+DPI(-4))

NOB = 16 NOVAR = 2
RANGE = 1965 TO 1980
RSQ = 0.9903 CRSQ = 0.98961 F(1/14) = 1429.870
SER = 15.8473 SSR = 3515.920 DW(0) = 1.03 COND(X) = 3.59

COEF	VALUE	ST ER	T-STAT
C51A	-48.48380	7.66457	-6.32570
C51B	0.03035	8.02538E-04	37.81360

234: PITRAN/PDRPI = C34A+C34B*POP+C34C*D61.72+EXTRNS/PDRPI

NOB = 20 NOVAR = 3
RANGE = 1961 TO 1980
RSQ = 0.93435 CRSQ = 0.92663 F(2/17) = 120.979
SER = 0.1370 SSR = 0.319 DW(0) = 0.74 COND(X) = 30.57

COEF	VALUE	ST ER	T-STAT
C34A	0.19742	0.43778	0.45096
C34B	0.00296	0.00112	2.63731
C34C	-0.62931	0.13954	-4.50993

235: PIOLI = C44A+C44D*D61.75+C44B*(WS98-WSCNP)+C44C*WSCNP(-1)

NOB = 20 NOVAR = 4
RANGE = 1961 TO 1980
RSQ = 0.99191 CRSQ = 0.99039 F(3/16) = 653.632
SER = 9.9931 SSR = 1597.790 DW(0) = 2.14 COND(X) = 16.29

COEF	VALUE	ST ER	T-STAT
C44A	16.69900	17.34240	0.96290
C44D	-40.26620	13.24440	-3.04023
C44B	0.06371	0.00422	15.10940
C44C	0.03243	0.01169	2.77496

```
236:  PISSC = C106A+C106B*(WS98-WSCNP)


NOB = 20      NOVAR = 2
RANGE =  1961 TO 1980
RSQ =    0.99259      CRSQ =    0.99218      F(1/18) =  2411.940
SER =    7.7477       SSR =  1080.480      DW(0) =  1.07      COND(X) =
    3.20


COEF              VALUE              ST ER              T-STAT

C106A          -19.35340           3.03884           -6.36868
C106B            0.06951           0.00142           49.11140



237:  PIPRO1*100/PDRPI = C45A+C45B*EMPRO1+C45C*D61.66+C45D*D79


NOB = 19      NOVAR = 4
RANGE =  1961 TO 1979
RSQ =    0.88532      CRSQ =    0.86239      F(3/15) =     38.601
SER =    5.0034       SSR =    375.508      DW(0) =  1.23      COND(X) =
   11.40


COEF              VALUE              ST ER              T-STAT

C45A             9.03220           6.29946            1.43380
C45B             7.29399           0.92964            7.84607
C45C            18.76790           5.32460            3.52474
C45D           -21.79060           5.95788           -3.65745



246:  PIRADJ*100/PDRPI = C103A+C103B*EMCNX1+C103C*EM97


NOB = 20      NOVAR = 3
RANGE =  1961 TO 1980
RSQ =    0.98502      CRSQ =    0.98326      F(2/17) =    559.021
SER =   12.6270       SSR =   2710.510      DW(0) =  2.15      COND(X) =
    6.78


COEF              VALUE              ST ER              T-STAT

C103A          -20.34940           8.55305           -2.37919
C103B           15.88470           0.72688           21.85320
C103C            0.71219           0.08147            8.74166
```

262: XXCN8 = C54A+C54B*R.DPI8N+C54C*R.DPI8X+C54D*R.DPI8X(-1)+C54E*D64.65

NOB = 19 NOVAR = 5
RANGE = 1962 TO 1980
RSQ = 0.96235 CRSQ = 0.95159 F(4/14) = 89.453
SER = 9.5354 SSR = 1272.930 DW(0) = 2.08 COND(X) = 8.72

COEF	VALUE	ST ER	T-STAT
C54A	20.30190	7.65963	2.65051
C54B	0.05847	0.00843	6.93728
C54C	0.20131	0.03229	6.23466
C54D	0.09886	0.03467	2.85108
C54E	11.61160	7.67436	1.51304

264: LOG(EMCN1) = C56A+C56B*LOG(XXCN1)

NOB = 21 NOVAR = 2
RANGE = 1961 TO 1981
RSQ = 0.95001 CRSQ = 0.94738 F(1/19) = 361.072
SER = 0.0903 SSR = 0.155 DW(0) = 0.47 COND(X) = 23.35

COEF	VALUE	ST ER	T-STAT
C56A	-2.32004	0.23045	-10.06740
C56B	0.94921	0.04995	19.00170

268: LOG(WRCNNP/PDRPI) = C59A+C59F*D.80DEC6+C59B*LOG(WEUS/PDUSCPI)+
C59C*LOG(1+EMCNRT)+C59D*LOG(1+EMCNRT(-1))+C59E*LOG(1+EMCNRT(-2))

NOB = 20 NOVAR = 6
RANGE = 1961 TO 1980
RSQ = 0.93976 CRSQ = 0.91825 F(5/14) = 43.680
SER = 0.0431 SSR = 2.602E-02 DW(0) = 1.38 COND(X) = 6.00

COEF	VALUE	ST ER	T-STAT
C59A	4.64174	0.01229	377.54500
C59F	0.28503	0.04745	6.00643
C59B	2.00986	0.24339	8.25779
C59C	2.67656	0.68143	3.92787
C59D	0.94968	0.93281	1.01808
C59E	1.43667	0.69160	2.07730

273: LOG(XXP9) = C52A+C52B*LOG(EMP9)

NOB = 19 NOVAR = 2
RANGE = 1961 TO 1979
RSQ = 0.89638 CRSQ = 0.89028 F(1/17) = 147.058
SER = 0.2534 SSR = 1.092 DW(0) = 0.80 COND(X) = 3.41

COEF	VALUE	ST ER	T-STAT
C52A	3.21093	0.10769	29.81700
C52B	1.28862	0.10626	12.12650

274: LOG(WRP9/PDRPI) = C53A+C53F*D.80DEC6+C53D*D61.76+C53B*LOG(WEUS/PDUSCPI)+C53C*LOG(1+EMCNRT)

NOB = 20 NOVAR = 5
RANGE = 1961 TO 1980
RSQ = 0.95268 CRSQ = 0.94032 F(4/15) = 75.835
SER = 0.0546 SSR = 4.480E-02 DW(0) = 1.53 COND(X) = 5.92

COEF	VALUE	ST ER	T-STAT
C53A	4.79210	0.03468	138.17800
C53F	0.32028	0.06966	4.59761
C53D	-0.27254	0.03549	-7.67849
C53B	3.05381	0.31010	9.84789
C53C	3.83615	0.48142	7.96847

276: EMMO = C60A+C60B*R.DPI8N+C60C*D61.77

NOB = 20 NOVAR = 3
RANGE = 1961 TO 1980
RSQ = 0.98062 CRSQ = 0.97834 F(2/17) = 430.081
SER = 0.0926 SSR = 0.146 DW(0) = 0.70 COND(X) = 10.73

COEF	VALUE	ST ER	T-STAT
C60A	0.91741	0.10770	8.51843
C60B	0.00122	6.69159E-05	18.16440
C60C	-0.63048	0.06982	-9.03053

278: LOG(XXM91) = C61A+C61B*LOG(EMM91)

NOB = 19 NOVAR = 2
RANGE = 1961 TO 1979
RSQ = 0.88816 CRSQ = 0.88158 F(1/17) = 135.004
SER = 0.1177 SSR = 0.235 DW(0) = 0.92 COND(X) = 15.57

COEF	VALUE	ST ER	T-STAT
C61A	2.32730	0.21101	11.02960
C61B	1.18434	0.10193	11.61860

```
282:  LOG(WRM9A9/PDRPI) = C62A+C62F*D.80DEC6+C62B*LOG(WEUS/PDUSCPI)+
C62C*LOG(1+EMCNRT)+C62D*LOG(1+EMCNRT(-1))

NOB = 20       NOVAR = 5
RANGE =  1961 TO 1980
RSQ =    0.81971      CRSQ =    0.77163      F(4/15) =     17.050
SER =    0.0421       SSR = 2.663E-02        DW(0) =  1.50      COND(X) =
     2.97
```

COEF	VALUE	ST ER	T-STAT
C62A	4.13658	0.01161	356.33400
C62F	0.15724	0.04638	3.39060
C62B	1.57290	0.23340	6.73918
C62C	0.90165	0.51283	1.75817
C62D	0.70681	0.51625	1.36914

```
287:  XXTNT = C64A+C64B*R.DPI8X+C64D*R.DPI8X*R.DPI8X(-1)+C64C*R.DPI8N+
C64E*D71.73

NOB = 19       NOVAR = 5
RANGE =  1962 TO 1980
RSQ =    0.99452      CRSQ =    0.99295      F(4/14) =    634.976
SER =    4.4006       SSR =    271.116       DW(0) =  2.39      COND(X) =
     7.46
```

COEF	VALUE	ST ER	T-STAT
C64A	3.83502	3.02693	1.26696
C64B	0.20420	0.02259	9.03747
C64D	-6.32537E-04	9.93881E-05	-6.36431
C64C	0.12550	0.00335	37.48510
C64E	-12.31880	2.83003	-4.35288

288: LOG(EMTNT) = C65A+C65B*LOG(XXTNT)

NOB = 20 NOVAR = 2
RANGE = 1961 TO 1980
RSQ = 0.98902 CRSQ = 0.98841 F(1/18) = 1621.080
SER = 0.0368 SSR = 2.438E-02 DW(0) = 0.93 COND(X) =
21.86

COEF	VALUE	ST ER	T-STAT
C65A	-1.78308	0.09015	-19.77980
C65B	0.77175	0.01917	40.26220

293: LOG(WRT9/PDRPI) = C66A+C66F*D.80DEC6+C66D*D61.76+C66B*LOG(WEUS/PDUSCPI)+C66C*LOG(1+EMCNRT)+C66E*LOG(1+EMCNRT(-1))

NOB = 20 NOVAR = 6
RANGE = 1961 TO 1980
RSQ = 0.96202 CRSQ = 0.94846 F(5/14) = 70.923
SER = 0.0438 SSR = 2.680E-02 DW(0) = 1.99 COND(X) =
8.85

COEF	VALUE	ST ER	T-STAT
C66A	4.37672	0.03632	120.51600
C66F	0.14883	0.06076	2.44942
C66D	-0.25390	0.03755	-6.76150
C66B	1.79364	0.24866	7.21334
C66C	5.75206	0.63002	9.12999
C66E	-0.89740	0.70836	-1.26688

295: XXCM = C68A+C68B*R.DPI8N(-1)+C68C*D61.74+C68D*WEALTH(-1)*POP(-1)

NOB = 16 NOVAR = 4
RANGE = 1965 TO 1980
RSQ = 0.98863 CRSQ = 0.98579 F(3/12) = 347.875
SER = 6.5512 SSR = 515.018 DW(0) = 1.68 COND(X) = 57.55

COEF	VALUE	ST ER	T-STAT
C68A	41.17560	15.84540	2.59858
C68B	-0.12347	0.03746	-3.29566
C68C	-30.74570	8.13001	-3.78175
C68D	1.98004E-04	3.12176E-05	6.34269

296: LOG(EMCM) = C69A+C69B*LOG(XXCM)

NOB = 20 NOVAR = 2
RANGE = 1961 TO 1980
RSQ = 0.95761 CRSQ = 0.95525 F(1/18) = 406.583
SER = 0.0696 SSR = 8.708E-02 DW(0) = 0.66 COND(X) = 18.67

COEF	VALUE	ST ER	T-STAT
C69A	-1.99105	0.14562	-13.67290
C69B	0.65356	0.03241	20.16380

297: LOG(WRCMPU/PDRPI) = C70A+C70F*D.80DEC6+C70B*LOG(WEUS/PDUSCPI)+C70C*LOG(1+EMCNRT(-2))+C70D*LOG(1+EMCNRT(-1))

NOB = 20 NOVAR = 5
RANGE = 1961 TO 1980
RSQ = 0.77282 CRSQ = 0.71224 F(4/15) = 12.757
SER = 0.0479 SSR = 3.444E-02 DW(0) = 1.65 COND(X) = 3.02

COEF	VALUE	ST ER	T-STAT
C70A	4.53206	0.01306	347.01400
C70F	0.17780	0.05268	3.37538
C70B	0.72318	0.26940	2.68445
C70C	1.22075	0.59194	2.06229
C70D	1.43879	0.58295	2.46813

299: XXPU = C72A+C72B*R.DPI8N(-1)+C72C*R.DPI8X+C72D*R.DPI8N(-2)

NOB = 18 NOVAR = 4
RANGE = 1963 TO 1980
RSQ = 0.99072 CRSQ = 0.98873 F(3/14) = 497.984
SER = 1.4839 SSR = 30.828 DW(0) = 2.67 COND(X) = 49.68

COEF	VALUE	ST ER	T-STAT
C72A	3.76867	1.07636	3.50130
C72B	0.01123	0.00744	1.50922
C72C	0.01374	0.00599	2.29492
C72D	0.02553	0.00705	3.61830

300: LOG(EMPU) = C73A+C73C*PIPE(-1)+C73B*LOG(XXPU)

NOB = 20 NOVAR = 3
RANGE = 1961 TO 1980
RSQ = 0.9914 CRSQ = 0.99039 F(2/17) = 979.867
SER = 0.0366 SSR = 2.274E-02 DW(0) = 1.62 COND(X) = 16.58

COEF	VALUE	ST ER	T-STAT
C73A	-3.01609	0.06610	-45.62580
C73C	-0.04871	0.03876	-1.25677
C73B	0.83004	0.01923	43.15370

301: LOG(WRCMPU/PDRPI) = C74A+C74F*D.80DEC6+C74B*LOG(WEUS/PDUSCPI)+C74C*LOG(1+EMCNRT(-2))+C74D*LOG(1+EMCNRT(-1))

NOB = 20 NOVAR = 5
RANGE = 1961 TO 1980
RSQ = 0.77282 CRSQ = 0.71224 F(4/15) = 12.757
SER = 0.0479 SSR = 3.444E-02 DW(0) = 1.65 COND(X) = 3.02

COEF	VALUE	ST ER	T-STAT
C74A	4.53206	0.01306	347.01400
C74F	0.17780	0.05268	3.37538
C74B	0.72318	0.26940	2.68445
C74C	1.22075	0.59194	2.06229
C74D	1.43879	0.58295	2.46813

303: XXDW = C71A+C71B*R.DPI8N+C71C*R.DPI8X+C71D*R.DPI8X(-1)*R.DPI8X+C71E*WEALTH(-1)*POP(-1)

NOB = 16 NOVAR = 5
RANGE = 1965 TO 1980
RSQ = 0.99494 CRSQ = 0.9931 F(4/11) = 540.533
SER = 2.6783 SSR = 78.907 DW(0) = 1.40 COND(X) = 63.22

COEF	VALUE	ST ER	T-STAT
C71A	-4.27825	3.93849	-1.08627
C71B	0.01682	0.01623	1.03628
C71C	0.14847	0.02288	6.48977
C71D	-2.95076E-04	6.45149E-05	-4.57376
C71E	5.26814E-05	1.19548E-05	4.40671

304: XXDRNT = C76A+C76B*R.DPI8N+C76C*R.DPI8X+C76D*R.DPI8N(-1)+C76E*R.DPI8X(-1)

NOB = 19 NOVAR = 5
RANGE = 1962 TO 1980
RSQ = 0.99701 CRSQ = 0.99616 F(4/14) = 1167.510
SER = 3.7780 SSR = 199.828 DW(0) = 2.91 COND(X) = 62.81

COEF	VALUE	ST ER	T-STAT
C76A	-8.12942	2.98554	-2.72293
C76B	0.06973	0.02099	3.32245
C76C	0.07878	0.02108	3.73662
C76D	0.09790	0.02020	4.84584
C76E	-0.09266	0.01603	-5.78080

```
305 :  LOG(EMDW) = C77A+C77B*LOG(XXDW)

NOB = 20      NOVAR = 2
RANGE =  1961 TO 1980
RSQ =    0.99722      CRSQ =    0.99707      F(1/18) =   6467.990
SER =    0.0266       SSR = 1.278E-02      DW(0) =   0.46      COND(X) =
   14.68

COEF              VALUE            ST ER          T-STAT

C77A            -2.35546          0.04393       -53.61710
C77B             0.87700          0.01090        80.42340
```

```
306 :  LOG(EMDRNT) = C75A+C75B*LOG(XXDRNT)

NOB = 20      NOVAR = 2
RANGE =  1961 TO 1980
RSQ =    0.99744      CRSQ =    0.9973       F(1/18) =   7017.800
SER =    0.0239       SSR = 1.032E-02      DW(0) =   1.28      COND(X) =
   21.68

COEF              VALUE            ST ER          T-STAT

C75A            -2.37192          0.05817       -40.77430
C75B             1.00465          0.01199        83.77210
```

```
308:  LOG(WRDW/PDRPI) = C78A+C78F*D.80DEC6+C78B*LOG(WEUS/PDUSCPI)+C78C
*LOG(1+EMCNRT)+C78D*LOG(1+EMCNRT(-1))+C78E*LOG(1+EMCNRT(-2))

NOB = 20      NOVAR = 6
RANGE =  1961 TO 1980
RSQ =    0.87863      CRSQ =    0.83528      F(5/14) =     20.269
SER =    0.0275       SSR = 1.058E-02        DW(0) =  1.68      COND(X) =
     6.00
```

COEF	VALUE	ST ER	T-STAT
C78A	4.34562	0.00784	554.30800
C78F	0.07522	0.03026	2.48574
C78B	0.72197	0.15520	4.65192
C78C	1.69244	0.43452	3.89499
C78D	0.14758	0.59482	0.24812
C78E	0.58088	0.44101	1.31715

```
309:  LOG(WRDR/PDRPI) = C79A+C79F*D.80DEC6+C79B*LOG(WEUS/PDUSCPI)+(+
C79D)*LOG(1+EMCNRT(-1))+C79E*LOG(1+EMCNRT(-2))

NOB = 20      NOVAR = 5
RANGE =  1961 TO 1980
RSQ =    0.6895       CRSQ =    0.6067       F(4/15) =      8.327
SER =    0.0273       SSR = 1.122E-02        DW(0) =  2.28      COND(X) =
     3.02
```

COEF	VALUE	ST ER	T-STAT
C79A	3.83950	0.00745	515.09800
C79F	-0.04314	0.03006	-1.43510
C79B	0.61019	0.15376	3.96855
C79D	0.96035	0.33271	2.88643
C79E	-0.91468	0.33784	-2.70742

316: XXFI = C80A+C80C*D71.73+C80B*WEALTH(-1)*POP(-1)

NOB = 16 NOVAR = 3
RANGE = 1965 TO 1980
RSQ = 0.9941 CRSQ = 0.9932 F(2/13) = 1096.090
SER = 8.4999 SSR = 939.228 DW(0) = 1.24 COND(X) =
5.85

COEF	VALUE	ST ER	T-STAT
C80A	-50.15230	6.16004	-8.14155
C80C	-15.88940	5.53236	-2.87209
C80B	2.41737E-04	5.31543E-06	45.47830

317: LOG(EMFI) = C81A+C81B*LOG(XXFI)

NOB = 21 NOVAR = 2
RANGE = 1961 TO 1981
RSQ = 0.99604 CRSQ = 0.99583 F(1/19) = 4773.880
SER = 0.0386 SSR = 2.826E-02 DW(0) = 0.60 COND(X) =
17.03

COEF	VALUE	ST ER	T-STAT
C81A	-3.62853	0.07190	-50.46620
C81B	0.98204	0.01421	69.09300

318: LOG(WRFI/PDRFI) = C82A+C82F*D.80DEC6+C82B*LOG(WEUS/PDUSCPI)+C82
*LOG(1+EMCNRT)+C82C*LOG(1+EMCNRT(-1))

NOB = 20 NOVAR = 5
RANGE = 1961 TO 1980
RSQ = 0.94077 CRSQ = 0.92498 F(4/15) = 59.567
SER = 0.0253 SSR = 9.630E-03 DW(0) = 1.57 COND(X) =
2.97

COEF	VALUE	ST ER	T-STAT
C82A	3.97093	0.00698	568.82900
C82F	0.19859	0.02789	7.12106
C82B	1.89818	0.14035	13.52440
C82D	0.60491	0.30839	1.96150
C82C	0.75790	0.31045	2.44133

320: XXSSNT = C84A+C84B*R.DPI8N+C84C*R.DPI8X(-1)+C84D*WEALTH(-1)*POP(-1)

NOB = 16 NOVAR = 4
RANGE = 1965 TO 1980
RSQ = 0.99276 CRSQ = 0.99095 F(3/12) = 548.673
SER = 5.0981 SSR = 311.890 DW(0) = 2.13 COND(X) = 30.09

COEF	VALUE	ST ER	T-STAT
C84A	-26.91120	5.30315	-5.07457
C84B	0.04680	0.01557	3.00657
C84C	-0.05933	0.01786	-3.32122
C84D	9.73265E-05	1.17353E-05	8.29346

321: XXSB = C83A+(+C83C)*R.DPI8X+C83D*R.DPI8X(-1)+C83E*WEALTH(-1)*POP(-1)

NOB = 16 NOVAR = 4
RANGE = 1965 TO 1980
RSQ = 0.97912 CRSQ = 0.97391 F(3/12) = 187.610
SER = 4.2878 SSR = 220.627 DW(0) = 2.19 COND(X) = 7.28

COEF	VALUE	ST ER	T-STAT
C83A	-4.91663	3.15771	-1.55702
C83C	0.13914	0.01415	9.83411
C83D	0.03976	0.01584	2.51112
C83E	3.43157E-05	3.11547E-06	11.01460

322: LOG(EMS8NT) = C85A+C85B*LOG(XXS8NT)

NOB = 20 NOVAR = 2
RANGE = 1961 TO 1980
RSQ = 0.99834 CRSQ = 0.99825 F(1/18) = 1.08E+04
SER = 0.0228 SSR = 9.376E-03 DW(0) = 0.98 COND(X) = 17.17

COEF	VALUE	ST ER	T-STAT
C85A	-2.27710	0.04397	-51.78730
C85B	1.00835	0.00969	104.04200

323: LOG(EMSB) = C87A+C87B*LOG(XXSB)

NOB = 20 NOVAR = 2
RANGE = 1961 TO 1980
RSQ = 0.9989 CRSQ = 0.99884 F(1/18) = 1.64E+04
SER = 0.0250 SSR = 1.128E-02 DW(0) = 0.76 COND(X) = 9.24

COEF	VALUE	ST ER	T-STAT
C87A	-2.41837	0.02617	-92.42570
C87B	1.00842	0.00788	128.03700

324: LOG(WRSNB/PDRPI) = C86A+C86F*D.80DEC6+C86B*LOG(WEUS/PDUSCPI)+C86C*LOG(1+EMCNRT)+C86D*LOG(1+EMCNRT(-1))+C86E*LOG(1+EMCNRT(-2))

NOB = 20 NOVAR = 6
RANGE = 1961 TO 1980
RSQ = 0.83956 CRSQ = 0.78226 F(5/14) = 14.652
SER = 0.0600 SSR = 5.033E-02 DW(0) = 0.86 COND(X) = 6.00

COEF	VALUE	ST ER	T-STAT
C86A	3.77964	0.01710	221.02400
C86F	0.22935	0.06600	3.47475
C86B	1.36430	0.33853	4.03004
C86C	2.78304	0.94780	2.93630
C86D	-0.23809	1.29746	-0.18350
C86E	2.13938	0.96196	2.22398

325: LOG(WRSB/PDRFI) = C88A+C88F*D.80DEC6+C88E*D61.70+C88B*LOG(WEUS/PDUSCPI)+C88C*LOG(1+EMCNRT)+C88D*LOG(1+EMCNRT(-1))+C88G*LOG(1+EMCNRT(-2))

NOB = 20 NOVAR = 7
RANGE = 1961 TO 1980
RSQ = 0.95023 CRSQ = 0.92727 F(6/13) = 41.371
SER = 0.0632 SSR = 5.193E-02 DW(0) = 1.92 COND(X) = 8.95

COEF	VALUE	ST ER	T-STAT
C88A	3.89635	0.04859	80.18010
C88F	0.21638	0.09348	2.31476
C88E	0.24418	0.05403	4.51911
C88B	0.67850	0.49601	1.36792
C88C	9.34441	1.21868	7.66762
C88D	-0.24398	1.44964	-0.16830
C88G	4.52672	1.17680	3.84664

334: LOG(XXGF) = C101A+C101B*LOG(EMGF)

NOB = 19 NOVAR = 2
RANGE = 1961 TO 1979
RSQ = 0.16241 CRSQ = 0.11314 F(1/17) = 3.296
SER = 0.0312 SSR = 1.656E-02 DW(0) = 0.49 COND(X) 103.99

COEF	VALUE	ST ER	T-STAT
C101A	5.58779	0.37237	15.00610
C101B	0.16273	0.09690	1.67945

335: LOG(WRGC/PDRPI) = C89A+LOG(WEUS/PDUSCPI)

NOB = 20 NOVAR = 1
RANGE = 1961 TO 1980
RSQ = 0.44462 CRSQ = 0.44462 F(0/19) = 15.211
SER = 0.0853 SSR = 0.138 DW(0) = 0.22 COND(X) =
1.00

COEF	VALUE	ST ER	T-STAT
C89A	4.14408	0.01907	217.32900

341: LOG(WRGS/PDRPI) = C92A+C92F*D.80DEC6+C92B*LOG(WEUS/PDUSCPI)+C92C
*D61.73

NOB = 20 NOVAR = 4
RANGE = 1961 TO 1980
RSQ = 0.94424 CRSQ = 0.93378 F(3/16) = 90.312
SER = 0.0473 SSR = 3.582E-02 DW(0) = 1.06 COND(X) =
3.90

COEF	VALUE	ST ER	T-STAT
C92A	4.28374	0.02172	197.22500
C92F	0.29925	0.05622	5.32240
C92B	2.40477	0.26893	8.94205
C92C	-0.23483	0.02418	-9.70994

343: LOG(WRGL/PDRPI) = C102A+C102F*D.80DEC6+C102D*D61.69+C102C*LOG(1+
EMCNRT)+C102B*LOG(WEUS/PDUSCPI)

NOB = 20 NOVAR = 5
RANGE = 1961 TO 1980
RSQ = 0.94901 CRSQ = 0.93542 F(4/15) = 69.798
SER = 0.0353 SSR = 1.867E-02 DW(0) = 1.87 COND(X) =
5.02

COEF	VALUE	ST ER	T-STAT
C102A	4.09380	0.02027	201.93100
C102F	0.24326	0.04742	5.12951
C102D	-0.08986	0.02486	-3.61516
C102C	1.68094	0.36066	4.66074
C102B	1.95194	0.26951	7.24264

348: LOG(XXGA) = C104A+C104B*LOG(EMGA)

NOB = 19 NOVAR = 2
RANGE = 1961 TO 1979
RSQ = 0.99634 CRSQ = 0.99613 F(1/17) = 4631.660
SER = 0.0281 SSR = 1.339E-02 DW(0) = 1.95 COND(X) = 12.91

COEF	VALUE	ST ER	T-STAT
C104A	2.28334	0.04182	54.59890
C104B	0.96757	0.01422	68.05550

350: XXA9 = C90A+C90B*(EMA9+EMPROFIS)

NOB = 19 NOVAR = 2
RANGE = 1961 TO 1979
RSQ = 0.88599 CRSQ = 0.87929 F(1/17) = 132.115
SER = 5.1414 SSR = 449.375 DW(0) = 2.13 COND(X) = 10.16

COEF	VALUE	ST ER	T-STAT
C90A	-43.64550	6.05120	-7.21269
C90B	13.92170	1.21120	11.49410

351: LOG(WRM9A9/PDRPI) = C95A+C95F*D.80DEC6+C95B*LOG(WEUS/PDUSCPI)+C95C*LOG(1+EMCNRT)+C95D*LOG(1+EMCNRT(-1))

NOB = 20 NOVAR = 5
RANGE = 1961 TO 1980
RSQ = 0.81971 CRSQ = 0.77163 F(4/15) = 17.050
SER = 0.0421 SSR = 2.663E-02 DW(0) = 1.50 COND(X) = 2.97

COEF	VALUE	ST ER	T-STAT
C95A	4.13658	0.01161	356.33400
C95F	0.15724	0.04638	3.39060
C95B	1.57290	0.23340	6.73918
C95C	0.90165	0.51283	1.75817
C95D	0.70681	0.51625	1.36914

359: LOG(EMPRO1) = C100A+C100C*D61.66+C100B*LOG(EM98)

NOB = 20 NOVAR = 3
RANGE = 1961 TO 1980
RSQ = 0.94547 CRSQ = 0.93906 F(2/17) = 147.382
SER = 0.1937 SSR = 0.638 DW(0) = 0.81 COND(X) =
59.08

COEF	VALUE	ST ER	T-STAT
C100A	-4.35555	1.18255	-3.68318
C100C	-0.99303	0.14017	-7.08426
C100B	1.25095	0.23555	5.31071

APPENDIX I
MAP REGIONALIZATION MODEL LISTING

(Including Parameters)

MODEL: A83.CD

PURPOSE: This model allocates statewide projections of population, employment, and households from the MAP economic model to the census division level.

DATE: May 2, 1983

SYMBOLS:

ENDOGENOUS:
M.01 M.02 M.03 M.04 M.05 M.06 M.07 M.08 M.09 M.10 M.11
M.12 M.13 M.14 M.15 M.16 M.17 M.18 M.19 M.20 M.21 M.22
M.23 M.24 M.25 M.26 M.27 M.28 M.29 PCEN.06

CONSTRUCT:
ADJ B.AG B.AM B.FG B.NR B.RB B.ST BAG BAM BFG BNR BRB
BST G.AG G.AM G.FG G.NR G.RB G.ST GAG GAM GFG GNR GRB
GST M.AG M.AM M.FG M.NR M.RB M.ST P.AG P.AM P.FG P.NR
P.RB P.ST P.01 P.02 P.03 P.04 P.05 P.06 P.07 P.08 P.09
P.10 P.11 P.12 P.13 P.14 P.15 P.16 P.17 P.18 P.19 P.20
P.21 P.22 P.23 P.24 P.25 P.26 P.27 P.28 P.29 PCEN.01
PCEN.02 PCEN.03 PCEN.04 PCEN.05 PCEN.07 PCEN.08 PCEN.09
PCEN.10 PCEN.11 PCEN.12 PCEN.13 PCEN.14 PCEN.15 PCEN.16
PCEN.17 PCEN.18 PCEN.19 PCEN.20 PCEN.21 PCEN.22 PCEN.23
PRE.ST PRE.01 PRE.02 PRE.03 PRE.04 PRE.05 PRE.06 PRE.07
PRE.08 PRE.09 PRE.10 PRE.11 PRE.12 PRE.13 PRE.14 PRE.15
PRE.16 PRE.17 PRE.18 PRE.19 PRE.20 PRE.21 PRE.22 PRE.23
PRE.24 PRE.25 PRE.26 PRE.27 PRE.28 PRE.29 S.AG S.AM S.FG
S.NR S.RB S.ST

DEFINITION:
ADJHH B.IR G.IR HH.AG HH.AM HH.FG HH.IR HHCEN.ST HHCEN.01
HHCEN.02 HHCEN.03 HHCEN.04 HHCEN.05 HHCEN.06 HHCEN.07
HHCEN.08 HHCEN.09 HHCEN.10 HHCEN.11 HHCEN.12 HHCEN.13
HHCEN.14 HHCEN.15 HHCEN.16 HHCEN.17 HHCEN.18 HHCEN.19
HHCEN.20 HHCEN.21 HHCEN.22 HHCEN.23 HPRE.ST HPRE.01 HPRE.02
HPRE.03 HPRE.04 HPRE.05 HPRE.06 HPRE.07 HPRE.08 HPRE.09
HPRE.10 HPRE.11 HPRE.12 HPRE.13 HPRE.14 HPRE.15 HPRE.16
HPRE.17 HPRE.18 HPRE.19 HPRE.20 HPRE.21 HPRE.22 HPRE.23 M.IR

P.IR S.IR S.01 S.01.01 S.01.02 S.01.03 S.01.04 S.01.05
S.01.06 S.01.07 S.01.08 S.01.09 S.01.10 S.01.11 S.01.12
S.01.13 S.01.14 S.01.15 S.01.16 S.01.17 S.01.18 S.01.19
S.01.20 S.01.21 S.01.22 S.01.23 S.01.24 S.01.25 S.01.26
S.01.27 S.01.28 S.01.29 S.02 S.02.01 S.02.02

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S.28.28 S.28.29 S.29 S.29.01 S.29.02 S.29.03 S.29.04 S.29.05
S.29.06 S.29.07 S.29.08 S.29.09 S.29.10 S.29.11 S.29.12
S.29.13 S.29.14 S.29.15 S.29.16 S.29.17 S.29.18 S.29.19
S.29.20 S.29.21 S.29.22 S.29.23 S.29.24 S.29.25 S.29.26
S.29.27 S.29.28 S.29.29

EXOGENOUS:
B.01 B.02 B.04 B.05 B.06 B.08 B.09 B.11 B.12 B.14 B.15
B.16 B.17 B.18 B.21 B.24 B.25 B.26 B.27 B.29 BETA B01
B02 B04 B05 B06 B08 B09 B11 B12 B14 B15 B16 B17 B18
B21 B24 B25 B26 B27 B29 G.01 G.02 G.04 G.05 G.06 G.08
G.09 G.11 G.12 G.14 G.15 G.16 G.17 G.18 G.21 G.24 G.25
G.26 G.27 G.29 G01 G02 G04 G05 G06 G08 G09 G11 G12 G14
G15 G16 G17 G18 G21 G24 G25 G26 G27 G29 HH POP

PARAMETER:
A.01.01 A.01.02 A.01.03 A.01.04 A.01.05 A.01.06 A.01.07
A.01.08 A.01.09 A.01.10 A.01.11 A.01.12 A.01.13 A.01.14
A.01.15 A.01.16 A.01.17 A.01.18 A.01.19 A.01.20 A.01.21
A.01.22 A.01.23 A.01.24 A.01.25 A.01.26 A.01.27 A.01.28
A.01.29 A.02.01 A.02.02

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A.28.29 A.29.01 A.29.02 A.29.03 A.29.04 A.29.05 A.29.06
A.29.07 A.29.08 A.29.09 A.29.10 A.29.11 A.29.12 A.29.13
A.29.14 A.29.15 A.29.16 A.29.17 A.29.18 A.29.19 A.29.20
A.29.21 A.29.22 A.29.23 A.29.24 A.29.25 A.29.26 A.29.27
A.29.28 A.29.29 B.03 B.07 B.10 B.13 B.19 B.20 B.22 B.23
B.28 B03 B07 B10 B13 B19 B20 B22 B23 B28 G.03 G.07 G.10
G.13 G.19 G.20 G.22 G.23 G.28 G03 G07 G10 G13 G19 G20
G22 G23 G28 HHSZ.01 HHSZ.02 HHSZ.03 HHSZ.04 HHSZ.05 HHSZ.06
HHSZ.07 HHSZ.08 HHSZ.09 HHSZ.10 HHSZ.11 HHSZ.12 HHSZ.13
HHSZ.14 HHSZ.15 HHSZ.16 HHSZ.17 HHSZ.18 HHSZ.19 HHSZ.20
HHSZ.21 HHSZ.22 HHSZ.23 IM.01.01 IM.01.02 IM.01.03 IM.01.04
IM.01.05 IM.01.06 IM.01.07 IM.01.08 IM.01.09 IM.01.10
IM.01.11 IM.01.12 IM.01.13 IM.01.14 IM.01.15 IM.01.16

IM.01.17 IM.01.18 IM.01.19 IM.01.20 IM.01.21 IM.01.22
IM.01.23 IM.01.24 IM.01.25 IM.01.26 IM.01.27 IM.01.28
IM.01.29 IM.02.01 IM.02.02

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IM.28.28 IM.28.29 IM.29.01 IM.29.02 IM.29.03 IM.29.04
IM.29.05 IM.29.06 IM.29.07 IM.29.08 IM.29.09 IM.29.10
IM.29.11 IM.29.12 IM.29.13 IM.29.14 IM.29.15 IM.29.16
IM.29.17 IM.29.18 IM.29.19 IM.29.20 IM.29.21 IM.29.22
IM.29.23 IM.29.24 IM.29.25 IM.29.26 IM.29.27 IM.29.28
IM.29.29 PC.04.16 PC.04.25 PC.06.25 PC.08.16
PGQ.01 PGQ.02 PGQ.03 PGQ.04 PGQ.05 PGQ.06 PGQ.07
PGQ.08 PGQ.09 PGQ.10 PGQ.11 PGQ.12 PGQ.13 PGQ.14 PGQ.15
PGQ.16 PGQ.17 PGQ.18 PGQ.19 PGQ.20 PGQ.21 PGQ.22 PGQ.23
PM.01 PM.02 PM.03 PM.04 PM.05 PM.06 PM.07 PM.08 PM.09
PM.10 PM.11 PM.12 PM.13 PM.14 PM.15 PM.16 PM.17 PM.18
PM.19 PM.20 PM.21 PM.22 PM.23 PM.24 PM.25 PM.26 PM.27
PM.28 PM.29

EQUATIONS:

Total Employment (M.aa) in region aa

1: M.01 = (A.01.01*M.01+A.01.02*M.02+A.01.03*M.03+A.01.04*
M.04+A.01.05*M.05+A.01.06*M.06+A.01.07*M.07+A.01.08*M.08
+A.01.09*M.09+A.01.10*M.10+A.01.11*M.11+A.01.12*M.12+
A.01.13*M.13+A.01.14*M.14+A.01.15*M.15+A.01.16*M.16+
A.01.17*M.17+A.01.18*M.18+A.01.19*M.19+A.01.20*M.20+
A.01.21*M.21+A.01.22*M.22+A.01.23*M.23+A.01.24*M.24+
A.01.25*M.25+A.01.26*M.26+A.01.27*M.27+A.01.28*M.28+
A.01.29*M.29)*BETA+B.01+G.01

2: M.02 = (A.02.01*M.01+A.02.02*M.02+A.02.03*M.03+A.02.04*
M.04+A.02.05*M.05+A.02.06*M.06+A.02.07*M.07+A.02.08*M.08
+A.02.09*M.09+A.02.10*M.10+A.02.11*M.11+A.02.12*M.12+
A.02.13*M.13+A.02.14*M.14+A.02.15*M.15+A.02.16*M.16+
A.02.17*M.17+A.02.18*M.18+A.02.19*M.19+A.02.20*M.20+
A.02.21*M.21+A.02.22*M.22+A.02.23*M.23+A.02.24*M.24+
A.02.25*M.25+A.02.26*M.26+A.02.27*M.27+A.02.28*M.28+
A.02.29*M.29)*BETA+B.02+G.02

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3:        M.03 = (A.03.01*M.01+A.03.02*M.02+A.03.03*M.03+A.03.04*
          M.04+A.03.05*M.05+A.03.06*M.06+A.03.07*M.07+A.03.08*M.08
          +A.03.09*M.09+A.03.10*M.10+A.03.11*M.11+A.03.12*M.12+
          A.03.13*M.13+A.03.14*M.14+A.03.15*M.15+A.03.16*M.16+
          A.03.17*M.17+A.03.18*M.18+A.03.19*M.19+A.03.20*M.20+
          A.03.21*M.21+A.03.22*M.22+A.03.23*M.23+A.03.24*M.24+
          A.03.25*M.25+A.03.26*M.26+A.03.27*M.27+A.03.28*M.28+
          A.03.29*M.29)*BETA+B.03+G.03

4:        M.04 = (A.04.01*M.01+A.04.02*M.02+A.04.03*M.03+A.04.04*
          M.04+A.04.05*M.05+A.04.06*M.06+A.04.07*M.07+A.04.08*M.08
          +A.04.09*M.09+A.04.10*M.10+A.04.11*M.11+A.04.12*M.12+
          A.04.13*M.13+A.04.14*M.14+A.04.15*M.15+A.04.16*M.16+
          A.04.17*M.17+A.04.18*M.18+A.04.19*M.19+A.04.20*M.20+
          A.04.21*M.21+A.04.22*M.22+A.04.23*M.23+A.04.24*M.24+
          A.04.25*M.25+A.04.26*M.26+A.04.27*M.27+A.04.28*M.28+
          A.04.29*M.29)*BETA+B.04+G.04

5:        M.05 = (A.05.01*M.01+A.05.02*M.02+A.05.03*M.03+A.05.04*
          M.04+A.05.05*M.05+A.05.06*M.06+A.05.07*M.07+A.05.08*M.08
          +A.05.09*M.09+A.05.10*M.10+A.05.11*M.11+A.05.12*M.12+
          A.05.13*M.13+A.05.14*M.14+A.05.15*M.15+A.05.16*M.16+
          A.05.17*M.17+A.05.18*M.18+A.05.19*M.19+A.05.20*M.20+
          A.05.21*M.21+A.05.22*M.22+A.05.23*M.23+A.05.24*M.24+
          A.05.25*M.25+A.05.26*M.26+A.05.27*M.27+A.05.28*M.28+
          A.05.29*M.29)*BETA+B.05+G.05

6:        M.06 = (A.06.01*M.01+A.06.02*M.02+A.06.03*M.03+A.06.04*
          M.04+A.06.05*M.05+A.06.06*M.06+A.06.07*M.07+A.06.08*M.08
          +A.06.09*M.09+A.06.10*M.10+A.06.11*M.11+A.06.12*M.12+
          A.06.13*M.13+A.06.14*M.14+A.06.15*M.15+A.06.16*M.16+
          A.06.17*M.17+A.06.18*M.18+A.06.19*M.19+A.06.20*M.20+
          A.06.21*M.21+A.06.22*M.22+A.06.23*M.23+A.06.24*M.24+
          A.06.25*M.25+A.06.26*M.26+A.06.27*M.27+A.06.28*M.28+
          A.06.29*M.29)*BETA+B.06+G.06

7:        M.07 = (A.07.01*M.01+A.07.02*M.02+A.07.03*M.03+A.07.04*
          M.04+A.07.05*M.05+A.07.06*M.06+A.07.07*M.07+A.07.08*M.08
          +A.07.09*M.09+A.07.10*M.10+A.07.11*M.11+A.07.12*M.12+
          A.07.13*M.13+A.07.14*M.14+A.07.15*M.15+A.07.16*M.16+
          A.07.17*M.17+A.07.18*M.18+A.07.19*M.19+A.07.20*M.20+
          A.07.21*M.21+A.07.22*M.22+A.07.23*M.23+A.07.24*M.24+
          A.07.25*M.25+A.07.26*M.26+A.07.27*M.27+A.07.28*M.28+
          A.07.29*M.29)*BETA+B.07+G.07
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 8:      M.08 = (A.08.01*M.01+A.08.02*M.02+A.08.03*M.03+A.08.04*
         M.04+A.08.05*M.05+A.08.06*M.06+A.08.07*M.07+A.08.08*M.08
         +A.08.09*M.09+A.08.10*M.10+A.08.11*M.11+A.08.12*M.12+
         A.08.13*M.13+A.08.14*M.14+A.08.15*M.15+A.08.16*M.16+
         A.08.17*M.17+A.08.18*M.18+A.08.19*M.19+A.08.20*M.20+
         A.08.21*M.21+A.08.22*M.22+A.08.23*M.23+A.08.24*M.24+
         A.08.25*M.25+A.08.26*M.26+A.08.27*M.27+A.08.28*M.28+
         A.08.29*M.29)*BETA+B.08+G.08

 9:      M.09 = (A.09.01*M.01+A.09.02*M.02+A.09.03*M.03+A.09.04*
         M.04+A.09.05*M.05+A.09.06*M.06+A.09.07*M.07+A.09.08*M.08
         +A.09.09*M.09+A.09.10*M.10+A.09.11*M.11+A.09.12*M.12+
         A.09.13*M.13+A.09.14*M.14+A.09.15*M.15+A.09.16*M.16+
         A.09.17*M.17+A.09.18*M.18+A.09.19*M.19+A.09.20*M.20+
         A.09.21*M.21+A.09.22*M.22+A.09.23*M.23+A.09.24*M.24+
         A.09.25*M.25+A.09.26*M.26+A.09.27*M.27+A.09.28*M.28+
         A.09.29*M.29)*BETA+B.09+G.09

10:      M.10 = (A.10.01*M.01+A.10.02*M.02+A.10.03*M.03+A.10.04*
         M.04+A.10.05*M.05+A.10.06*M.06+A.10.07*M.07+A.10.08*M.08
         +A.10.09*M.09+A.10.10*M.10+A.10.11*M.11+A.10.12*M.12+
         A.10.13*M.13+A.10.14*M.14+A.10.15*M.15+A.10.16*M.16+
         A.10.17*M.17+A.10.18*M.18+A.10.19*M.19+A.10.20*M.20+
         A.10.21*M.21+A.10.22*M.22+A.10.23*M.23+A.10.24*M.24+
         A.10.25*M.25+A.10.26*M.26+A.10.27*M.27+A.10.28*M.28+
         A.10.29*M.29)*BETA+B.10+G.10

11:      M.11 = (A.11.01*M.01+A.11.02*M.02+A.11.03*M.03+A.11.04*
         M.04+A.11.05*M.05+A.11.06*M.06+A.11.07*M.07+A.11.08*M.08
         +A.11.09*M.09+A.11.10*M.10+A.11.11*M.11+A.11.12*M.12+
         A.11.13*M.13+A.11.14*M.14+A.11.15*M.15+A.11.16*M.16+
         A.11.17*M.17+A.11.18*M.18+A.11.19*M.19+A.11.20*M.20+
         A.11.21*M.21+A.11.22*M.22+A.11.23*M.23+A.11.24*M.24+
         A.11.25*M.25+A.11.26*M.26+A.11.27*M.27+A.11.28*M.28+
         A.11.29*M.29)*BETA+B.11+G.11

12:      M.12 = (A.12.01*M.01+A.12.02*M.02+A.12.03*M.03+A.12.04*
         M.04+A.12.05*M.05+A.12.06*M.06+A.12.07*M.07+A.12.08*M.08
         +A.12.09*M.09+A.12.10*M.10+A.12.11*M.11+A.12.12*M.12+
         A.12.13*M.13+A.12.14*M.14+A.12.15*M.15+A.12.16*M.16+
         A.12.17*M.17+A.12.18*M.18+A.12.19*M.19+A.12.20*M.20+
         A.12.21*M.21+A.12.22*M.22+A.12.23*M.23+A.12.24*M.24+
         A.12.25*M.25+A.12.26*M.26+A.12.27*M.27+A.12.28*M.28+
         A.12.29*M.29)*BETA+B.12+G.12
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13:     M.13 = (A.13.01*M.01+A.13.02*M.02+A.13.03*M.03+A.13.04*
        M.04+A.13.05*M.05+A.13.06*M.06+A.13.07*M.07+A.13.08*M.08
        +A.13.09*M.09+A.13.10*M.10+A.13.11*M.11+A.13.12*M.12+
        A.13.13*M.13+A.13.14*M.14+A.13.15*M.15+A.13.16*M.16+
        A.13.17*M.17+A.13.18*M.18+A.13.19*M.19+A.13.20*M.20+
        A.13.21*M.21+A.13.22*M.22+A.13.23*M.23+A.13.24*M.24+
        A.13.25*M.25+A.13.26*M.26+A.13.27*M.27+A.13.28*M.28+
        A.13.29*M.29)*BETA+B.13+G.13

14:     M.14 = (A.14.01*M.01+A.14.02*M.02+A.14.03*M.03+A.14.04*
        M.04+A.14.05*M.05+A.14.06*M.06+A.14.07*M.07+A.14.08*M.08
        +A.14.09*M.09+A.14.10*M.10+A.14.11*M.11+A.14.12*M.12+
        A.14.13*M.13+A.14.14*M.14+A.14.15*M.15+A.14.16*M.16+
        A.14.17*M.17+A.14.18*M.18+A.14.19*M.19+A.14.20*M.20+
        A.14.21*M.21+A.14.22*M.22+A.14.23*M.23+A.14.24*M.24+
        A.14.25*M.25+A.14.26*M.26+A.14.27*M.27+A.14.28*M.28+
        A.14.29*M.29)*BETA+B.14+G.14

15:     M.15 = (A.15.01*M.01+A.15.02*M.02+A.15.03*M.03+A.15.04*
        M.04+A.15.05*M.05+A.15.06*M.06+A.15.07*M.07+A.15.08*M.08
        +A.15.09*M.09+A.15.10*M.10+A.15.11*M.11+A.15.12*M.12+
        A.15.13*M.13+A.15.14*M.14+A.15.15*M.15+A.15.16*M.16+
        A.15.17*M.17+A.15.18*M.18+A.15.19*M.19+A.15.20*M.20+
        A.15.21*M.21+A.15.22*M.22+A.15.23*M.23+A.15.24*M.24+
        A.15.25*M.25+A.15.26*M.26+A.15.27*M.27+A.15.28*M.28+
        A.15.29*M.29)*BETA+B.15+G.15

16:     M.16 = (A.16.01*M.01+A.16.02*M.02+A.16.03*M.03+A.16.04*
        M.04+A.16.05*M.05+A.16.06*M.06+A.16.07*M.07+A.16.08*M.08
        +A.16.09*M.09+A.16.10*M.10+A.16.11*M.11+A.16.12*M.12+
        A.16.13*M.13+A.16.14*M.14+A.16.15*M.15+A.16.16*M.16+
        A.16.17*M.17+A.16.18*M.18+A.16.19*M.19+A.16.20*M.20+
        A.16.21*M.21+A.16.22*M.22+A.16.23*M.23+A.16.24*M.24+
        A.16.25*M.25+A.16.26*M.26+A.16.27*M.27+A.16.28*M.28+
        A.16.29*M.29)*BETA+B.16+G.16

17:     M.17 = (A.17.01*M.01+A.17.02*M.02+A.17.03*M.03+A.17.04*
        M.04+A.17.05*M.05+A.17.06*M.06+A.17.07*M.07+A.17.08*M.08
        +A.17.09*M.09+A.17.10*M.10+A.17.11*M.11+A.17.12*M.12+
        A.17.13*M.13+A.17.14*M.14+A.17.15*M.15+A.17.16*M.16+
        A.17.17*M.17+A.17.18*M.18+A.17.19*M.19+A.17.20*M.20+
        A.17.21*M.21+A.17.22*M.22+A.17.23*M.23+A.17.24*M.24+
        A.17.25*M.25+A.17.26*M.26+A.17.27*M.27+A.17.28*M.28+
        A.17.29*M.29)*BETA+B.17+G.17
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18:     M.18 = (A.18.01*M.01+A.18.02*M.02+A.18.03*M.03+A.18.04*
        M.04+A.18.05*M.05+A.18.06*M.06+A.18.07*M.07+A.18.08*M.08
        +A.18.09*M.09+A.18.10*M.10+A.18.11*M.11+A.18.12*M.12+
        A.18.13*M.13+A.18.14*M.14+A.18.15*M.15+A.18.16*M.16+
        A.18.17*M.17+A.18.18*M.18+A.18.19*M.19+A.18.20*M.20+
        A.18.21*M.21+A.18.22*M.22+A.18.23*M.23+A.18.24*M.24+
        A.18.25*M.25+A.18.26*M.26+A.18.27*M.27+A.18.28*M.28+
        A.18.29*M.29)*BETA+B.18+G.18

19:     M.19 = (A.19.01*M.01+A.19.02*M.02+A.19.03*M.03+A.19.04*
        M.04+A.19.05*M.05+A.19.06*M.06+A.19.07*M.07+A.19.08*M.08
        +A.19.09*M.09+A.19.10*M.10+A.19.11*M.11+A.19.12*M.12+
        A.19.13*M.13+A.19.14*M.14+A.19.15*M.15+A.19.16*M.16+
        A.19.17*M.17+A.19.18*M.18+A.19.19*M.19+A.19.20*M.20+
        A.19.21*M.21+A.19.22*M.22+A.19.23*M.23+A.19.24*M.24+
        A.19.25*M.25+A.19.26*M.26+A.19.27*M.27+A.19.28*M.28+
        A.19.29*M.29)*BETA+B.19+G.19

20:     M.20 = (A.20.01*M.01+A.20.02*M.02+A.20.03*M.03+A.20.04*
        M.04+A.20.05*M.05+A.20.06*M.06+A.20.07*M.07+A.20.08*M.08
        +A.20.09*M.09+A.20.10*M.10+A.20.11*M.11+A.20.12*M.12+
        A.20.13*M.13+A.20.14*M.14+A.20.15*M.15+A.20.16*M.16+
        A.20.17*M.17+A.20.18*M.18+A.20.19*M.19+A.20.20*M.20+
        A.20.21*M.21+A.20.22*M.22+A.20.23*M.23+A.20.24*M.24+
        A.20.25*M.25+A.20.26*M.26+A.20.27*M.27+A.20.28*M.28+
        A.20.29*M.29)*BETA+B.20+G.20

21:     M.21 = (A.21.01*M.01+A.21.02*M.02+A.21.03*M.03+A.21.04*
        M.04+A.21.05*M.05+A.21.06*M.06+A.21.07*M.07+A.21.08*M.08
        +A.21.09*M.09+A.21.10*M.10+A.21.11*M.11+A.21.12*M.12+
        A.21.13*M.13+A.21.14*M.14+A.21.15*M.15+A.21.16*M.16+
        A.21.17*M.17+A.21.18*M.18+A.21.19*M.19+A.21.20*M.20+
        A.21.21*M.21+A.21.22*M.22+A.21.23*M.23+A.21.24*M.24+
        A.21.25*M.25+A.21.26*M.26+A.21.27*M.27+A.21.28*M.28+
        A.21.29*M.29)*BETA+B.21+G.21

22:     M.22 = (A.22.01*M.01+A.22.02*M.02+A.22.03*M.03+A.22.04*
        M.04+A.22.05*M.05+A.22.06*M.06+A.22.07*M.07+A.22.08*M.08
        +A.22.09*M.09+A.22.10*M.10+A.22.11*M.11+A.22.12*M.12+
        A.22.13*M.13+A.22.14*M.14+A.22.15*M.15+A.22.16*M.16+
        A.22.17*M.17+A.22.18*M.18+A.22.19*M.19+A.22.20*M.20+
        A.22.21*M.21+A.22.22*M.22+A.22.23*M.23+A.22.24*M.24+
        A.22.25*M.25+A.22.26*M.26+A.22.27*M.27+A.22.28*M.28+
        A.22.29*M.29)*BETA+B.22+G.22
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23:     M.23 = (A.23.01*M.01+A.23.02*M.02+A.23.03*M.03+A.23.04*
        M.04+A.23.05*M.05+A.23.06*M.06+A.23.07*M.07+A.23.08*M.08
        +A.23.09*M.09+A.23.10*M.10+A.23.11*M.11+A.23.12*M.12+
        A.23.13*M.13+A.23.14*M.14+A.23.15*M.15+A.23.16*M.16+
        A.23.17*M.17+A.23.18*M.18+A.23.19*M.19+A.23.20*M.20+
        A.23.21*M.21+A.23.22*M.22+A.23.23*M.23+A.23.24*M.24+
        A.23.25*M.25+A.23.26*M.26+A.23.27*M.27+A.23.28*M.28+
        A.23.29*M.29)*BETA+B.23+G.23

24:     M.24 = (A.24.01*M.01+A.24.02*M.02+A.24.03*M.03+A.24.04*
        M.04+A.24.05*M.05+A.24.06*M.06+A.24.07*M.07+A.24.08*M.08
        +A.24.09*M.09+A.24.10*M.10+A.24.11*M.11+A.24.12*M.12+
        A.24.13*M.13+A.24.14*M.14+A.24.15*M.15+A.24.16*M.16+
        A.24.17*M.17+A.24.18*M.18+A.24.19*M.19+A.24.20*M.20+
        A.24.21*M.21+A.24.22*M.22+A.24.23*M.23+A.24.24*M.24+
        A.24.25*M.25+A.24.26*M.26+A.24.27*M.27+A.24.28*M.28+
        A.24.29*M.29)*BETA+B.24+G.24

25:     M.25 = (A.25.01*M.01+A.25.02*M.02+A.25.03*M.03+A.25.04*
        M.04+A.25.05*M.05+A.25.06*M.06+A.25.07*M.07+A.25.08*M.08
        +A.25.09*M.09+A.25.10*M.10+A.25.11*M.11+A.25.12*M.12+
        A.25.13*M.13+A.25.14*M.14+A.25.15*M.15+A.25.16*M.16+
        A.25.17*M.17+A.25.18*M.18+A.25.19*M.19+A.25.20*M.20+
        A.25.21*M.21+A.25.22*M.22+A.25.23*M.23+A.25.24*M.24+
        A.25.25*M.25+A.25.26*M.26+A.25.27*M.27+A.25.28*M.28+
        A.25.29*M.29)*BETA+B.25+G.25

26:     M.26 = (A.26.01*M.01+A.26.02*M.02+A.26.03*M.03+A.26.04*
        M.04+A.26.05*M.05+A.26.06*M.06+A.26.07*M.07+A.26.08*M.08
        +A.26.09*M.09+A.26.10*M.10+A.26.11*M.11+A.26.12*M.12+
        A.26.13*M.13+A.26.14*M.14+A.26.15*M.15+A.26.16*M.16+
        A.26.17*M.17+A.26.18*M.18+A.26.19*M.19+A.26.20*M.20+
        A.26.21*M.21+A.26.22*M.22+A.26.23*M.23+A.26.24*M.24+
        A.26.25*M.25+A.26.26*M.26+A.26.27*M.27+A.26.28*M.28+
        A.26.29*M.29)*BETA+B.26+G.26

27:     M.27 = (A.27.01*M.01+A.27.02*M.02+A.27.03*M.03+A.27.04*
        M.04+A.27.05*M.05+A.27.06*M.06+A.27.07*M.07+A.27.08*M.08
        +A.27.09*M.09+A.27.10*M.10+A.27.11*M.11+A.27.12*M.12+
        A.27.13*M.13+A.27.14*M.14+A.27.15*M.15+A.27.16*M.16+
        A.27.17*M.17+A.27.18*M.18+A.27.19*M.19+A.27.20*M.20+
        A.27.21*M.21+A.27.22*M.22+A.27.23*M.23+A.27.24*M.24+
        A.27.25*M.25+A.27.26*M.26+A.27.27*M.27+A.27.28*M.28+
        A.27.29*M.29)*BETA+B.27+G.27
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28: M.28 = (A.28.01*M.01+A.28.02*M.02+A.28.03*M.03+A.28.04*
M.04+A.28.05*M.05+A.28.06*M.06+A.28.07*M.07+A.28.08*M.08
+A.28.09*M.09+A.28.10*M.10+A.28.11*M.11+A.28.12*M.12+
A.28.13*M.13+A.28.14*M.14+A.28.15*M.15+A.28.16*M.16+
A.28.17*M.17+A.28.18*M.18+A.28.19*M.19+A.28.20*M.20+
A.28.21*M.21+A.28.22*M.22+A.28.23*M.23+A.28.24*M.24+
A.28.25*M.25+A.28.26*M.26+A.28.27*M.27+A.28.28*M.28+
A.28.29*M.29)*BETA+B.28+G.28

29: M.29 = (A.29.01*M.01+A.29.02*M.02+A.29.03*M.03+A.29.04*
M.04+A.29.05*M.05+A.29.06*M.06+A.29.07*M.07+A.29.08*M.08
+A.29.09*M.09+A.29.10*M.10+A.29.11*M.11+A.29.12*M.12+
A.29.13*M.13+A.29.14*M.14+A.29.15*M.15+A.29.16*M.16+
A.29.17*M.17+A.29.18*M.18+A.29.19*M.19+A.29.20*M.20+
A.29.21*M.21+A.29.22*M.22+A.29.23*M.23+A.29.24*M.24+
A.29.25*M.25+A.29.26*M.26+A.29.27*M.27+A.29.28*M.28+
A.29.29*M.29)*BETA+B.29+G.29

Support Employment (S.aa.bb) in region aa due to economic activity in region bb

30: S.01.01 == A.01.01*M.01*BETA

31: S.01.02 == A.01.02*M.02*BETA

32: S.01.03 == A.01.03*M.03*BETA

33: S.01.04 == A.01.04*M.04*BETA

34: S.01.05 == A.01.05*M.05*BETA

35: S.01.06 == A.01.06*M.06*BETA

36: S.01.07 == A.01.07*M.07*BETA

37: S.01.08 == A.01.08*M.08*BETA

38: S.01.09 == A.01.09*M.09*BETA

39: S.01.10 == A.01.10*M.10*BETA

40: S.01.11 == A.01.11*M.11*BETA

41: S.01.12 == A.01.12*M.12*BETA

42: S.01.13 == A.01.13*M.13*BETA

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43:     S.01.14 == A.01.14*M.14*BETA
44:     S.01.15 == A.01.15*M.15*BETA
45:     S.01.16 == A.01.16*M.16*BETA
46:     S.01.17 == A.01.17*M.17*BETA
47:     S.01.18 == A.01.18*M.18*BETA
48:     S.01.19 == A.01.19*M.19*BETA
49:     S.01.20 == A.01.20*M.20*BETA
50:     S.01.21 == A.01.21*M.21*BETA
51:     S.01.22 == A.01.22*M.22*BETA
52:     S.01.23 == A.01.23*M.23*BETA
53:     S.01.24 == A.01.24*M.24*BETA
54:     S.01.25 == A.01.25*M.25*BETA
55:     S.01.26 == A.01.26*M.26*BETA
56:     S.01.27 == A.01.27*M.27*BETA
57:     S.01.28 == A.01.28*M.28*BETA
58:     S.01.29 == A.01.29*M.29*BETA
59:     S.02.01 == A.02.01*M.01*BETA
60:     S.02.02 == A.02.02*M.02*BETA

                      .
                      .
                      .

840:    S.28.28 == A.28.28*M.28*BETA
841:    S.28.29 == A.28.29*M.29*BETA
842:    S.29.01 == A.29.01*M.01*BETA
843:    S.29.02 == A.29.02*M.02*BETA
844:    S.29.03 == A.29.03*M.03*BETA
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845:        S.29.04 == A.29.04*M.04*BETA
846:        S.29.05 == A.29.05*M.05*BETA
847:        S.29.06 == A.29.06*M.06*BETA
848:        S.29.07 == A.29.07*M.07*BETA
849:        S.29.08 == A.29.08*M.08*BETA
850:        S.29.09 == A.29.09*M.09*BETA
851:        S.29.10 == A.29.10*M.10*BETA
852:        S.29.11 == A.29.11*M.11*BETA
853:        S.29.12 == A.29.12*M.12*BETA
854:        S.29.13 == A.29.13*M.13*BETA
855:        S.29.14 == A.29.14*M.14*BETA
856:        S.29.15 == A.29.15*M.15*BETA
857:        S.29.16 == A.29.16*M.16*BETA
858:        S.29.17 == A.29.17*M.17*BETA
859:        S.29.18 == A.29.18*M.18*BETA
860:        S.29.19 == A.29.19*M.19*BETA
861:        S.29.20 == A.29.20*M.20*BETA
862:        S.29.21 == A.29.21*M.21*BETA
863:        S.29.22 == A.29.22*M.22*BETA
864:        S.29.23 == A.29.23*M.23*BETA
865:        S.29.24 == A.29.24*M.24*BETA
866:        S.29.25 == A.29.25*M.25*BETA
867:        S.29.26 == A.29.26*M.26*BETA
868:        S.29.27 == A.29.27*M.27*BETA
869:        S.29.28 == A.29.28*M.28*BETA
870:        S.29.29 == A.29.29*M.29*BETA
```

Support Employment (S.aa) in region aa

871: S.01 == S.01.01+S.01.02+S.01.03+S.01.04+S.01.05+S.01.06+
S.01.07+S.01.08+S.01.09+S.01.10+S.01.11+S.01.12+S.01.13+
S.01.14+S.01.15+S.01.16+S.01.17+S.01.18+S.01.19+S.01.20+
S.01.21+S.01.22+S.01.23+S.01.24+S.01.25+S.01.26+S.01.27+
S.01.28+S.01.29

872: S.02 == S.02.01+S.02.02+S.02.03+S.02.04+S.02.05+S.02.06+
S.02.07+S.02.08+S.02.09+S.02.10+S.02.11+S.02.12+S.02.13+
S.02.14+S.02.15+S.02.16+S.02.17+S.02.18+S.02.19+S.02.20+
S.02.21+S.02.22+S.02.23+S.02.24+S.02.25+S.02.26+S.02.27+
S.02.28+S.02.29

873: S.03 == S.03.01+S.03.02+S.03.03+S.03.04+S.03.05+S.03.06+
S.03.07+S.03.08+S.03.09+S.03.10+S.03.11+S.03.12+S.03.13+
S.03.14+S.03.15+S.03.16+S.03.17+S.03.18+S.03.19+S.03.20+
S.03.21+S.03.22+S.03.23+S.03.24+S.03.25+S.03.26+S.03.27+
S.03.28+S.03.29

874: S.04 == S.04.01+S.04.02+S.04.03+S.04.04+S.04.05+S.04.06+
S.04.07+S.04.08+S.04.09+S.04.10+S.04.11+S.04.12+S.04.13+
S.04.14+S.04.15+S.04.16+S.04.17+S.04.18+S.04.19+S.04.20+
S.04.21+S.04.22+S.04.23+S.04.24+S.04.25+S.04.26+S.04.27+
S.04.28+S.04.29

875: S.05 == S.05.01+S.05.02+S.05.03+S.05.04+S.05.05+S.05.06+
S.05.07+S.05.08+S.05.09+S.05.10+S.05.11+S.05.12+S.05.13+
S.05.14+S.05.15+S.05.16+S.05.17+S.05.18+S.05.19+S.05.20+
S.05.21+S.05.22+S.05.23+S.05.24+S.05.25+S.05.26+S.05.27+
S.05.28+S.05.29

876: S.06 == S.06.01+S.06.02+S.06.03+S.06.04+S.06.05+S.06.06+
S.06.07+S.06.08+S.06.09+S.06.10+S.06.11+S.06.12+S.06.13+
S.06.14+S.06.15+S.06.16+S.06.17+S.06.18+S.06.19+S.06.20+
S.06.21+S.06.22+S.06.23+S.06.24+S.06.25+S.06.26+S.06.27+
S.06.28+S.06.29

877: S.07 == S.07.01+S.07.02+S.07.03+S.07.04+S.07.05+S.07.06+
S.07.07+S.07.08+S.07.09+S.07.10+S.07.11+S.07.12+S.07.13+
S.07.14+S.07.15+S.07.16+S.07.17+S.07.18+S.07.19+S.07.20+
S.07.21+S.07.22+S.07.23+S.07.24+S.07.25+S.07.26+S.07.27+
S.07.28+S.07.29

878: S.08 == S.08.01+S.08.02+S.08.03+S.08.04+S.08.05+S.08.06+
S.08.07+S.08.08+S.08.09+S.08.10+S.08.11+S.08.12+S.08.13+
S.08.14+S.08.15+S.08.16+S.08.17+S.08.18+S.08.19+S.08.20+
S.08.21+S.08.22+S.08.23+S.08.24+S.08.25+S.08.26+S.08.27+
S.08.28+S.08.29

879: S.09 == S.09.01+S.09.02+S.09.03+S.09.04+S.09.05+S.09.06+
S.09.07+S.09.08+S.09.09+S.09.10+S.09.11+S.09.12+S.09.13+
S.09.14+S.09.15+S.09.16+S.09.17+S.09.18+S.09.19+S.09.20+
S.09.21+S.09.22+S.09.23+S.09.24+S.09.25+S.09.26+S.09.27+
S.09.28+S.09.29

880: S.10 == S.10.01+S.10.02+S.10.03+S.10.04+S.10.05+S.10.06+
S.10.07+S.10.08+S.10.09+S.10.10+S.10.11+S.10.12+S.10.13+
S.10.14+S.10.15+S.10.16+S.10.17+S.10.18+S.10.19+S.10.20+
S.10.21+S.10.22+S.10.23+S.10.24+S.10.25+S.10.26+S.10.27+
S.10.28+S.10.29

881: S.11 == S.11.01+S.11.02+S.11.03+S.11.04+S.11.05+S.11.06+
S.11.07+S.11.08+S.11.09+S.11.10+S.11.11+S.11.12+S.11.13+
S.11.14+S.11.15+S.11.16+S.11.17+S.11.18+S.11.19+S.11.20+
S.11.21+S.11.22+S.11.23+S.11.24+S.11.25+S.11.26+S.11.27+
S.11.28+S.11.29

882: S.12 == S.12.01+S.12.02+S.12.03+S.12.04+S.12.05+S.12.06+
S.12.07+S.12.08+S.12.09+S.12.10+S.12.11+S.12.12+S.12.13+
S.12.14+S.12.15+S.12.16+S.12.17+S.12.18+S.12.19+S.12.20+
S.12.21+S.12.22+S.12.23+S.12.24+S.12.25+S.12.26+S.12.27+
S.12.28+S.12.29

883: S.13 == S.13.01+S.13.02+S.13.03+S.13.04+S.13.05+S.13.06+
S.13.07+S.13.08+S.13.09+S.13.10+S.13.11+S.13.12+S.13.13+
S.13.14+S.13.15+S.13.16+S.13.17+S.13.18+S.13.19+S.13.20+
S.13.21+S.13.22+S.13.23+S.13.24+S.13.25+S.13.26+S.13.27+
S.13.28+S.13.29

884: S.14 == S.14.01+S.14.02+S.14.03+S.14.04+S.14.05+S.14.06+
S.14.07+S.14.08+S.14.09+S.14.10+S.14.11+S.14.12+S.14.13+
S.14.14+S.14.15+S.14.16+S.14.17+S.14.18+S.14.19+S.14.20+
S.14.21+S.14.22+S.14.23+S.14.24+S.14.25+S.14.26+S.14.27+
S.14.28+S.14.29

885: S.15 == S.15.01+S.15.02+S.15.03+S.15.04+S.15.05+S.15.06+
S.15.07+S.15.08+S.15.09+S.15.10+S.15.11+S.15.12+S.15.13+
S.15.14+S.15.15+S.15.16+S.15.17+S.15.18+S.15.19+S.15.20+
S.15.21+S.15.22+S.15.23+S.15.24+S.15.25+S.15.26+S.15.27+
S.15.28+S.15.29

886: S.16 == S.16.01+S.16.02+S.16.03+S.16.04+S.16.05+S.16.06+
S.16.07+S.16.08+S.16.09+S.16.10+S.16.11+S.16.12+S.16.13+
S.16.14+S.16.15+S.16.16+S.16.17+S.16.18+S.16.19+S.16.20+
S.16.21+S.16.22+S.16.23+S.16.24+S.16.25+S.16.26+S.16.27+
S.16.28+S.16.29

```
887:      S.17 == S.17.01+S.17.02+S.17.03+S.17.04+S.17.05+S.17.06+
          S.17.07+S.17.08+S.17.09+S.17.10+S.17.11+S.17.12+S.17.13+
          S.17.14+S.17.15+S.17.16+S.17.17+S.17.18+S.17.19+S.17.20+
          S.17.21+S.17.22+S.17.23+S.17.24+S.17.25+S.17.26+S.17.27+
          S.17.28+S.17.29

888:      S.18 == S.18.01+S.18.02+S.18.03+S.18.04+S.18.05+S.18.06+
          S.18.07+S.18.08+S.18.09+S.18.10+S.18.11+S.18.12+S.18.13+
          S.18.14+S.18.15+S.18.16+S.18.17+S.18.18+S.18.19+S.18.20+
          S.18.21+S.18.22+S.18.23+S.18.24+S.18.25+S.18.26+S.18.27+
          S.18.28+S.18.29

889:      S.19 == S.19.01+S.19.02+S.19.03+S.19.04+S.19.05+S.19.06+
          S.19.07+S.19.08+S.19.09+S.19.10+S.19.11+S.19.12+S.19.13+
          S.19.14+S.19.15+S.19.16+S.19.17+S.19.18+S.19.19+S.19.20+
          S.19.21+S.19.22+S.19.23+S.19.24+S.19.25+S.19.26+S.19.27+
          S.19.28+S.19.29

890:      S.20 == S.20.01+S.20.02+S.20.03+S.20.04+S.20.05+S.20.06+
          S.20.07+S.20.08+S.20.09+S.20.10+S.20.11+S.20.12+S.20.13+
          S.20.14+S.20.15+S.20.16+S.20.17+S.20.18+S.20.19+S.20.20+
          S.20.21+S.20.22+S.20.23+S.20.24+S.20.25+S.20.26+S.20.27+
          S.20.28+S.20.29

891:      S.21 == S.21.01+S.21.02+S.21.03+S.21.04+S.21.05+S.21.06+
          S.21.07+S.21.08+S.21.09+S.21.10+S.21.11+S.21.12+S.21.13+
          S.21.14+S.21.15+S.21.16+S.21.17+S.21.18+S.21.19+S.21.20+
          S.21.21+S.21.22+S.21.23+S.21.24+S.21.25+S.21.26+S.21.27+
          S.21.28+S.21.29

892:      S.22 == S.22.01+S.22.02+S.22.03+S.22.04+S.22.05+S.22.06+
          S.22.07+S.22.08+S.22.09+S.22.10+S.22.11+S.22.12+S.22.13+
          S.22.14+S.22.15+S.22.16+S.22.17+S.22.18+S.22.19+S.22.20+
          S.22.21+S.22.22+S.22.23+S.22.24+S.22.25+S.22.26+S.22.27+
          S.22.28+S.22.29

893:      S.23 == S.23.01+S.23.02+S.23.03+S.23.04+S.23.05+S.23.06+
          S.23.07+S.23.08+S.23.09+S.23.10+S.23.11+S.23.12+S.23.13+
          S.23.14+S.23.15+S.23.16+S.23.17+S.23.18+S.23.19+S.23.20+
          S.23.21+S.23.22+S.23.23+S.23.24+S.23.25+S.23.26+S.23.27+
          S.23.28+S.23.29

894:      S.24 == S.24.01+S.24.02+S.24.03+S.24.04+S.24.05+S.24.06+
          S.24.07+S.24.08+S.24.09+S.24.10+S.24.11+S.24.12+S.24.13+
          S.24.14+S.24.15+S.24.16+S.24.17+S.24.18+S.24.19+S.24.20+
          S.24.21+S.24.22+S.24.23+S.24.24+S.24.25+S.24.26+S.24.27+
          S.24.28+S.24.29
```

895: S.25 == S.25.01+S.25.02+S.25.03+S.25.04+S.25.05+S.25.06+
S.25.07+S.25.08+S.25.09+S.25.10+S.25.11+S.25.12+S.25.13+
S.25.14+S.25.15+S.25.16+S.25.17+S.25.18+S.25.19+S.25.20+
S.25.21+S.25.22+S.25.23+S.25.24+S.25.25+S.25.26+S.25.27+
S.25.28+S.25.29

896: S.26 == S.26.01+S.26.02+S.26.03+S.26.04+S.26.05+S.26.06+
S.26.07+S.26.08+S.26.09+S.26.10+S.26.11+S.26.12+S.26.13+
S.26.14+S.26.15+S.26.16+S.26.17+S.26.18+S.26.19+S.26.20+
S.26.21+S.26.22+S.26.23+S.26.24+S.26.25+S.26.26+S.26.27+
S.26.28+S.26.29

897: S.27 == S.27.01+S.27.02+S.27.03+S.27.04+S.27.05+S.27.06+
S.27.07+S.27.08+S.27.09+S.27.10+S.27.11+S.27.12+S.27.13+
S.27.14+S.27.15+S.27.16+S.27.17+S.27.18+S.27.19+S.27.20+
S.27.21+S.27.22+S.27.23+S.27.24+S.27.25+S.27.26+S.27.27+
S.27.28+S.27.29

898: S.28 == S.28.01+S.28.02+S.28.03+S.28.04+S.28.05+S.28.06+
S.28.07+S.28.08+S.28.09+S.28.10+S.28.11+S.28.12+S.28.13+
S.28.14+S.28.15+S.28.16+S.28.17+S.28.18+S.28.19+S.28.20+
S.28.21+S.28.22+S.28.23+S.28.24+S.28.25+S.28.26+S.28.27+
S.28.28+S.28.29

899: S.29 == S.29.01+S.29.02+S.29.03+S.29.04+S.29.05+S.29.06+
S.29.07+S.29.08+S.29.09+S.29.10+S.29.11+S.29.12+S.29.13+
S.29.14+S.29.15+S.29.16+S.29.17+S.29.18+S.29.19+S.29.20+
S.29.21+S.29.22+S.29.23+S.29.24+S.29.25+S.29.26+S.29.27+
S.29.28+S.29.29

Aggregate Employment by Type

900: S.ST == S.01+S.02+S.03+S.04+S.05+S.06+S.07+S.08+S.09+
S.10+S.11+S.12+S.13+S.14+S.15+S.16+S.17+S.18+S.19+S.20+
S.21+S.22+S.23+S.24+S.25+S.26+S.27+S.28+S.29

901: B.ST == B.01+B.02+B.03+B.04+B.05+B.06+B.07+B.08+B.09+
B.10+B.11+B.12+B.13+B.14+B.15+B.16+B.17+B.18+B.19+B.20+
B.21+B.22+B.23+B.24+B.25+B.26+B.27+B.28+B.29

902: G.ST == G.01+G.02+G.03+G.04+G.05+G.06+G.07+G.08+G.09+
G.10+G.11+G.12+G.13+G.14+G.15+G.16+G.17+G.18+G.19+G.20+
G.21+G.22+G.23+G.24+G.25+G.26+G.27+G.28+G.29

903: M.ST == M.01+M.02+M.03+M.04+M.05+M.06+M.07+M.08+M.09+
M.10+M.11+M.12+M.13+M.14+M.15+M.16+M.17+M.18+M.19+M.20+
M.21+M.22+M.23+M.24+M.25+M.26+M.27+M.28+M.29

904: B.RB == B.02+B.09+B.12+B.17+B.21+B.24+B.26

905: G.RB == G.02+G.09+G.12+G.17+G.21+G.24+G.26

906: S.RB == S.02+S.09+S.12+S.17+S.21+S.24+S.26

907: M.RB == M.02+M.09+M.12+M.17+M.21+M.24+M.26

908: B.NR == B.ST-B.RB

909: G.NR == G.ST-G.RB

910: S.NR == S.ST-S.RB

911: M.NR == M.ST-M.RB

912: B.AM == B.02+B.17

913: G.AM == G.02+G.17

914: S.AM == S.02+S.17

915: M.AM == M.02+M.17

916: BAM == B02+B17

917: GAM == G02+G17

918: BST == B01+B02+B03+B04+B05+B06+B07+B08+B09+B10+B11+B12+B13+B14+B15+B16+B17+B18+B19+B20+B21+B22+B23+B24+B25+B26+B27+B28+B29

919: GST == G01+G02+G03+G04+G05+G06+G07+G08+G09+G10+G11+G12+G13+G14+G15+G16+G17+G18+G19+G20+G21+G22+G23+G24+G25+G26+G27+G28+G29

920: BRB == B02+B09+B12+B17+B21+B24+B26

921: BNR == BST-BRB

922: GRB == G02+G09+G12+G17+G21+G24+G26

923: GNR == GST-GRB

924: G.AG == G.AM+G.21+G.12

925: B.AG == B.AM+B.21+B.12

926: S.AG == S.AM+S.21+S.12

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927:    M.AG == M.AM+M.21+M.12

928:    G.FG == G.09+G.24

929:    B.FG == B.09+B.24

930:    S.FG == S.09+S.24

931:    M.FG == M.09+M.24

932:    GAG == GAM+G21+G12

933:    BAG == BAM+B21+B12

934:    GFG == G09+G24

935:    BFG == B09+B24
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Preliminary Population Estimate (PRE.aa) for region aa

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936:    PRE.29 == PM.29*(M.01*IM.29.01+M.02*IM.29.02+M.03*
        IM.29.03+M.04*IM.29.04+M.05*IM.29.05+M.06*IM.29.06+M.07*
        IM.29.07+M.08*IM.29.08+M.09*IM.29.09+M.10*IM.29.10+M.11*
        IM.29.11+M.12*IM.29.12+M.13*IM.29.13+M.14*IM.29.14+M.15*
        IM.29.15+M.16*IM.29.16+M.17*IM.29.17+M.18*IM.29.18+M.19*
        IM.29.19+M.20*IM.29.20+M.21*IM.29.21+M.22*IM.29.22+M.23*
        IM.29.23+M.24*IM.29.24+M.25*IM.29.25+M.26*IM.29.26+M.27*
        IM.29.27+M.28*IM.29.28+M.29*IM.29.29)

937:    PRE.28 == PM.28*(M.01*IM.28.01+M.02*IM.28.02+M.03*
        IM.28.03+M.04*IM.28.04+M.05*IM.28.05+M.06*IM.28.06+M.07*
        IM.28.07+M.08*IM.28.08+M.09*IM.28.09+M.10*IM.28.10+M.11*
        IM.28.11+M.12*IM.28.12+M.13*IM.28.13+M.14*IM.28.14+M.15*
        IM.28.15+M.16*IM.28.16+M.17*IM.28.17+M.18*IM.28.18+M.19*
        IM.28.19+M.20*IM.28.20+M.21*IM.28.21+M.22*IM.28.22+M.23*
        IM.28.23+M.24*IM.28.24+M.25*IM.28.25+M.26*IM.28.26+M.27*
        IM.28.27+M.28*IM.28.28+M.29*IM.28.29)

938:    PRE.27 == PM.27*(M.01*IM.27.01+M.02*IM.27.02+M.03*
        IM.27.03+M.04*IM.27.04+M.05*IM.27.05+M.06*IM.27.06+M.07*
        IM.27.07+M.08*IM.27.08+M.09*IM.27.09+M.10*IM.27.10+M.11*
        IM.27.11+M.12*IM.27.12+M.13*IM.27.13+M.14*IM.27.14+M.15*
        IM.27.15+M.16*IM.27.16+M.17*IM.27.17+M.18*IM.27.18+M.19*
        IM.27.19+M.20*IM.27.20+M.21*IM.27.21+M.22*IM.27.22+M.23*
        IM.27.23+M.24*IM.27.24+M.25*IM.27.25+M.26*IM.27.26+M.27*
        IM.27.27+M.28*IM.27.28+M.29*IM.27.29)
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939:        PRE.26 == PM.26*(M.01*IM.26.01+M.02*IM.26.02+M.03*
            IM.26.03+M.04*IM.26.04+M.05*IM.26.05+M.06*IM.26.06+M.07*
            IM.26.07+M.08*IM.26.08+M.09*IM.26.09+M.10*IM.26.10+M.11*
            IM.26.11+M.12*IM.26.12+M.13*IM.26.13+M.14*IM.26.14+M.15*
            IM.26.15+M.16*IM.26.16+M.17*IM.26.17+M.18*IM.26.18+M.19*
            IM.26.19+M.20*IM.26.20+M.21*IM.26.21+M.22*IM.26.22+M.23*
            IM.26.23+M.24*IM.26.24+M.25*IM.26.25+M.26*IM.26.26+M.27*
            IM.26.27+M.28*IM.26.28+M.29*IM.26.29)

940:        PRE.25 == PM.25*(M.01*IM.25.01+M.02*IM.25.02+M.03*
            IM.25.03+M.04*IM.25.04+M.05*IM.25.05+M.06*IM.25.06+M.07*
            IM.25.07+M.08*IM.25.08+M.09*IM.25.09+M.10*IM.25.10+M.11*
            IM.25.11+M.12*IM.25.12+M.13*IM.25.13+M.14*IM.25.14+M.15*
            IM.25.15+M.16*IM.25.16+M.17*IM.25.17+M.18*IM.25.18+M.19*
            IM.25.19+M.20*IM.25.20+M.21*IM.25.21+M.22*IM.25.22+M.23*
            IM.25.23+M.24*IM.25.24+M.25*IM.25.25+M.26*IM.25.26+M.27*
            IM.25.27+M.28*IM.25.28+M.29*IM.25.29)

941:        PRE.24 == PM.24*(M.01*IM.24.01+M.02*IM.24.02+M.03*
            IM.24.03+M.04*IM.24.04+M.05*IM.24.05+M.06*IM.24.06+M.07*
            IM.24.07+M.08*IM.24.08+M.09*IM.24.09+M.10*IM.24.10+M.11*
            IM.24.11+M.12*IM.24.12+M.13*IM.24.13+M.14*IM.24.14+M.15*
            IM.24.15+M.16*IM.24.16+M.17*IM.24.17+M.18*IM.24.18+M.19*
            IM.24.19+M.20*IM.24.20+M.21*IM.24.21+M.22*IM.24.22+M.23*
            IM.24.23+M.24*IM.24.24+M.25*IM.24.25+M.26*IM.24.26+M.27*
            IM.24.27+M.28*IM.24.28+M.29*IM.24.29)

942:        PRE.23 == PM.23*(M.01*IM.23.01+M.02*IM.23.02+M.03*
            IM.23.03+M.04*IM.23.04+M.05*IM.23.05+M.06*IM.23.06+M.07*
            IM.23.07+M.08*IM.23.08+M.09*IM.23.09+M.10*IM.23.10+M.11*
            IM.23.11+M.12*IM.23.12+M.13*IM.23.13+M.14*IM.23.14+M.15*
            IM.23.15+M.16*IM.23.16+M.17*IM.23.17+M.18*IM.23.18+M.19*
            IM.23.19+M.20*IM.23.20+M.21*IM.23.21+M.22*IM.23.22+M.23*
            IM.23.23+M.24*IM.23.24+M.25*IM.23.25+M.26*IM.23.26+M.27*
            IM.23.27+M.28*IM.23.28+M.29*IM.23.29)

943:        PRE.22 == PM.22*(M.01*IM.22.01+M.02*IM.22.02+M.03*
            IM.22.03+M.04*IM.22.04+M.05*IM.22.05+M.06*IM.22.06+M.07*
            IM.22.07+M.08*IM.22.08+M.09*IM.22.09+M.10*IM.22.10+M.11*
            IM.22.11+M.12*IM.22.12+M.13*IM.22.13+M.14*IM.22.14+M.15*
            IM.22.15+M.16*IM.22.16+M.17*IM.22.17+M.18*IM.22.18+M.19*
            IM.22.19+M.20*IM.22.20+M.21*IM.22.21+M.22*IM.22.22+M.23*
            IM.22.23+M.24*IM.22.24+M.25*IM.22.25+M.26*IM.22.26+M.27*
            IM.22.27+M.28*IM.22.28+M.29*IM.22.29)
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944: PRE.21 == PM.21*(M.01*IM.21.01+M.02*IM.21.02+M.03*
IM.21.03+M.04*IM.21.04+M.05*IM.21.05+M.06*IM.21.06+M.07*
IM.21.07+M.08*IM.21.08+M.09*IM.21.09+M.10*IM.21.10+M.11*
IM.21.11+M.12*IM.21.12+M.13*IM.21.13+M.14*IM.21.14+M.15*
IM.21.15+M.16*IM.21.16+M.17*IM.21.17+M.18*IM.21.18+M.19*
IM.21.19+M.20*IM.21.20+M.21*IM.21.21+M.22*IM.21.22+M.23*
IM.21.23+M.24*IM.21.24+M.25*IM.21.25+M.26*IM.21.26+M.27*
IM.21.27+M.28*IM.21.28+M.29*IM.21.29)

945: PRE.20 == PM.20*(M.01*IM.20.01+M.02*IM.20.02+M.03*
IM.20.03+M.04*IM.20.04+M.05*IM.20.05+M.06*IM.20.06+M.07*
IM.20.07+M.08*IM.20.08+M.09*IM.20.09+M.10*IM.20.10+M.11*
IM.20.11+M.12*IM.20.12+M.13*IM.20.13+M.14*IM.20.14+M.15*
IM.20.15+M.16*IM.20.16+M.17*IM.20.17+M.18*IM.20.18+M.19*
IM.20.19+M.20*IM.20.20+M.21*IM.20.21+M.22*IM.20.22+M.23*
IM.20.23+M.24*IM.20.24+M.25*IM.20.25+M.26*IM.20.26+M.27*
IM.20.27+M.28*IM.20.28+M.29*IM.20.29)

946: PRE.19 == PM.19*(M.01*IM.19.01+M.02*IM.19.02+M.03*
IM.19.03+M.04*IM.19.04+M.05*IM.19.05+M.06*IM.19.06+M.07*
IM.19.07+M.08*IM.19.08+M.09*IM.19.09+M.10*IM.19.10+M.11*
IM.19.11+M.12*IM.19.12+M.13*IM.19.13+M.14*IM.19.14+M.15*
IM.19.15+M.16*IM.19.16+M.17*IM.19.17+M.18*IM.19.18+M.19*
IM.19.19+M.20*IM.19.20+M.21*IM.19.21+M.22*IM.19.22+M.23*
IM.19.23+M.24*IM.19.24+M.25*IM.19.25+M.26*IM.19.26+M.27*
IM.19.27+M.28*IM.19.28+M.29*IM.19.29)

947: PRE.18 == PM.18*(M.01*IM.18.01+M.02*IM.18.02+M.03*
IM.18.03+M.04*IM.18.04+M.05*IM.18.05+M.06*IM.18.06+M.07*
IM.18.07+M.08*IM.18.08+M.09*IM.18.09+M.10*IM.18.10+M.11*
IM.18.11+M.12*IM.18.12+M.13*IM.18.13+M.14*IM.18.14+M.15*
IM.18.15+M.16*IM.18.16+M.17*IM.18.17+M.18*IM.18.18+M.19*
IM.18.19+M.20*IM.18.20+M.21*IM.18.21+M.22*IM.18.22+M.23*
IM.18.23+M.24*IM.18.24+M.25*IM.18.25+M.26*IM.18.26+M.27*
IM.18.27+M.28*IM.18.28+M.29*IM.18.29)

948: PRE.17 == PM.17*(M.01*IM.17.01+M.02*IM.17.02+M.03*
IM.17.03+M.04*IM.17.04+M.05*IM.17.05+M.06*IM.17.06+M.07*
IM.17.07+M.08*IM.17.08+M.09*IM.17.09+M.10*IM.17.10+M.11*
IM.17.11+M.12*IM.17.12+M.13*IM.17.13+M.14*IM.17.14+M.15*
IM.17.15+M.16*IM.17.16+M.17*IM.17.17+M.18*IM.17.18+M.19*
IM.17.19+M.20*IM.17.20+M.21*IM.17.21+M.22*IM.17.22+M.23*
IM.17.23+M.24*IM.17.24+M.25*IM.17.25+M.26*IM.17.26+M.27*
IM.17.27+M.28*IM.17.28+M.29*IM.17.29)

949: PRE.16 == PM.16*(M.01*IM.16.01+M.02*IM.16.02+M.03*
IM.16.03+M.04*IM.16.04+M.05*IM.16.05+M.06*IM.16.06+M.07*
IM.16.07+M.08*IM.16.08+M.09*IM.16.09+M.10*IM.16.10+M.11*
IM.16.11+M.12*IM.16.12+M.13*IM.16.13+M.14*IM.16.14+M.15*
IM.16.15+M.16*IM.16.16+M.17*IM.16.17+M.18*IM.16.18+M.19*
IM.16.19+M.20*IM.16.20+M.21*IM.16.21+M.22*IM.16.22+M.23*
IM.16.23+M.24*IM.16.24+M.25*IM.16.25+M.26*IM.16.26+M.27*
IM.16.27+M.28*IM.16.28+M.29*IM.16.29)

950: PRE.15 == PM.15*(M.01*IM.15.01+M.02*IM.15.02+M.03*
IM.15.03+M.04*IM.15.04+M.05*IM.15.05+M.06*IM.15.06+M.07*
IM.15.07+M.08*IM.15.08+M.09*IM.15.09+M.10*IM.15.10+M.11*
IM.15.11+M.12*IM.15.12+M.13*IM.15.13+M.14*IM.15.14+M.15*
IM.15.15+M.16*IM.15.16+M.17*IM.15.17+M.18*IM.15.18+M.19*
IM.15.19+M.20*IM.15.20+M.21*IM.15.21+M.22*IM.15.22+M.23*
IM.15.23+M.24*IM.15.24+M.25*IM.15.25+M.26*IM.15.26+M.27*
IM.15.27+M.28*IM.15.28+M.29*IM.15.29)

951: PRE.14 == PM.14*(M.01*IM.14.01+M.02*IM.14.02+M.03*
IM.14.03+M.04*IM.14.04+M.05*IM.14.05+M.06*IM.14.06+M.07*
IM.14.07+M.08*IM.14.08+M.09*IM.14.09+M.10*IM.14.10+M.11*
IM.14.11+M.12*IM.14.12+M.13*IM.14.13+M.14*IM.14.14+M.15*
IM.14.15+M.16*IM.14.16+M.17*IM.14.17+M.18*IM.14.18+M.19*
IM.14.19+M.20*IM.14.20+M.21*IM.14.21+M.22*IM.14.22+M.23*
IM.14.23+M.24*IM.14.24+M.25*IM.14.25+M.26*IM.14.26+M.27*
IM.14.27+M.28*IM.14.28+M.29*IM.14.29)

952: PRE.13 == PM.13*(M.01*IM.13.01+M.02*IM.13.02+M.03*
IM.13.03+M.04*IM.13.04+M.05*IM.13.05+M.06*IM.13.06+M.07*
IM.13.07+M.08*IM.13.08+M.09*IM.13.09+M.10*IM.13.10+M.11*
IM.13.11+M.12*IM.13.12+M.13*IM.13.13+M.14*IM.13.14+M.15*
IM.13.15+M.16*IM.13.16+M.17*IM.13.17+M.18*IM.13.18+M.19*
IM.13.19+M.20*IM.13.20+M.21*IM.13.21+M.22*IM.13.22+M.23*
IM.13.23+M.24*IM.13.24+M.25*IM.13.25+M.26*IM.13.26+M.27*
IM.13.27+M.28*IM.13.28+M.29*IM.13.29)

953: PRE.12 == PM.12*(M.01*IM.12.01+M.02*IM.12.02+M.03*
IM.12.03+M.04*IM.12.04+M.05*IM.12.05+M.06*IM.12.06+M.07*
IM.12.07+M.08*IM.12.08+M.09*IM.12.09+M.10*IM.12.10+M.11*
IM.12.11+M.12*IM.12.12+M.13*IM.12.13+M.14*IM.12.14+M.15*
IM.12.15+M.16*IM.12.16+M.17*IM.12.17+M.18*IM.12.18+M.19*
IM.12.19+M.20*IM.12.20+M.21*IM.12.21+M.22*IM.12.22+M.23*
IM.12.23+M.24*IM.12.24+M.25*IM.12.25+M.26*IM.12.26+M.27*
IM.12.27+M.28*IM.12.28+M.29*IM.12.29)

954: PRE.11 == PM.11*(M.01*IM.11.01+M.02*IM.11.02+M.03*
IM.11.03+M.04*IM.11.04+M.05*IM.11.05+M.06*IM.11.06+M.07*
IM.11.07+M.08*IM.11.08+M.09*IM.11.09+M.10*IM.11.10+M.11*
IM.11.11+M.12*IM.11.12+M.13*IM.11.13+M.14*IM.11.14+M.15*
IM.11.15+M.16*IM.11.16+M.17*IM.11.17+M.18*IM.11.18+M.19*
IM.11.19+M.20*IM.11.20+M.21*IM.11.21+M.22*IM.11.22+M.23*
IM.11.23+M.24*IM.11.24+M.25*IM.11.25+M.26*IM.11.26+M.27*
IM.11.27+M.28*IM.11.28+M.29*IM.11.29)

955: PRE.10 == PM.10*(M.01*IM.10.01+M.02*IM.10.02+M.03*
IM.10.03+M.04*IM.10.04+M.05*IM.10.05+M.06*IM.10.06+M.07*
IM.10.07+M.08*IM.10.08+M.09*IM.10.09+M.10*IM.10.10+M.11*
IM.10.11+M.12*IM.10.12+M.13*IM.10.13+M.14*IM.10.14+M.15*
IM.10.15+M.16*IM.10.16+M.17*IM.10.17+M.18*IM.10.18+M.19*
IM.10.19+M.20*IM.10.20+M.21*IM.10.21+M.22*IM.10.22+M.23*
IM.10.23+M.24*IM.10.24+M.25*IM.10.25+M.26*IM.10.26+M.27*
IM.10.27+M.28*IM.10.28+M.29*IM.10.29)

956: PRE.09 == PM.09*(M.01*IM.09.01+M.02*IM.09.02+M.03*
IM.09.03+M.04*IM.09.04+M.05*IM.09.05+M.06*IM.09.06+M.07*
IM.09.07+M.08*IM.09.08+M.09*IM.09.09+M.10*IM.09.10+M.11*
IM.09.11+M.12*IM.09.12+M.13*IM.09.13+M.14*IM.09.14+M.15*
IM.09.15+M.16*IM.09.16+M.17*IM.09.17+M.18*IM.09.18+M.19*
IM.09.19+M.20*IM.09.20+M.21*IM.09.21+M.22*IM.09.22+M.23*
IM.09.23+M.24*IM.09.24+M.25*IM.09.25+M.26*IM.09.26+M.27*
IM.09.27+M.28*IM.09.28+M.29*IM.09.29)

957: PRE.08 == PM.08*(M.01*IM.08.01+M.02*IM.08.02+M.03*
IM.08.03+M.04*IM.08.04+M.05*IM.08.05+M.06*IM.08.06+M.07*
IM.08.07+M.08*IM.08.08+M.09*IM.08.09+M.10*IM.08.10+M.11*
IM.08.11+M.12*IM.08.12+M.13*IM.08.13+M.14*IM.08.14+M.15*
IM.08.15+M.16*IM.08.16+M.17*IM.08.17+M.18*IM.08.18+M.19*
IM.08.19+M.20*IM.08.20+M.21*IM.08.21+M.22*IM.08.22+M.23*
IM.08.23+M.24*IM.08.24+M.25*IM.08.25+M.26*IM.08.26+M.27*
IM.08.27+M.28*IM.08.28+M.29*IM.08.29)

958: PRE.07 == PM.07*(M.01*IM.07.01+M.02*IM.07.02+M.03*
IM.07.03+M.04*IM.07.04+M.05*IM.07.05+M.06*IM.07.06+M.07*
IM.07.07+M.08*IM.07.08+M.09*IM.07.09+M.10*IM.07.10+M.11*
IM.07.11+M.12*IM.07.12+M.13*IM.07.13+M.14*IM.07.14+M.15*
IM.07.15+M.16*IM.07.16+M.17*IM.07.17+M.18*IM.07.18+M.19*
IM.07.19+M.20*IM.07.20+M.21*IM.07.21+M.22*IM.07.22+M.23*
IM.07.23+M.24*IM.07.24+M.25*IM.07.25+M.26*IM.07.26+M.27*
IM.07.27+M.28*IM.07.28+M.29*IM.07.29)

959: PRE.06 == PM.06*(M.01*IM.06.01+M.02*IM.06.02+M.03*IM.06.03+M.04*IM.06.04+M.05*IM.06.05+M.06*IM.06.06+M.07*IM.06.07+M.08*IM.06.08+M.09*IM.06.09+M.10*IM.06.10+M.11*IM.06.11+M.12*IM.06.12+M.13*IM.06.13+M.14*IM.06.14+M.15*IM.06.15+M.16*IM.06.16+M.17*IM.06.17+M.18*IM.06.18+M.19*IM.06.19+M.20*IM.06.20+M.21*IM.06.21+M.22*IM.06.22+M.23*IM.06.23+M.24*IM.06.24+M.25*IM.06.25+M.26*IM.06.26+M.27*IM.06.27+M.28*IM.06.28+M.29*IM.06.29)

960: PRE.05 == PM.05*(M.01*IM.05.01+M.02*IM.05.02+M.03*IM.05.03+M.04*IM.05.04+M.05*IM.05.05+M.06*IM.05.06+M.07*IM.05.07+M.08*IM.05.08+M.09*IM.05.09+M.10*IM.05.10+M.11*IM.05.11+M.12*IM.05.12+M.13*IM.05.13+M.14*IM.05.14+M.15*IM.05.15+M.16*IM.05.16+M.17*IM.05.17+M.18*IM.05.18+M.19*IM.05.19+M.20*IM.05.20+M.21*IM.05.21+M.22*IM.05.22+M.23*IM.05.23+M.24*IM.05.24+M.25*IM.05.25+M.26*IM.05.26+M.27*IM.05.27+M.28*IM.05.28+M.29*IM.05.29)

961: PRE.04 == PM.04*(M.01*IM.04.01+M.02*IM.04.02+M.03*IM.04.03+M.04*IM.04.04+M.05*IM.04.05+M.06*IM.04.06+M.07*IM.04.07+M.08*IM.04.08+M.09*IM.04.09+M.10*IM.04.10+M.11*IM.04.11+M.12*IM.04.12+M.13*IM.04.13+M.14*IM.04.14+M.15*IM.04.15+M.16*IM.04.16+M.17*IM.04.17+M.18*IM.04.18+M.19*IM.04.19+M.20*IM.04.20+M.21*IM.04.21+M.22*IM.04.22+M.23*IM.04.23+M.24*IM.04.24+M.25*IM.04.25+M.26*IM.04.26+M.27*IM.04.27+M.28*IM.04.28+M.29*IM.04.29)

962: PRE.03 == PM.03*(M.01*IM.03.01+M.02*IM.03.02+M.03*IM.03.03+M.04*IM.03.04+M.05*IM.03.05+M.06*IM.03.06+M.07*IM.03.07+M.08*IM.03.08+M.09*IM.03.09+M.10*IM.03.10+M.11*IM.03.11+M.12*IM.03.12+M.13*IM.03.13+M.14*IM.03.14+M.15*IM.03.15+M.16*IM.03.16+M.17*IM.03.17+M.18*IM.03.18+M.19*IM.03.19+M.20*IM.03.20+M.21*IM.03.21+M.22*IM.03.22+M.23*IM.03.23+M.24*IM.03.24+M.25*IM.03.25+M.26*IM.03.26+M.27*IM.03.27+M.28*IM.03.28+M.29*IM.03.29)

963: PRE.02 == PM.02*(M.01*IM.02.01+M.02*IM.02.02+M.03*IM.02.03+M.04*IM.02.04+M.05*IM.02.05+M.06*IM.02.06+M.07*IM.02.07+M.08*IM.02.08+M.09*IM.02.09+M.10*IM.02.10+M.11*IM.02.11+M.12*IM.02.12+M.13*IM.02.13+M.14*IM.02.14+M.15*IM.02.15+M.16*IM.02.16+M.17*IM.02.17+M.18*IM.02.18+M.19*IM.02.19+M.20*IM.02.20+M.21*IM.02.21+M.22*IM.02.22+M.23*IM.02.23+M.24*IM.02.24+M.25*IM.02.25+M.26*IM.02.26+M.27*IM.02.27+M.28*IM.02.28+M.29*IM.02.29)

964: PRE.01 == PM.01*(M.01*IM.01.01+M.02*IM.01.02+M.03*IM.01.03+M.04*IM.01.04+M.05*IM.01.05+M.06*IM.01.06+M.07*IM.01.07+M.08*IM.01.08+M.09*IM.01.09+M.10*IM.01.10+M.11*IM.01.11+M.12*IM.01.12+M.13*IM.01.13+M.14*IM.01.14+M.15*IM.01.15+M.16*IM.01.16+M.17*IM.01.17+M.18*IM.01.18+M.19*IM.01.19+M.20*IM.01.20+M.21*IM.01.21+M.22*IM.01.22+M.23*IM.01.23+M.24*IM.01.24+M.25*IM.01.25+M.26*IM.01.26+M.27*IM.01.27+M.28*IM.01.28+M.29*IM.01.29)

965: PRE.ST == PRE.01+PRE.02+PRE.03+PRE.04+PRE.05+PRE.06+PRE.07+PRE.08+PRE.09+PRE.10+PRE.11+PRE.12+PRE.13+PRE.14+PRE.15+PRE.16+PRE.17+PRE.18+PRE.19+PRE.20+PRE.21+PRE.22+PRE.23+PRE.24+PRE.25+PRE.26+PRE.27+PRE.28+PRE.29

966: ADJ == POP/PRE.ST

Population (P.aa) in region aa (1970 Census Divisions)

967: P.29 == PRE.29*ADJ

968: P.28 == PRE.28*ADJ

969: P.27 == PRE.27*ADJ

970: P.26 == PRE.26*ADJ

971: P.25 == PRE.25*ADJ

972: P.24 == PRE.24*ADJ

973: P.23 == PRE.23*ADJ

974: P.22 == PRE.22*ADJ

975: P.21 == PRE.21*ADJ

976: P.20 == PRE.20*ADJ

977: P.19 == PRE.19*ADJ

978: P.18 == PRE.18*ADJ

979: P.17 == PRE.17*ADJ

980: P.16 == PRE.16*ADJ

981: P.15 == PRE.15*ADJ

982: P.14 == PRE.14*ADJ

983: P.13 == PRE.13*ADJ

984: P.12 == PRE.12*ADJ

985: P.11 == PRE.11*ADJ

986: P.10 == PRE.10*ADJ

987: P.09 == PRE.09*ADJ

988: P.08 == PRE.08*ADJ

989: P.07 == PRE.07*ADJ

990: P.06 == PRE.06*ADJ

991: P.05 == PRE.05*ADJ

992: P.04 == PRE.04*ADJ

993: P.03 == PRE.03*ADJ

994: P.02 == PRE.02*ADJ

995: P.01 == PRE.01*ADJ

996: P.ST == P.01+P.02+P.03+P.04+P.05+P.06+P.07+P.08+P.09+
P.10+P.11+P.12+P.13+P.14+P.15+P.16+P.17+P.18+P.19+P.20+
P.21+P.22+P.23+P.24+P.25+P.26+P.27+P.28+P.29

997: P.RB == P.02+P.09+P.12+P.17+P.21+P.24+P.26

998: P.NR == P.ST-P.RB

999: P.AM == P.02+P.17

1000: P.AG == P.AM+P.21+P.12

1001: P.FG == P.09+P.24

Population (PCEN.cc) in region cc (1980 Census Divisions)

1002:	PCEN.01 == P.04
1003:	PCEN.02 == P.14
1004:	PCEN.03 == P.18
1005:	PCEN.04 == P.29+P.16*PC.04.16+P.25*PC.04.25
1006:	PCEN.05 == P.09
1007:	PCEN.06 = P.24+P.25*PC.06.25
1008:	PCEN.07 == P.27
1009:	PCEN.08 == P.05+P.16*PC.08.16
1010:	PCEN.09 == P.07
1011:	PCEN.10 == P.06
1012:	PCEN.11 == P.01
1013:	PCEN.12 == P.17
1014:	PCEN.13 == P.02
1015:	PCEN.14 == P.12+P.21
1016:	PCEN.15 == P.15
1017:	PCEN.16 == P.08+P.26
1018:	PCEN.17 == P.23+P.03
1019:	PCEN.18 == P.10
1020:	PCEN.19 == P.11
1021:	PCEN.20 == P.22
1022:	PCEN.21 == P.28
1023:	PCEN.22 == P.20+P.19
1024:	PCEN.23 == P.13

Preliminary Household Estimate (HPRE.cc) for region cc

1025: HPRE.01 == (PCEN.01-PGQ.01)/HHSZ.01

1026: HPRE.02 == (PCEN.02-PGQ.02)/HHSZ.02

1027: HPRE.03 == (PCEN.03-PGQ.03)/HHSZ.03

1028: HPRE.04 == (PCEN.04-PGQ.04)/HHSZ.04

1029: HPRE.05 == (PCEN.05-PGQ.05)/HHSZ.05

1030: HPRE.06 == (PCEN.06-PGQ.06)/HHSZ.06

1031: HPRE.07 == (PCEN.07-PGQ.07)/HHSZ.07

1032: HPRE.08 == (PCEN.08-PGQ.08)/HHSZ.08

1033: HPRE.09 == 0

1034: HPRE.10 == (PCEN.10-PGQ.10)/HHSZ.10

1035: HPRE.11 == (PCEN.11-PGQ.11)/HHSZ.11

1036: HPRE.12 == (PCEN.12-PGQ.12)/HHSZ.12

1037: HPRE.13 == (PCEN.13-PGQ.13)/HHSZ.13

1038: HPRE.14 == (PCEN.14-PGQ.14)/HHSZ.14

1039: HPRE.15 == (PCEN.15-PGQ.15)/HHSZ.15

1040: HPRE.16 == (PCEN.16-PGQ.16)/HHSZ.16

1041: HPRE.17 == 0

1042: HPRE.18 == 0

1043: HPRE.19 == (PCEN.19-PGQ.19)/HHSZ.19

1044: HPRE.20 == 0

1045: HPRE.21 == 0

1046: HPRE.22 == 0

1047: HPRE.23 == 0

1048: HPRE.ST == HPRE.01+HPRE.02+HPRE.03+HPRE.04+HPRE.05+
HPRE.06+HPRE.07+HPRE.08+HPRE.09+HPRE.10+HPRE.11+HPRE.12+
HPRE.13+HPRE.14+HPRE.15+HPRE.16+HPRE.17+HPRE.18+HPRE.19+
HPRE.20+HPRE.21+HPRE.22+HPRE.23

1049: ADJHH == HH/HPRE.ST

Households (HHCEN.cc) for region cc (1980 Census Divisions)

1050: HHCEN.01 == HPRE.01*ADJHH

1051: HHCEN.02 == HPRE.02*ADJHH

1052: HHCEN.03 == HPRE.03*ADJHH

1053: HHCEN.04 == HPRE.04*ADJHH

1054: HHCEN.05 == HPRE.05*ADJHH

1055: HHCEN.06 == HPRE.06*ADJHH

1056: HHCEN.07 == HPRE.07*ADJHH

1057: HHCEN.08 == HPRE.08*ADJHH

1058: HHCEN.09 == HPRE.09*ADJHH

1059: HHCEN.10 == HPRE.10*ADJHH

1060: HHCEN.11 == HPRE.11*ADJHH

1061: HHCEN.12 == HPRE.12*ADJHH

1062: HHCEN.13 == HPRE.13*ADJHH

1063: HHCEN.14 == HPRE.14*ADJHH

1064: HHCEN.15 == HPRE.15*ADJHH

1065: HHCEN.16 == HPRE.16*ADJHH

1066: HHCEN.17 == HPRE.17*ADJHH

1067: HHCEN.18 == HPRE.18*ADJHH

1068: HHCEN.19 == HPRE.19*ADJHH

1069: HHCEN.20 == HPRE.20*ADJHH

1070: HHCEN.21 == HPRE.21*ADJHH

1071: HHCEN.22 == HPRE.22*ADJHH

1072: HHCEN.23 == HPRE.23*ADJHH

1073: HHCEN.ST == HHCEN.01+HHCEN.02+HHCEN.03+HHCEN.04+HHCEN.05
+HHCEN.06+HHCEN.07+HHCEN.08+HHCEN.09+HHCEN.10+HHCEN.11+
HHCEN.12+HHCEN.13+HHCEN.14+HHCEN.15+HHCEN.16+HHCEN.17+
HHCEN.18+HHCEN.19+HHCEN.20+HHCEN.21+HHCEN.22+HHCEN.23

1074: B.IR == B.RB-B.26

1075: G.IR == G.RB-G.26

1076: S.IR == S.RB-S.26

1077: M.IR == M.RB-M.26

1078: P.IR == P.RB-P.26

Households (HH.aa) in region aa (1970 Census Divisions)

1079: HH.AM == HHCEN.12+HHCEN.13

1080: HH.AG == HH.AM+HHCEN.14

1081: HH.FG == HHCEN.05+HHCEN.06*(P.24/PCEN.06)

1082: HH.IR == HH.AG+HH.FG

PARAMETERS:

A.01.01	0.16	A.01.02	0.	A.01.03	0.
A.01.04	0.	A.01.05	0.	A.01.06	0.
A.01.07	0.	A.01.08	0.	A.01.09	0.
A.01.10	0.	A.01.11	0.	A.01.12	0.
A.01.13	0.	A.01.14	0.	A.01.15	0.
A.01.16	0.	A.01.17	0.	A.01.18	0.
A.01.19	0.	A.01.20	0.	A.01.21	0.
A.01.22	0.	A.01.23	0.	A.01.24	0.
A.01.25	0.	A.01.26	0.	A.01.27	0.
A.01.28	0.	A.01.29	0.	A.02.01	0.84
A.02.02	1.	A.02.03	0.	A.02.04	0.73
A.02.05	0.	A.02.06	0.44	A.02.07	0.
A.02.08	0.41	A.02.09	0.	A.02.10	0.
A.02.11	0.19	A.02.12	0.08	A.02.13	0.
A.02.14	0.01	A.02.15	0.43	A.02.16	0.
A.02.17	0.	A.02.18	0.	A.02.19	0.
A.02.20	0.	A.02.21	0.28	A.02.22	0.
A.02.23	0.	A.02.24	0.7	A.02.25	0.
A.02.26	0.21	A.02.27	0.	A.02.28	0.
A.02.29	0.25	A.03.01	0.	A.03.02	0.
A.03.03	0.	A.03.04	0.	A.03.05	0.
A.03.06	0.	A.03.07	0.	A.03.08	0.
A.03.09	0.	A.03.10	0.	A.03.11	0.
A.03.12	0.	A.03.13	0.	A.03.14	0.
A.03.15	0.	A.03.16	0.	A.03.17	0.
A.03.18	0.	A.03.19	0.	A.03.20	0.
A.03.21	0.	A.03.22	0.	A.03.23	0.
A.03.24	0.	A.03.25	0.	A.03.26	0.
A.03.27	0.	A.03.28	0.	A.03.29	0.
A.04.01	0.	A.04.02	0.	A.04.03	0.
A.04.04	0.27	A.04.05	0.	A.04.06	0.
A.04.07	0.	A.04.08	0.	A.04.09	0.
A.04.10	0.	A.04.11	0.	A.04.12	0.
A.04.13	0.	A.04.14	0.	A.04.15	0.
A.04.16	0.	A.04.17	0.	A.04.18	0.
A.04.19	0.	A.04.20	0.	A.04.21	0.
A.04.22	0.	A.04.23	0.	A.04.24	0.
A.04.25	0.	A.04.26	0.	A.04.27	0.
A.04.28	0.	A.04.29	0.	A.05.01	0.
A.05.02	0.	A.05.03	0.	A.05.04	0.
A.05.05	1.	A.05.06	0.	A.05.07	0.
A.05.08	0.	A.05.09	0.	A.05.10	0.
A.05.11	0.	A.05.12	0.	A.05.13	0.
A.05.14	0.	A.05.15	0.	A.05.16	0.

A.05.17	0.	A.05.18	0.	A.05.19	0.
A.05.20	0.	A.05.21	0.	A.05.22	0.
A.05.23	0.	A.05.24	0.	A.05.25	0.
A.05.26	0.	A.05.27	0.49	A.05.28	0.
A.05.29	0.	A.06.01	0.	A.06.02	0.
A.06.03	0.	A.06.04	0.	A.06.05	0.
A.06.06	0.56	A.06.07	0.	A.06.08	0.
A.06.09	0.	A.06.10	0.	A.06.11	0.
A.06.12	0.	A.06.13	0.	A.06.14	0.
A.06.15	0.	A.06.16	0.	A.06.17	0.
A.06.18	0.	A.06.19	0.	A.06.20	0.
A.06.21	0.	A.06.22	0.	A.06.23	0.
A.06.24	0.	A.06.25	0.	A.06.26	0.
A.06.27	0.	A.06.28	0.	A.06.29	0.
A.07.01	0.	A.07.02	0.	A.07.03	0.
A.07.04	0.	A.07.05	0.	A.07.06	0.
A.07.07	0.	A.07.08	0.	A.07.09	0.
A.07.10	0.	A.07.11	0.	A.07.12	0.
A.07.13	0.	A.07.14	0.	A.07.15	0.
A.07.16	0.	A.07.17	0.	A.07.18	0.
A.07.19	0.	A.07.20	0.	A.07.21	0.
A.07.22	0.	A.07.23	0.	A.07.24	0.
A.07.25	0.	A.07.26	0.	A.07.27	0.
A.07.28	0.	A.07.29	0.	A.08.01	0.
A.08.02	0.	A.08.03	0.	A.08.04	0.
A.08.05	0.	A.08.06	0.	A.08.07	0.
A.08.08	0.59	A.08.09	0.	A.08.10	0.
A.08.11	0.	A.08.12	0.	A.08.13	0.
A.08.14	0.	A.08.15	0.	A.08.16	0.
A.08.17	0.	A.08.18	0.	A.08.19	0.
A.08.20	0.	A.08.21	0.	A.08.22	0.
A.08.23	0.	A.08.24	0.	A.08.25	0.
A.08.26	0.	A.08.27	0.	A.08.28	0.
A.08.29	0.	A.09.01	0.	A.09.02	0.
A.09.03	0.	A.09.04	0.	A.09.05	0.
A.09.06	0.	A.09.07	0.	A.09.08	0.
A.09.09	1.	A.09.10	0.	A.09.11	0.
A.09.12	0.	A.09.13	0.	A.09.14	0.
A.09.15	0.	A.09.16	0.45	A.09.17	0.
A.09.18	0.	A.09.19	0.	A.09.20	0.
A.09.21	0.	A.09.22	0.	A.09.23	0.
A.09.24	0.	A.09.25	0.41	A.09.26	0.
A.09.27	0.	A.09.28	0.	A.09.29	0.24
A.10.01	0.	A.10.02	0.	A.10.03	0.
A.10.04	0.	A.10.05	0.	A.10.06	0.
A.10.07	0.	A.10.08	0.	A.10.09	0.

A.10.10	0.	A.10.11	0.	A.10.12	0.
A.10.13	0.	A.10.14	0.	A.10.15	0.
A.10.16	0.	A.10.17	0.	A.10.18	0.
A.10.19	0.	A.10.20	0.	A.10.21	0.
A.10.22	0.	A.10.23	0.	A.10.24	0.
A.10.25	0.	A.10.26	0.	A.10.27	0.
A.10.28	0.	A.10.29	0.	A.11.01	0.
A.11.02	0.	A.11.03	0.	A.11.04	0.
A.11.05	0.	A.11.06	0.	A.11.07	0.
A.11.08	0.	A.11.09	0.	A.11.10	0.
A.11.11	0.81	A.11.12	0.	A.11.13	0.
A.11.14	0.	A.11.15	0.	A.11.16	0.
A.11.17	0.	A.11.18	0.	A.11.19	0.
A.11.20	0.	A.11.21	0.	A.11.22	0.
A.11.23	0.	A.11.24	0.	A.11.25	0.
A.11.26	0.	A.11.27	0.	A.11.28	0.
A.11.29	0.	A.12.01	0.	A.12.02	0.
A.12.03	0.	A.12.04	0.	A.12.05	0.
A.12.06	0.	A.12.07	0.	A.12.08	0.
A.12.09	0.	A.12.10	0.	A.12.11	0.
A.12.12	0.92	A.12.13	0.	A.12.14	0.
A.12.15	0.	A.12.16	0.	A.12.17	0.
A.12.18	0.	A.12.19	0.	A.12.20	0.
A.12.21	0.	A.12.22	0.	A.12.23	0.
A.12.24	0.	A.12.25	0.	A.12.26	0.
A.12.27	0.	A.12.28	0.	A.12.29	0.
A.13.01	0.	A.13.02	0.	A.13.03	0.
A.13.04	0.	A.13.05	0.	A.13.06	0.
A.13.07	0.	A.13.08	0.	A.13.09	0.
A.13.10	0.	A.13.11	0.	A.13.12	0.
A.13.13	0.	A.13.14	0.	A.13.15	0.
A.13.16	0.	A.13.17	0.	A.13.18	0.
A.13.19	0.	A.13.20	0.	A.13.21	0.
A.13.22	0.	A.13.23	0.	A.13.24	0.
A.13.25	0.	A.13.26	0.	A.13.27	0.
A.13.28	0.	A.13.29	0.	A.14.01	0.
A.14.02	0.	A.14.03	0.	A.14.04	0.
A.14.05	0.	A.14.06	0.	A.14.07	0.
A.14.08	0.	A.14.09	0.	A.14.10	0.
A.14.11	0.	A.14.12	0.	A.14.13	0.
A.14.14	0.71	A.14.15	0.	A.14.16	0.
A.14.17	0.	A.14.18	0.	A.14.19	0.
A.14.20	0.	A.14.21	0.	A.14.22	0.
A.14.23	0.	A.14.24	0.	A.14.25	0.
A.14.26	0.	A.14.27	0.	A.14.28	0.
A.14.29	0.	A.15.01	0.	A.15.02	0.

A.15.03	0.	A.15.04	0.	A.15.05	0.
A.15.06	0.	A.15.07	0.	A.15.08	0.
A.15.09	0.	A.15.10	0.	A.15.11	0.
A.15.12	0.	A.15.13	0.	A.15.14	0.
A.15.15	0.57	A.15.16	0.	A.15.17	0.
A.15.18	0.	A.15.19	0.	A.15.20	0.
A.15.21	0.	A.15.22	0.	A.15.23	0.
A.15.24	0.	A.15.25	0.	A.15.26	0.
A.15.27	0.	A.15.28	0.	A.15.29	0.
A.16.01	0.	A.16.02	0.	A.16.03	0.
A.16.04	0.	A.16.05	0.	A.16.06	0.
A.16.07	0.	A.16.08	0.	A.16.09	0.
A.16.10	0.	A.16.11	0.	A.16.12	0.
A.16.13	0.	A.16.14	0.	A.16.15	0.
A.16.16	0.55	A.16.17	0.	A.16.18	0.
A.16.19	0.	A.16.20	0.	A.16.21	0.
A.16.22	0.	A.16.23	0.	A.16.24	0.
A.16.25	0.	A.16.26	0.	A.16.27	0.
A.16.28	0.	A.16.29	0.	A.17.01	0.
A.17.02	0.	A.17.03	0.	A.17.04	0.
A.17.05	0.	A.17.06	0.	A.17.07	0.
A.17.08	0.	A.17.09	0.	A.17.10	0.
A.17.11	0.	A.17.12	0.	A.17.13	0.
A.17.14	0.	A.17.15	0.	A.17.16	0.
A.17.17	1.	A.17.18	0.	A.17.19	0.
A.17.20	0.	A.17.21	0.	A.17.22	0.
A.17.23	0.	A.17.24	0.	A.17.25	0.
A.17.26	0.	A.17.27	0.	A.17.28	0.
A.17.29	0.	A.18.01	0.	A.18.02	0.
A.18.03	0.	A.18.04	0.	A.18.05	0.
A.18.06	0.	A.18.07	0.	A.18.08	0.
A.18.09	0.	A.18.10	0.	A.18.11	0.
A.18.12	0.	A.18.13	0.	A.18.14	0.28
A.18.15	0.	A.18.16	0.	A.18.17	0.
A.18.18	1.	A.18.19	0.	A.18.20	0.
A.18.21	0.	A.18.22	0.	A.18.23	0.
A.18.24	0.	A.18.25	0.	A.18.26	0.
A.18.27	0.	A.18.28	0.	A.18.29	0.
A.19.01	0.	A.19.02	0.	A.19.03	0.
A.19.04	0.	A.19.05	0.	A.19.06	0.
A.19.07	0.	A.19.08	0.	A.19.09	0.
A.19.10	0.	A.19.11	0.	A.19.12	0.
A.19.13	0.	A.19.14	0.	A.19.15	0.
A.19.16	0.	A.19.17	0.	A.19.18	0.
A.19.19	0.	A.19.20	0.	A.19.21	0.
A.19.22	0.	A.19.23	0.	A.19.24	0.

A.19.25	0.	A.19.26	0.	A.19.27	0.
A.19.28	0.	A.19.29	0.	A.20.01	0.
A.20.02	0.	A.20.03	0.	A.20.04	0.
A.20.05	0.	A.20.06	0.	A.20.07	0.
A.20.08	0.	A.20.09	0.	A.20.10	0.
A.20.11	0.	A.20.12	0.	A.20.13	0.
A.20.14	0.	A.20.15	0.	A.20.16	0.
A.20.17	0.	A.20.18	0.	A.20.19	0.
A.20.20	0.	A.20.21	0.	A.20.22	0.
A.20.23	0.	A.20.24	0.	A.20.25	0.
A.20.26	0.	A.20.27	0.	A.20.28	0.
A.20.29	0.	A.21.01	0.	A.21.02	0.
A.21.03	0.	A.21.04	0.	A.21.05	0.
A.21.06	0.	A.21.07	0.	A.21.08	0.
A.21.09	0.	A.21.10	0.	A.21.11	0.
A.21.12	0.	A.21.13	0.	A.21.14	0.
A.21.15	0.	A.21.16	0.	A.21.17	0.
A.21.18	0.	A.21.19	0.	A.21.20	0.
A.21.21	0.72	A.21.22	0.	A.21.23	0.
A.21.24	0.	A.21.25	0.	A.21.26	0.
A.21.27	0.	A.21.28	0.	A.21.29	0.
A.22.01	0.	A.22.02	0.	A.22.03	0.
A.22.04	0.	A.22.05	0.	A.22.06	0.
A.22.07	0.	A.22.08	0.	A.22.09	0.
A.22.10	0.	A.22.11	0.	A.22.12	0.
A.22.13	0.	A.22.14	0.	A.22.15	0.
A.22.16	0.	A.22.17	0.	A.22.18	0.
A.22.19	0.	A.22.20	0.	A.22.21	0.
A.22.22	0.	A.22.23	0.	A.22.24	0.
A.22.25	0.	A.22.26	0.	A.22.27	0.
A.22.28	0.	A.22.29	0.	A.23.01	0.
A.23.02	0.	A.23.03	0.	A.23.04	0.
A.23.05	0.	A.23.06	0.	A.23.07	0.
A.23.08	0.	A.23.09	0.	A.23.10	0.
A.23.11	0.	A.23.12	0.	A.23.13	0.
A.23.14	0.	A.23.15	0.	A.23.16	0.
A.23.17	0.	A.23.18	0.	A.23.19	0.
A.23.20	0.	A.23.21	0.	A.23.22	0.
A.23.23	0.	A.23.24	0.	A.23.25	0.
A.23.26	0.	A.23.27	0.	A.23.28	0.
A.23.29	0.	A.24.01	0.	A.24.02	0.
A.24.03	0.	A.24.04	0.	A.24.05	0.
A.24.06	0.	A.24.07	0.	A.24.08	0.
A.24.09	0.	A.24.10	0.	A.24.11	0.
A.24.12	0.	A.24.13	0.	A.24.14	0.
A.24.15	0.	A.24.16	0.	A.24.17	0.

A.24.18	0.	A.24.19	0.	A.24.20	0.
A.24.21	0.	A.24.22	0.	A.24.23	0.
A.24.24	0.3	A.24.25	0.	A.24.26	0.
A.24.27	0.	A.24.28	0.	A.24.29	0.
A.25.01	0.	A.25.02	0.	A.25.03	0.
A.25.04	0.	A.25.05	0.	A.25.06	0.
A.25.07	0.	A.25.08	0.	A.25.09	0.
A.25.10	0.	A.25.11	0.	A.25.12	0.
A.25.13	0.	A.25.14	0.	A.25.15	0.
A.25.16	0.	A.25.17	0.	A.25.18	0.
A.25.19	0.	A.25.20	0.	A.25.21	0.
A.25.22	0.	A.25.23	0.	A.25.24	0.
A.25.25	0.59	A.25.26	0.	A.25.27	0.
A.25.28	0.	A.25.29	0.	A.26.01	0.
A.26.02	0.	A.26.03	0.	A.26.04	0.
A.26.05	0.	A.26.06	0.	A.26.07	0.
A.26.08	0.	A.26.09	0.	A.26.10	0.
A.26.11	0.	A.26.12	0.	A.26.13	0.
A.26.14	0.	A.26.15	0.	A.26.16	0.
A.26.17	0.	A.26.18	0.	A.26.19	0.
A.26.20	0.	A.26.21	0.	A.26.22	0.
A.26.23	0.	A.26.24	0.	A.26.25	0.
A.26.26	0.79	A.26.27	0.	A.26.28	0.
A.26.29	0.	A.27.01	0.	A.27.02	0.
A.27.03	0.	A.27.04	0.	A.27.05	0.
A.27.06	0.	A.27.07	0.	A.27.08	0.
A.27.09	0.	A.27.10	0.	A.27.11	0.
A.27.12	0.	A.27.13	0.	A.27.14	0.
A.27.15	0.	A.27.16	0.	A.27.17	0.
A.27.18	0.	A.27.19	0.	A.27.20	0.
A.27.21	0.	A.27.22	0.	A.27.23	0.
A.27.24	0.	A.27.25	0.	A.27.26	0.
A.27.27	0.51	A.27.28	0.	A.27.29	0.
A.28.01	0.	A.28.02	0.	A.28.03	0.
A.28.04	0.	A.28.05	0.	A.28.06	0.
A.28.07	0.	A.28.08	0.	A.28.09	0.
A.28.10	0.	A.28.11	0.	A.28.12	0.
A.28.13	0.	A.28.14	0.	A.28.15	0.
A.28.16	0.	A.28.17	0.	A.28.18	0.
A.28.19	0.	A.28.20	0.	A.28.21	0.
A.28.22	0.	A.28.23	0.	A.28.24	0.
A.28.25	0.	A.28.26	0.	A.28.27	0.
A.28.28	0.	A.28.29	0.	A.29.01	0.
A.29.02	0.	A.29.03	0.	A.29.04	0.
A.29.05	0.	A.29.06	0.	A.29.07	0.
A.29.08	0.	A.29.09	0.	A.29.10	0.

A.29.11	0.	A.29.12	0.	A.29.13	0.
A.29.14	0.	A.29.15	0.	A.29.16	0.
A.29.17	0.	A.29.18	0.	A.29.19	0.
A.29.20	0.	A.29.21	0.	A.29.22	0.
A.29.23	0.	A.29.24	0.	A.29.25	0.
A.29.26	0.	A.29.27	0.	A.29.28	0.
A.29.29	0.51	B.03	0.	B.07	0.
B.10	0.	B.13	0.	B.19	0.
B.20	0.	B.22	0.	B.23	0.
B.28	0.	B03	0.	B07	0.
B10	0.	B13	0.	B19	0.
B20	0.	B22	0.	B23	0.
B28	0.	G.03	0.	G.07	0.
G.10	0.	G.13	0.	G.19	0.
G.20	0.	G.22	0.	G.23	0.
G.28	0.	G03	0.	G07	0.
G10	0.	G13	0.	G19	0.
G20	0.	G22	0.	G23	0.
G28	0.	HHSZ.01	3.91	HHSZ.02	4.2
HHSZ.03	3.7	HHSZ.04	3.18	HHSZ.05	2.78
HHSZ.06	3.16	HHSZ.07	4.87	HHSZ.08	4.05
HHSZ.09	0.	HHSZ.10	3.68	HHSZ.11	3.27
HHSZ.12	3.06	HHSZ.13	2.8	HHSZ.14	2.92
HHSZ.15	3.06	HHSZ.16	2.84	HHSZ.17	0.
HHSZ.18	0.	HHSZ.19	2.89	HHSZ.20	0.
HHSZ.21	0.	HHSZ.22	0.	HHSZ.23	0.
IM.01.01	0.412	IM.01.02	0.	IM.01.03	0.
IM.01.04	0.	IM.01.05	0.	IM.01.06	0.
IM.01.07	0.	IM.01.08	0.	IM.01.09	0.
IM.01.10	0.	IM.01.11	0.	IM.01.12	0.
IM.01.13	0.	IM.01.14	0.	IM.01.15	0.
IM.01.16	0.	IM.01.17	0.	IM.01.18	0.
IM.01.19	0.	IM.01.20	0.	IM.01.21	0.
IM.01.22	0.	IM.01.23	0.	IM.01.24	0.
IM.01.25	0.	IM.01.26	0.	IM.01.27	0.
IM.01.28	0.	IM.01.29	0.	IM.02.01	0.09
IM.02.02	0.861	IM.02.03	0.	IM.02.04	0.376
IM.02.05	0.09	IM.02.06	0.09	IM.02.07	0.
IM.02.08	0.02	IM.02.09	0.	IM.02.10	0.
IM.02.11	0.	IM.02.12	0.02	IM.02.13	0.
IM.02.14	0.	IM.02.15	0.02	IM.02.16	0.09
IM.02.17	0.	IM.02.18	0.	IM.02.19	0.
IM.02.20	0.	IM.02.21	0.02	IM.02.22	0.
IM.02.23	0.	IM.02.24	0.	IM.02.25	0.
IM.02.26	0.	IM.02.27	0.	IM.02.28	0.
IM.02.29	0.	IM.03.01	0.	IM.03.02	0.

IM.03.03	0.	IM.03.04	0.	IM.03.05	0.
IM.03.06	0.	IM.03.07	0.	IM.03.08	0.
IM.03.09	0.	IM.03.10	0.	IM.03.11	0.
IM.03.12	0.	IM.03.13	0.	IM.03.14	0.
IM.03.15	0.	IM.03.16	0.	IM.03.17	0.
IM.03.18	0.	IM.03.19	0.	IM.03.20	0.
IM.03.21	0.	IM.03.22	0.	IM.03.23	0.
IM.03.24	0.	IM.03.25	0.	IM.03.26	0.
IM.03.27	0.	IM.03.28	0.	IM.03.29	0.
IM.04.01	0.	IM.04.02	0.	IM.04.03	0.
IM.04.04	0.078	IM.04.05	0.	IM.04.06	0.
IM.04.07	0.	IM.04.08	0.	IM.04.09	0.
IM.04.10	0.	IM.04.11	0.	IM.04.12	0.
IM.04.13	0.	IM.04.14	0.	IM.04.15	0.
IM.04.16	0.	IM.04.17	0.	IM.04.18	0.
IM.04.19	0.	IM.04.20	0.	IM.04.21	0.
IM.04.22	0.	IM.04.23	0.	IM.04.24	0.
IM.04.25	0.	IM.04.26	0.	IM.04.27	0.
IM.04.28	0.	IM.04.29	0.	IM.05.01	0.
IM.05.02	0.	IM.05.03	0.	IM.05.04	0.002
IM.05.05	0.861	IM.05.06	0.	IM.05.07	0.
IM.05.08	0.	IM.05.09	0.	IM.05.10	0.
IM.05.11	0.	IM.05.12	0.	IM.05.13	0.
IM.05.14	0.	IM.05.15	0.02	IM.05.16	0.
IM.05.17	0.	IM.05.18	0.	IM.05.19	0.
IM.05.20	0.	IM.05.21	0.	IM.05.22	0.
IM.05.23	0.	IM.05.24	0.	IM.05.25	0.
IM.05.26	0.	IM.05.27	0.	IM.05.28	0.
IM.05.29	0.	IM.06.01	0.	IM.06.02	0.
IM.06.03	0.	IM.06.04	0.	IM.06.05	0.
IM.06.06	0.5	IM.06.07	0.	IM.06.08	0.
IM.06.09	0.	IM.06.10	0.	IM.06.11	0.
IM.06.12	0.	IM.06.13	0.	IM.06.14	0.
IM.06.15	0.	IM.06.16	0.	IM.06.17	0.
IM.06.18	0.	IM.06.19	0.	IM.06.20	0.
IM.06.21	0.	IM.06.22	0.	IM.06.23	0.
IM.06.24	0.	IM.06.25	0.	IM.06.26	0.
IM.06.27	0.	IM.06.28	0.	IM.06.29	0.
IM.07.01	0.	IM.07.02	0.	IM.07.03	0.
IM.07.04	0.	IM.07.05	0.	IM.07.06	0.
IM.07.07	0.	IM.07.08	0.	IM.07.09	0.
IM.07.10	0.	IM.07.11	0.	IM.07.12	0.
IM.07.13	0.	IM.07.14	0.	IM.07.15	0.
IM.07.16	0.	IM.07.17	0.	IM.07.18	0.
IM.07.19	0.	IM.07.20	0.	IM.07.21	0.
IM.07.22	0.	IM.07.23	0.	IM.07.24	0.

IM.07.25	0.	IM.07.26	0.	IM.07.27	0.
IM.07.28	0.	IM.07.29	0.	IM.08.01	0.
IM.08.02	0.	IM.08.03	0.	IM.08.04	0.
IM.08.05	0.	IM.08.06	0.	IM.08.07	0.
IM.08.08	0.545	IM.08.09	0.	IM.08.10	0.
IM.08.11	0.	IM.08.12	0.	IM.08.13	0.
IM.08.14	0.	IM.08.15	0.	IM.08.16	0.
IM.08.17	0.	IM.08.18	0.	IM.08.19	0.
IM.08.20	0.	IM.08.21	0.	IM.08.22	0.
IM.08.23	0.	IM.08.24	0.	IM.08.25	0.
IM.08.26	0.	IM.08.27	0.	IM.08.28	0.
IM.08.29	0.	IM.09.01	0.	IM.09.02	0.
IM.09.03	0.	IM.09.04	0.163	IM.09.05	0.
IM.09.06	0.	IM.09.07	0.	IM.09.08	0.
IM.09.09	0.863	IM.09.10	0.	IM.09.11	0.
IM.09.12	0.	IM.09.13	0.	IM.09.14	0.
IM.09.15	0.	IM.09.16	0.	IM.09.17	0.
IM.09.18	0.	IM.09.19	0.	IM.09.20	0.
IM.09.21	0.	IM.09.22	0.	IM.09.23	0.
IM.09.24	0.05	IM.09.25	0.	IM.09.26	0.
IM.09.27	0.	IM.09.28	0.	IM.09.29	0.
IM.10.01	0.	IM.10.02	0.	IM.10.03	0.
IM.10.04	0.	IM.10.05	0.	IM.10.06	0.
IM.10.07	0.	IM.10.08	0.	IM.10.09	0.
IM.10.10	0.	IM.10.11	0.	IM.10.12	0.
IM.10.13	0.	IM.10.14	0.	IM.10.15	0.
IM.10.16	0.	IM.10.17	0.	IM.10.18	0.
IM.10.19	0.	IM.10.20	0.	IM.10.21	0.
IM.10.22	0.	IM.10.23	0.	IM.10.24	0.
IM.10.25	0.	IM.10.26	0.	IM.10.27	0.
IM.10.28	0.	IM.10.29	0.	IM.11.01	0.
IM.11.02	0.	IM.11.03	0.	IM.11.04	0.011
IM.11.05	0.	IM.11.06	0.	IM.11.07	0.
IM.11.08	0.	IM.11.09	0.	IM.11.10	0.
IM.11.11	0.84	IM.11.12	0.	IM.11.13	0.
IM.11.14	0.	IM.11.15	0.	IM.11.16	0.
IM.11.17	0.	IM.11.18	0.	IM.11.19	0.
IM.11.20	0.	IM.11.21	0.	IM.11.22	0.
IM.11.23	0.	IM.11.24	0.	IM.11.25	0.
IM.11.26	0.	IM.11.27	0.	IM.11.28	0.
IM.11.29	0.	IM.12.01	0.02	IM.12.02	0.
IM.12.03	0.	IM.12.04	0.064	IM.12.05	0.02
IM.12.06	0.02	IM.12.07	0.	IM.12.08	0.
IM.12.09	0.	IM.12.10	0.	IM.12.11	0.
IM.12.12	0.986	IM.12.13	0.	IM.12.14	0.
IM.12.15	0.	IM.12.16	0.02	IM.12.17	0.

IM.12.18	0.	IM.12.19	0.	IM.12.20	0.
IM.12.21	0.	IM.12.22	0.	IM.12.23	0.
IM.12.24	0.	IM.12.25	0.	IM.12.26	0.
IM.12.27	0.	IM.12.28	0.	IM.12.29	0.
IM.13.01	0.	IM.13.02	0.	IM.13.03	0.
IM.13.04	0.	IM.13.05	0.	IM.13.06	0.
IM.13.07	0.	IM.13.08	0.	IM.13.09	0.
IM.13.10	0.	IM.13.11	0.	IM.13.12	0.
IM.13.13	0.	IM.13.14	0.	IM.13.15	0.
IM.13.16	0.	IM.13.17	0.	IM.13.18	0.
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IM.15.15	0.69	IM.15.16	0.02	IM.15.17	0.
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IM.16.04	0.	IM.16.05	0.	IM.16.06	0.
IM.16.07	0.	IM.16.08	0.	IM.16.09	0.
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IM.25.25	1.	IM.25.26	0.	IM.25.27	0.
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IM.26.11	0.	IM.26.12	0.	IM.26.13	0.
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IM.26.20	0.	IM.26.21	0.	IM.26.22	0.
IM.26.23	0.	IM.26.24	0.	IM.26.25	0.

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IM.27.03	0.	IM.27.04	0.	IM.27.05	0.
IM.27.06	0.	IM.27.07	0.	IM.27.08	0.
IM.27.09	0.	IM.27.10	0.	IM.27.11	0.
IM.27.12	0.	IM.27.13	0.	IM.27.14	0.
IM.27.15	0.	IM.27.16	0.	IM.27.17	0.
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IM.28.10	0.	IM.28.11	0.	IM.28.12	0.
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IM.28.19	0.	IM.28.20	0.	IM.28.21	0.
IM.28.22	0.	IM.28.23	0.	IM.28.24	0.
IM.28.25	0.	IM.28.26	0.	IM.28.27	0.
IM.28.28	0.	IM.28.29	0.	IM.29.01	0.
IM.29.02	0.	IM.29.03	0.	IM.29.04	0.005
IM.29.05	0.	IM.29.06	0.	IM.29.07	0.
IM.29.08	0.	IM.29.09	0.	IM.29.10	0.
IM.29.11	0.	IM.29.12	0.	IM.29.13	0.
IM.29.14	0.	IM.29.15	0.	IM.29.16	0.
IM.29.17	0.	IM.29.18	0.	IM.29.19	0.
IM.29.20	0.	IM.29.21	0.	IM.29.22	0.
IM.29.23	0.	IM.29.24	0.	IM.29.25	0.
IM.29.26	0.	IM.29.27	0.	IM.29.28	0.
IM.29.29	0.611	PC.04.16	0.5079	PC.04.25	0.9475
PC.06.25	0.0525	PC.08.16	0.4921	PGQ.01	0.365
PGQ.02	0.048	PGQ.03	0.088	PGQ.04	0.614
PGQ.05	3.339	PGQ.06	0.399	PGQ.07	0.055
PGQ.08	0.118	PGQ.09	0.	PGQ.10	0.339
PGQ.11	2.548	PGQ.12	0.324	PGQ.13	4.848
PGQ.14	0.32	PGQ.15	0.681	PGQ.16	0.702
PGQ.17	0.	PGQ.18	0.	PGQ.19	1.418
PGQ.20	0.	PGQ.21	0.	PGQ.22	0.
PGQ.23	0.	PM.01	3.374	PM.02	2.066
PM.03	0.	PM.04	7.1	PM.05	3.211
PM.06	2.977	PM.07	0.	PM.08	2.629
PM.09	2.239	PM.10	0.	PM.11	2.036
PM.12	2.624	PM.13	0.	PM.14	3.127
PM.15	1.782	PM.16	5.506	PM.17	3.093
PM.18	3.961	PM.19	0.	PM.20	0.
PM.21	3.893	PM.22	0.	PM.23	0.
PM.24	3.895	PM.25	3.534	PM.26	2.141
PM.27	4.388	PM.28	0.	PM.29	3.076

APPENDIX J.
MAP ECONOMIC MODEL SENSITIVITY ANALYSIS

Procedure

A large number of sensitivity tests were run using the MAP economic model to gauge the sensitivity of the results to variations in (1) the economic development scenario, (2) national economic growth assumptions, (3) state fiscal variable assumptions, and (4) model coefficient (regression-determined) and parameter (nonstochastically-determined) values, as well as model specification (form of equations).[1]

The procedure for running the tests involved four steps. The first was to compile a list of those input variables, parameters, and model structural features, variations of which had previously been shown to affect, were suspected to affect, or might be thought to affect the level of MAP economic model output variables. This resulted in a list of about 29 different cases--including variables (data vectors) and parameters (or parameter sets)--for analysis.

The second step was to choose for each variable or parameter the lowest and highest possible values which might be conceivable in the year 2000. The idea was to bracket the most likely value, used in the control simulation, with the effective end points of the distribution of the variable. Choosing these values was, of necessity, a subjective exercise based upon a combination of historical patterns, knowledge of the economy and its structure, and statistics. For each case examined, the most likely lowest and highest values used are shown in Table J.1.[2]

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[1]These tests were based upon a version of the model, A83.1, which was used to generate projections in February 1983. The model, A.83.1SEN, input data files A.83.1SEN and A83SEN, and control program, &A83RUNSE, are similar to those used to produce the projections for this report. The model gives slightly different results, but this does not materially affect the results of this analysis which are applicable to interpreting the results of model version A83.2.

[2]In general, a data vector was adjusted so that it trended over time from its actual 1982 value to the year 2000 value, while parameters and coefficients were set at their alternative value for the entire range of simulation. The only exception was the parameter LFPART, which was trended toward its 2000 value of .68.

TABLE J.1. MAP SENSITIVITY TESTS RESULTS

Case	Variable	Value in 2000 (000)			Households in 2000 (000)	
		Lowest	Most Likely	Highest	Lowest	Highest
	Exogenous Employment Variables					
Control Case		-	-	-	215.824(a)	
1	Petroleum (EMP9)	3.990	9.911	19.107	200.458	229.782
2	Military (EMGM)	16.892	23.323	33.000	209.936	224.575
3	Tourists	1066	1566	2566	209.724	224.567
4	Gasline Construction (1994 Peak Completion)	-	-	-	-	221.725
5	Current Manufacturing (EMMX2)	8.205	12.122	16.000	210.106	220.833
6	Enclave Construction (EMCNX1)	0	1.000	2.000	212.523	217.971
7	Federal Civilian (EMGC)	17.800	20.019	21.719	212.372	217.962
8	Fish Harvesting (EMFISH)	4.536	7.096	9.192	213.557	217.744
9	Construction (EMCNX2)	0	0	1.000	215.119	217.579
10	Agriculture (EMAGRI)	.160	.508	2.000	215.436	217.352
11	Pipelines (EMT9X)	1.100	1.968	2.968	214.306	217.223
12	High Wage Manu-facturing (EMMX1)	0	0	.486	215.824	216.610
	National Economic Variables					
13	Real Wage Growth (GRRWEUS)	.005	.01	.015	211.335	223.723
14	Unemployment (UUS)	.05	.06	.075	211.161	222.178
15	Price Level Growth (GRUSCPI)	.09	.065	.05	205.924	222.305
16	Price Level Growth with Petroleum Revenues Adjusted	.09	.065	.05	212.080	216.486
17	Real Income Growth (GRDIRPU)	.005	.015	.025	215.493	216.272

(a) In 1981 households total 137.018.

TABLE J.1. (continued)

State Fiscal Variables

Case	Variable	Rate			Households in 2000 (000)	
		Lowest	Most Likely	Highest	Lowest	Highest
18	Petroleum Revenues (RPTS, RPRY, RTCSPX)	10%	50%	90%	195.969	224.855
18a	Post 1999 Petroleum Revenues (Extrapolation Rate - period of calculation)	1995-99		1997-99	241.491(2010)	243.218(2010)
19	Operations - Capital Split (5/6 Operations, 1/6 Capital)	-	-	-	-	219.958

Model Parameters

Case	Variable	Lowest	Most Likely	Highest	Lowest	Highest
20	Average Household Size (b)	2.932	2.549	2.2	187.631	250.062
21	Labor Force Participation Rate LFPART	.9338	.78	.68	177.84	238.145
22	Support Sector Elasticities (to Wealth)					
	C71E	.00003	.00005	.00008	193.821	243.698
	C84D	.00005	.00009	.00015		
23	Migration Sensitivity					
	CMIG2	3.32	14.12	24.92	195.413	240.146
	CMIG3	21.8	49.22	76.62		
	CMIG4	.76	.96	1.15		
24	Alaskan Price Level C67A	-.1	-.3	-.5	215.781	227.165

(b) No simulation necessary to obtain the result.

TABLE J.1. (continued)

Model Parameters

Case	Variable	Rate			Households in 2000 (000)	
		Lowest	Most Likely	Highest	Lowest	Highest
25	Support Sector Elasticities (to Income)					
	C71B	.0084	.017	.0252	206.592	225.466
	C84B	.0234	.047	.0702		
26	Alaska Relative Wage Rate Growth					
	CxxB	.5	various	2	213.738	220.350
27	Federal Tax Bite					
	C26B	1.042	1.00	.966	212.608	218.656
28	Wealth Variable	-	-	-	-	216.221
	C68i					
	C71i					
	C80i					
	C83i					
	C84i					
29	Construction Sector Activity specification	-	-	-	213.976	-
	C54i					

The sensitivity tests involving the gas pipeline, the mix of government expenditures, the specification of wealth, and the specification of exogenous construction employment involved only one rather than a high and low alternative to the control case.

Third, each variable or parameter in turn was perturbed from the control case level and the model simulated. Summary results for each of these simulations are shown in Table J.1. Detailed results are available upon request from ISER.

Finally, the cases were informally ranked in terms of the sensitivity of the number of households statewide to the variable or parameter perturbation to the highest possible value (in relation to increasing the number of households). Households was chosen because the electricity load is most sensitive to this output variable.

Results

The most important result of the sensitivity tests is the demonstration that the simulation results are more sensitive to the values chosen for several of the parameters than to variation in employment and state fiscal assumptions. In particular, the number of household is most sensitive to average household size and the labor force participation rate. A substantial reduction in either the average household size or in the labor force participation rate, other things equal, could raise the number of households in 2000 16 percent and 10 percent, respectively, above the control case. In contrast, the highest likely level of petroleum employment would increase households over the base case by 6.5 percent, while the highest likely level of petroleum revenues would increase households by 4.2 percent.

The implication of this conclusion is that a substantial portion of the potential error of projection can arise not from the economic scenario or fiscal policy assumptions, but rather in incorrect parameter values within the structure of the model. This is a source of potential error that cannot be altogether eliminated and is understandably large for the Alaska economic model. The reasons relate to three factors: (1) poor quality data, (2) substantial structural change in the past, and (3) small size of the economy. Consequently, past structural relationships are difficult to specify as well as might be hoped, and future values defining those relationships are subject to substantial variations which are not possible to eliminate by additional analysis of existing data.

In short, reasonable arguments can be raised for a number of different values for parameters such as household size and the labor force participation rate in future years. None can be proven correct or incorrect.

When interpreting the results of these sensitivity tests, the assumption of other things constant (ceteris parabis) should be kept in mind. In fact, it is unlikely that variation in one parameter or variable would not be accompanied by change in other parameters affecting output either in the same or opposite direction. For example, if the average household size did actually fall to 2.2 persons in 2000, it is likely that the labor force participation rate would rise from its current level. These two countervailing movements would have opposing effects and would tend to moderate change in the number of households.

Closely related to household size and labor force participation rate in affecting population and, thus, households, is the specification of the net migration equation. Simultaneously increasing and decreasing all coefficients of this equation by two standard errors shows the possible range of outcomes which this equation can generate. This equation tends to be self-correcting, since higher net migration rates increase unemployment, which increases outmigration.

Economic activity and, consequently, households, are sensitive to the growth in support sector employment. This was tested by examining the coefficients on income and wealth as well as the specification of wealth in the equations determining support sector demand levels. Since wealth is highly correlated with income, the sensitivity reported here is an overestimate; but it is clear that this is one of the critical model areas.

A final sensitive area in terms of parameters is the Alaskan price level. If the Alaska price level were to move within 9 percent of the U.S. average level by 2000 this would provide a significant impetus to economic growth.

The simulations are relatively insensitive to variation in three areas of model specification. First, there is little sensitivity to the share of personal income siphoned off as federal taxes. Second, variation in the elasticity of real wage rate growth compared to the U.S. average has only a modest effect. Third, an adjustment for a possible misspecification of the construction demand equation has a small effect.[3]

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[3]Current practice in the model treats only Alyeska pipeline construction employment as exogenous during the historical period. This test arbitrarily assumes a constant positive historical level of other exogenous construction employment and a new construction demand equation is estimated.

Turning to fiscal policy variables, if the level of petroleum revenues is increased from the 50 to 90 percent Alaska Department of Revenue case, this has a larger impact than changing the mix of activities. Since the Department of Revenue projections only cover the years through 1999, the method used for extrapolation to the year 2010 was tested. Households was insensitive to this.

The simulation is moderately sensitive to the values chosen for two national variables which affect the Alaskan economy. These are the growth in the average real weekly wage and the U.S. unemployment rate. The growth in the price level, ceteris paribus, is a sensitive variable, but it operates primarily by affecting the level of real petroleum revenues. When real, rather than nominal, petroleum revenues are held constant and the test is repeated, the sensitivity of simulation to the national price level falls to practically zero.

The number of households in 2000 is insensitive to variation in most of the exogenous employment variables. Tests on most employment variables produce less sensitivity than most of the parameters, fiscal variables, and national growth rates. The most sensitive employment variables are petroleum, military, and tourists; primarily due to their large size, but also their potential range of variation. The sensitivity of several industries is quite modest.

Although the analysis has been presented in terms of the increase in the number of households to variations in parameters and variables, it is instructive to examine the downside sensitivity also. It is clear from an examination of Table J-1 that the distribution of households in some tests is not symmetrical, but rather is skewed towards higher values. This results basically from more uncertainty about maximum values parameters and variables may assume.

APPENDIX K
MAN-IN-THE-ARCTIC PROGRAM (MAP)
TECHNICAL DOCUMENTATION REPORT

SCENARIO DOCUMENTATION

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K.1. Summary of Base Case Assumptions

The base case assumptions currently in place for simulating with the MAP Economic Modeling System are summarized in Table K.1. This table describes the assumptions used in three areas--national variables, exogenous employment variables (economic scenario), and state fiscal variables.

The base case assumptions have been developed to represent, in the aggregate, a median outcome for future economic and fiscal conditions affecting the Alaskan economy. This is in contrast to both the most likely outcome (mode) and the average outcome (mean). The difference among the three measures can be discussed with reference to Figure K.1 which portrays the hypothetical distribution of all the possible values that an exogenous employment variable may assume in, for example, the year 2000.

The distribution is skewed to the right because very large positive values are possible with some small probability greater than zero, while values less than zero are impossible. The most likely outcome (mode) has the highest probability of occurence, but may have a value (in this case, one thousand) less than the majority of the possible outcomes. The median is the value where 50 percent of the outcomes have lower values, while 50 percent have higher values. The mean (simple average) exceeds the median since it is the average of the values of all possible outcomes.

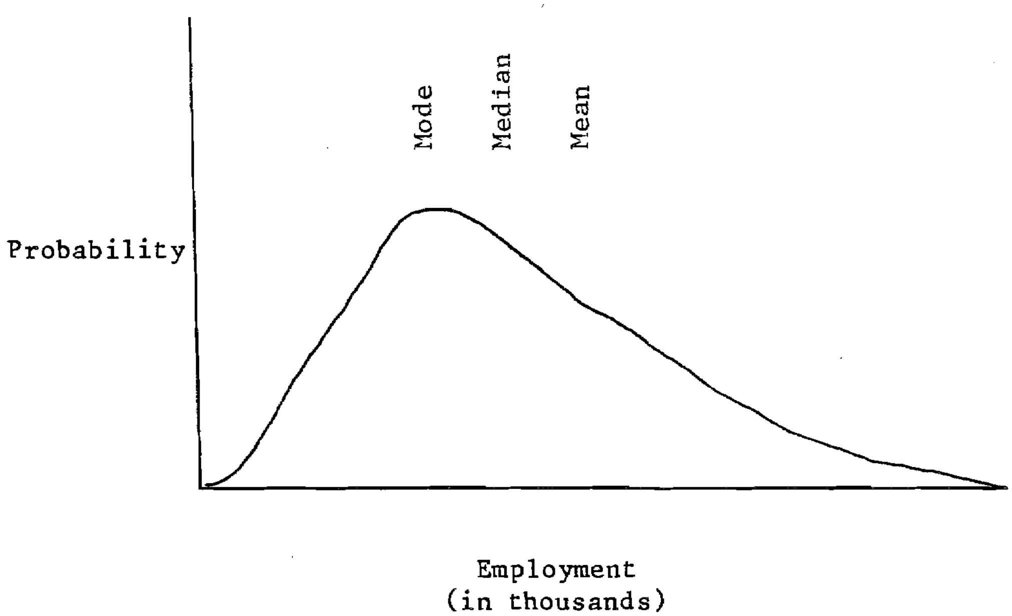
Only one value from the distribution will be the actual outcome in the year 2000, and the question is which measure of central tendency best represents that unknown outcome in a base case simulation. The median is used because of obvious deficiencies in the other two measures.

Although the model is the most likely outcome, the majority of outcomes could be higher, as in Figure K.1, or lower. Use of the mode could then be unrepresentative of the universe of possible outcomes. For example, the three possible uses of North Slope gas and their respective probabilities could be (1) pipeline to lower--48-40 percent, (2) conversion to methanol--30 percent, (3) reinjection--30 percent. Although the pipeline alternative alone has the highest probability because it is unrepresentative of the other outcomes which together are more likely, choice of the mode would produce a biased result.

Likewise, the choice of the mean value can result in bias if the distribution of possible outcomes is skewed as in Figure K.1. For example, there is a small probability of very large petroleum revenues in the year 2000. Most outcomes have smaller associated revenues. Since only a single outcome is possible, the low probability high outcomes should be discounted in the calculation of the base case because they are so unlikely.

FIGURE K 1

Distribution
of
Possible Values for Exogenous Employment



With that general framework in mind, the base case assumptions have been chosen on the basis of concensus among the economists at ISER. The process builds upon a documented eight-year experience of scenario construction for the MAP models which has, from time to time, utilized a large number of sources, individuals within and without ISER, and techniques including probability encoding and interagency committee. The base case scenario is constructed so that in the aggregate, rather than in any of its individual elements, it represents the median outcome.

Each national variable assumption is represented by a time series of values. These time series are set to represent the best judgement of ISER economists on the future trends in these values as they influence the Alaskan economy. That influence is primarily upon the growth in the real wage, the price level, and the equilibrium rate of unemployment.

The exogenous employment assumptions consist of a series of case file assumptions about economic behavior in particular industries or particular projects. Detail on all of the case files included in individual case files are chosen from the library of case files in the scenario generator mode and are combined by that model to form industry-wide basic employment assumptions. These aggregated employment series (as well as tourists visiting Alaska) are presented in Table K.2. The particular shape of the time paths of the employment variables takes account of the fact that activity in some industries such as fish harvesting is resource base constrained, while in others the level is more strongly influenced by demand such as mining employment.

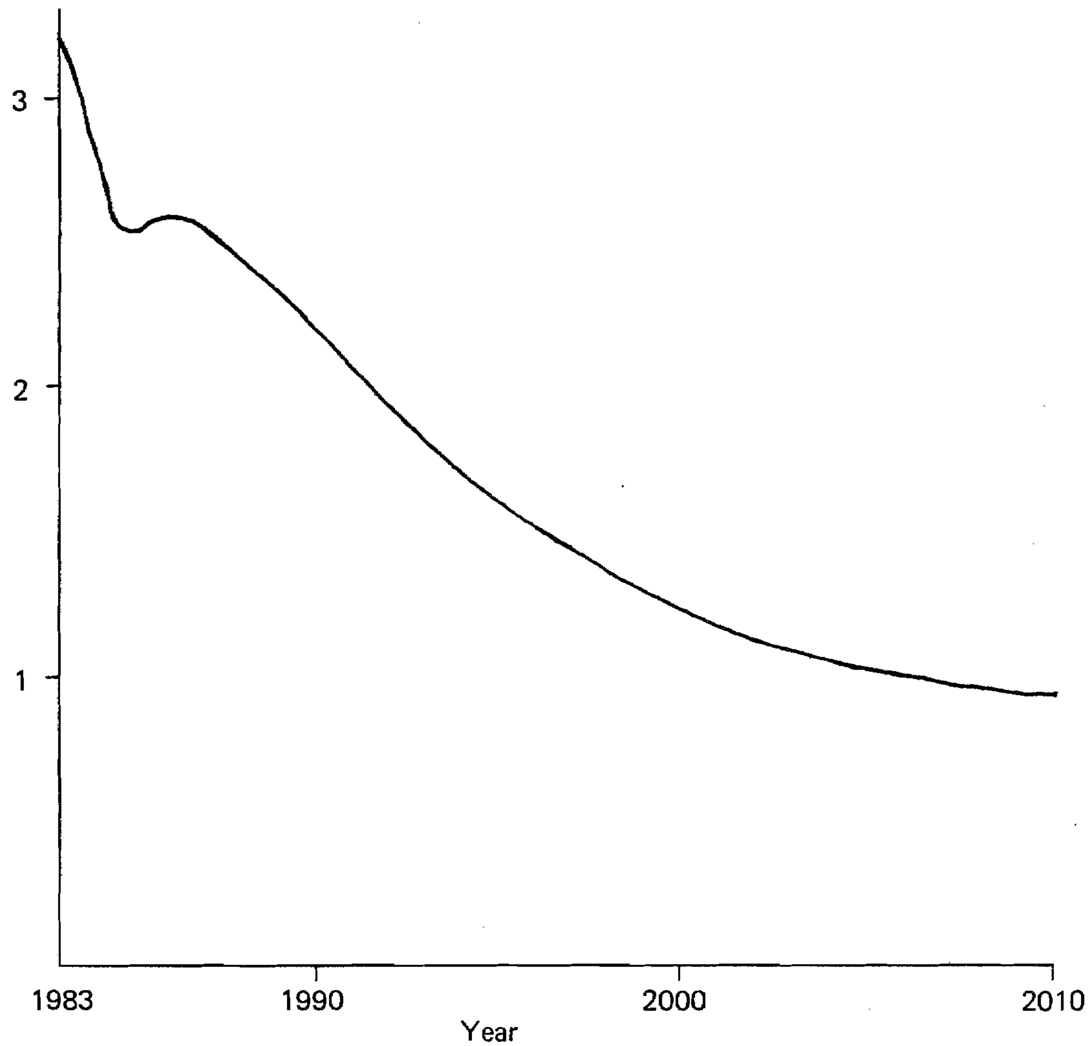
State revenue and expenditure assumptions consist of exogenous vectors of petroleum revenues, which are chosen from the scenario generator library of cases, and a set of options chosen by the model user which together are loosely called the fiscal rule.

Values for the most important petroleum revenues--royalties and severance taxes--are taken from the Alaska Department of Revenue. Since these projections end in 1999, they are extrapolated to 2010 using the growth rate over the interval 1996 to 1999. This interval is felt to be representative of the subsequent decline in production on state fields, particularly prudhoe Bay. Consequently, the time series of total petroleum revenues in real dollars in the base case has the shape shown in Figure K.2.

The other petroleum revenue source of consequence, the corporate income tax, is extremely difficult to project because it is dependent not only on the levels of production and prices of Alaskan petroleum but upon all aspects of worldwide operations of the major international oil companies operating in Alaska. The base case assumptions for this revenue source is that it grows at 7 percent annually, slightly faster than inflation. The petroleum property tax depends upon taxable property of the oil companies.

FIGURE K.2. BASE CASE SIMULATION
TOTAL PETROLEUM REVENUES

(billion 1982 $)



A "fiscal rule" is necessary for the determination of the level and composition of state expenditures for two reasons. First, the historical pattern of state expenditure behavior provides no state guide to future spending patterns. Second, the potential for revenue surpluses on current account allows for considerable flexibility in the timing and composition of spending. In 1982 Alaskan voters approved a spending limit which limits spending to $2.5 billion adjusted annually for the change in population and the price level.

The limit covers all state spending except Permanent Fund dividends and debt service. Special capital approriations over the limit and special contributions to the Permanent Fund can be done with voter approval. The limit also requires that at least one-third of spending be for capital appropriations. Excess revenues accrue in the General Fund until needed, earning positive real interest.

The limit provides a useful set of guidelines for the fiscal rule when current revenues plus General Fund balances are sufficient to allow spending to be at the limit established by the limit. The outstanding obligations to the Permanent Fund is not paid off. When a simulation indicates that current revenues and the fund balance do not provide revenues sufficient to spend up to the limit, then an alternate set of guidelines defining spending must be invoked. Since there is no historical experience to base these guidelines upon, they are defined by what appears reasonable politically in an era of declining revenues. The basic assumption is "last in-first out" referring to the fact that newer programs, initiated in years when revenues are increasing rapidly, are most likely to be cut back the most when revenues are falling. All programs would experience cuts to some degree at the same time that some newer programs are eliminated.

The sequence of events which is triggered by a shortfall of revenues below the spending limit is as follows: Total expenditures for programs funded under the limit are reduced. Permanent Fund dividends and debt service payments are not directly affected. Capital expenditures are reduced more than operating expenditures over a two-year period until operations represents 75 percent of spending. The reduction of operations results in a reduction in local transfers. As the retrenchment continues, the subsidy half of the capital budget is eliminated and replaced by "bricks and mortar" spending. Capital spending financed by bonds and federal grants continues to be a fixed portion of capital spending under the limit.

In addition to subsidies, the Permanent Fund dividend program is eliminated.

Two revenue enhancement measures are subsequently introduced. The first is the reintroduction of the personal income tax at the rates prevailing when it was eliminated in the 1970s. The second is the annual transfer of all Permanent Fund earnings, both real and nominal, to the General Fund. This produces current income but erodes the real value of the Permanent Fund.

TABLE K.1. SUMMARY OF BASE CASE ASSUMPTIONS FOR MAP MODEL
RAILBELT ECONOMIC STUDY, MAY 1983
(SB87.3 - CB87.3)

ASSUMPTIONS	DESCRIPTION (a)
National Variables Assumptions	
U.S. Inflation Rate	Consumer prices rise at approximately 6.5 percent annually after 1985.
Real Average Weekly Earnings	Growth in real average weekly earnings averages 1 percent annually.
Real Per Capita Income	Growth in real per capita income averages 1.5 percent annually after 1984.
Unemployment Rate	Long-run rate of 6 percent.
Exogenous Employment Assumptions	
Trans-Alaska Oil Pipeline	Operating employment remains constant at 1,500 through 2010 (TAP.083).
North Slope Petroleum Development	Construction employment developing Prudhoe Bay and Kuparuk fields peaks at 2,400 in 1983 and 1986. Operating employment remains at 2,502 through 2010 for overall North Slope production (NSO.082).
Upper Cook Inlet Petroleum Production	Employment declines gradually beginning in 1983 so as to reach 50 percent of the 1982 level (778) by 2010 (UPC.082).

(a) Codes in parentheses indicate ISER names for MAP Model SCEN_ case files. These are presented in detail starting in Table K.3 of this appendix.

Tertiary Recovery of North Slope Oil	Tertiary oil recovery project utilizing North Slope natural gas occurs in early 1990s with a peak annual employment of 2,000 (NSO.TRC).
OCS Exploration and Development	The current OCS five-year leasing schedule calls for 16 OCS lease sales subsequent to October 1982, including the Beaufort, Norton, and St. George Sales, which have already taken place (Sales 71, 57, and 70). Development is assumed to occur only in the Navarin Basin (1.14 billion barrels of oil) and the Beaufort Sea (6.1 billion barrels of oil). All other sales are assumed to result in exploration employment only (OCS.G01, OCS.G03, OCS.G04, OCS.G05, OCS.G06, OCS.G07, OCS.G09, OCS.G10, OCS.G11, OCS.G12, OCS.G13, OCS.G14).
Anchorage Oil Headquarters	Several oil companies establish regional headquarters in Alaska in mid-1980s (OHQ.083).
Beluga Chuitna Coal Production	Development of 4.4 million ton/year mine for export beginning in 1990 provides total employment of 524 (BCL.04T(-4)).
Hydroelectric Projects	Employment peaks at 725 in 1990 for construction of several state-funded hydroelectric projects around the state (SHP.082, SHP.PJH).
U.S. Borax Mine	The U.S. Borax mine near Ketchikan is brought into production with operating employment of 790 by 1988 (BXM.PJM).
Greens Creek Mine	Production from the Greens Creek Mine on Admiralty Island results in employment of 315 people from 1986 through 1996 (GCM.082).

Red Dog Mine	The Red Dog Mine in the Western Brooks Range reaches full production with operating employment of 448 by 1988 (RED.PJH).
Other Mining Activity	Employment increases from a 1982 level of 5,267 at 1 percent annually (OMN.083).
Agriculture	Moderate state support results in expansion of agriculture to employment of 508 in 2000 (AGR.PJM).
Forest and Lumber Products	Employment expands to over 3,200 by 1990 before beginning to decline gradually after 2000 to about 2,800 by 2010 (FLL.083).
Pulp Mills	Employment declines at a rate of 1 percent per year after 1983 (FPU.082).
Commercial Fishing-Nonbottomfish	Employment levels in fishing and fish processing remain constant at 6,323 and 7,123, respectively (TCF.002).
Commercial Fishing-Bottomfish	The total U.S. bottomfish catch expands at a constant rate to allowable catch in 2000, with Alaska resident harvesting employment rising to 733. Onshore processing capacity expands in the Aleutians and Kodiak census divisions to provide total resident employment of 971 by 2000 (BCF.183).
Federal Military Employment	Employment remains constant at 23,323 (GFM.082).
Federal Civilian Employment	Rises at 0.5 percent annual rate from 17,900 in 1982 to 20,583 by 2010 (GFC.083).

Tourism Assumptions

Number of visitors to Alaska increases by 50,000 per year from 680,000 in 1982 to over 2 million by 2010 (TRS.082).

State Revenue and Expenditure Assumptions

Petroleum Revenues

State petroleum revenues from the severance tax and royalties are based upon Alaska Department of Revenue projections published in March of 1983. Subsequent to 1999, they are extrapolated at the growth rate over the interval 1996-1999. Oil and gas corporate income tax revenues are projected to grow at a nominal rate of 7 percent per year after 1985. Petroleum property taxes are a function of petroleum industry capital stock (DOR.5M83).

Expenditures

State expenditures are at the levels allowed by the recently passed spending limit, with combined subsidies and capital expenditures equaling one-third of total expenditures. As revenue growth slows, the income tax is reinstated, subsidies are eliminated, the Permanent Fund dividend program is phased out, and proportional cuts in the operating and capital budgets are made to keep total expenditures equal to total revenues. Capital expenditures fall to one-fourth of total spending. After the Permanent Fund dividend program is phased out, all Permanent Fund earnings are annually transferred to the general fund.

K.2 Aggregate Base Case Variables

Table K.2 presents the values in the base case for the sixteen variables which form the output of the scenario generator model for the state economic model. These variables are aggregated from the individual case files presented in Section K.3.

TABLE K.2. APA BASE CASE
EXOGENOUS EMPLOYMENT ASSUMPTIONS FOR MAP STATEWIDE MODEL

(thousands of employees)

	Agricultural Employment	Mining Employment	High Wage Exogenous Construction Employment	Low Wage Exogenous Construction Employment	Exogenous Transportation Employment
1982	0.194	8.411	2.269	0.125	1.500
1983	0.203	9.387	3.261	0.290	1.552
1984	0.211	9.983	2.203	0.726	1.631
1985	0.219	11.279	2.627	0.863	1.949
1986	0.228	12.400	2.911	0.850	2.157
1987	0.239	13.149	3.069	0.613	2.471
1988	0.250	14.062	3.128	0.401	2.804
1989	0.263	14.526	3.244	0.875	2.440
1990	0.276	14.797	4.276	1.025	2.752
1991	0.291	15.671	1.667	1.125	2.063
1992	0.306	16.557	6.301	1.075	2.753
1993	0.325	16.068	5.164	0.563	2.348
1994	0.343	16.969	2.141	0.100	3.147
1995	0.365	17.329	1.529	0.000	3.055
1996	0.389	17.501	1.303	0.000	3.291
1997	0.414	17.390	1.303	0.000	3.351
1998	0.442	16.994	1.070	0.000	3.423
1999	0.474	16.620	1.070	0.000	3.423
2000	0.508	16.226	1.070	0.000	3.423
2001	0.527	15.957	1.070	0.000	3.423
2002	0.546	15.888	1.070	0.000	3.423
2003	0.568	16.089	1.070	0.000	3.423
2004	0.589	16.143	1.070	0.000	3.423
2005	0.611	16.197	1.070	0.000	3.423
2006	0.634	16.253	1.070	0.000	3.423
2007	0.660	16.309	1.063	0.000	3.351
2008	0.686	16.340	1.063	0.000	3.351
2009	0.712	16.223	1.056	0.000	3.279
2010	0.740	16.282	1.056	0.000	3.279

SOURCE: SCENARIOSB87.3--CREATED 4/83

TABLE K.2. APA BASE CASE (continued)
EXOGENOUS EMPLOYMENT ASSUMPTIONS FOR MAP STATEWIDE MODEL

(thousands of employees)

	High Wage Exogenous Manufacturing Employment	Low Wage Exogenous Manufacturing Employment	Fish Harvesting Employment	Active Duty Military Employment	Civilian Federal Employment
1982	0.000	8.771	5.217	23.323	17.900
1983	0.000	10.433	6.421	23.323	17.989
1984	0.000	10.571	6.444	23.323	18.079
1985	0.000	10.749	6.471	23.323	18.170
1986	0.000	10.929	6.499	23.323	18.261
1987	0.000	11.107	6.527	23.323	18.352
1988	0.000	11.196	6.544	23.323	18.444
1989	0.000	11.240	6.579	23.323	18.536
1990	0.000	11.292	6.592	23.323	18.629
1991	0.000	11.299	6.608	23.323	18.722
1992	0.000	11.315	6.629	23.323	18.815
1993	0.000	11.335	6.655	23.323	18.909
1994	0.000	11.366	6.689	23.323	19.004
1995	0.000	11.413	6.731	23.323	19.099
1996	0.000	11.478	6.784	23.323	19.194
1997	0.000	11.571	6.851	23.323	19.290
1998	0.000	11.704	6.935	23.323	19.387
1999	0.000	11.887	7.041	23.323	19.484
2000	0.000	12.122	7.096	23.323	19.581
2001	0.000	12.018	7.096	23.323	19.679
2002	0.000	11.807	7.096	23.323	19.777
2003	0.000	11.776	7.096	23.323	19.876
2004	0.000	11.747	7.096	23.323	19.976
2005	0.000	11.718	7.096	23.323	20.076
2006	0.000	11.641	7.096	23.323	20.176
2007	0.000	11.634	7.096	23.323	20.277
2008	0.000	11.626	7.096	23.323	20.378
2009	0.000	11.623	7.096	23.323	20.480
2010	0.000	11.617	7.096	23.323	20.583

SOURCE: SCENARIOSB87.3--CREATED 4/83

TABLE K.2. APA BASE CASE (continued)
EXOGENOUS REVENUE ASSUMPTIONS FOR MAP STATEWIDE MODEL

(millions of current dollars)

	State Production Tax Revenue	State Royalty Income	State Bonus Payment Revenue	State Property Tax Revenue	State Corporate Petroleum Tax Revenue
1982	1590.000	1530.000	6.700	142.700	668.900
1983	1480.000	1430.000	26.100	148.600	235.000
1984	1220.000	1200.000	11.066	153.200	272.000
1985	1260.000	1240.000	4.692	158.000	295.000
1986	1350.000	1350.000	1.990	163.456	315.650
1987	1430.000	1450.000	0.844	169.101	337.745
1988	1500.000	1520.000	0.358	174.940	361.387
1989	1380.000	1650.000	0.152	180.981	386.684
1990	1420.000	1710.000	0.064	187.231	413.751
1991	1230.000	1570.000	0.027	244.697	442.714
1992	1150.000	1550.000	0.012	253.385	473.704
1993	1110.000	1520.000	0.005	334.305	506.863
1994	1090.000	1500.000	0.002	360.464	542.343
1995	1000.000	1410.000	0.001	372.870	580.306
1996	910.000	1290.000	0.000	386.531	620.927
1997	930.000	1330.000	0.000	399.458	664.392
1998	910.000	1340.000	0.000	412.658	710.899
1999	860.000	1350.000	0.000	425.141	760.662
2000	843.918	1370.384	0.000	438.917	813.907
2001	828.136	1391.076	0.000	452.996	870.881
2002	812.650	1412.081	0.000	465.389	931.842
2003	797.453	1433.402	0.000	480.106	997.070
2004	782.541	1455.046	0.000	494.158	1066.865
2005	767.907	1477.016	0.000	506.558	1141.545
2006	753.547	1499.318	0.000	519.317	1221.453
2007	739.456	1521.957	0.000	530.447	1306.954
2008	725.628	1544.938	0.000	542.962	1398.440
2009	712.058	1568.266	0.000	554.874	1496.331
2010	698.743	1591.946	0.000	564.198	1601.073

SOURCE: SCENARIOSB87.3--CREATED 4/83

TABLE K.2. APA BASE CASE (continued)
EXOGENOUS TOURISM ASSUMPTIONS FOR MAP STATEWIDE MODEL

(thousands of tourists)

	Tourists Visiting Alaska
1982	680.000
1983	730.000
1984	780.000
1985	830.000
1986	880.000
1987	930.000
1988	980.000
1989	1030.000
1990	1080.000
1991	1130.000
1992	1180.000
1993	1230.000
1994	1280.000
1995	1330.000
1996	1380.000
1997	1430.000
1998	1480.000
1999	1530.000
2000	1580.000
2001	1630.000
2002	1680.000
2003	1730.000
2004	1780.000
2005	1830.000
2006	1880.000
2007	1930.000
2008	1980.000
2009	2030.000
2010	2080.000

SOURCE: SCENARIOSB87.3--CREATED 4/83

K.3. Scenario Case Files for Base Case

This section contains a written description plus the actual file contents in table form of each case file used to form the base case output of the scenario generator.

1. <u>Trans-Alaska Oil Pipeline</u>

Trans-Alaska Pipeline Service (TAPS) employment through 1977 included only the exogenous construction employment engaged in the initial construction of the pipeline. After completion in 1977, employment has been of two types. First, there has been additional construction of four pump stations (see Oil and Gas Journal, 2/25/80, p. 72), and second, there is exogenous transportation sector employment associated with operation of the line.

SOURCE: Construction estimate based on assumed installation of four pump stations adding capacity of .15 mmbd each, from <u>Beaufort OCS Development Scenarios</u>, Dames and Moore, 1978.

Operations employment from <u>Alaska Economic Trends, Alaska Dept. of Labor</u>, October 1978.

TABLE K.3a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
TRANS-ALASKA OIL PIPELINE

(thousands of employees)

	High Wage Exogenous Construction Employment	Exogenous Transportation Employment
1982	0.090	1.500
1983	0.000	1.500
1984	0.000	1.500
1985	0.000	1.500
1986	0.000	1.500
1987	0.000	1.500
1988	0.000	1.500
1989	0.000	1.500
1990	0.000	1.500
1991	0.000	1.500
1992	0.000	1.500
1993	0.000	1.500
1994	0.000	1.500
1995	0.000	1.500
1996	0.000	1.500
1997	0.000	1.500
1998	0.000	1.500
1999	0.000	1.500
2000	0.000	1.500
2001	0.000	1.500
2002	0.000	1.500
2003	0.000	1.500
2004	0.000	1.500
2005	0.000	1.500
2006	0.000	1.500
2007	0.000	1.500
2008	0.000	1.500
2009	0.000	1.500
2010	0.000	1.500

SOURCE: MAP MODEL CASE TAP.083
VARIABLES: EMCNX1 EMT9X

TABLE K.3b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
TRANS-ALASKA OIL PIPELINE

(thousands of employees)

	Barrow-North Slope	Fairbanks	Southeast Fairbanks	Valdez/Chitina/Whittier	Yukon/Koyukuk
1982	0.474	0.079	0.079	0.406	0.552
1983	0.474	0.079	0.079	0.316	0.552
1984	0.474	0.079	0.079	0.316	0.552
1985	0.474	0.079	0.079	0.316	0.552
1986	0.474	0.079	0.079	0.316	0.552
1987	0.474	0.079	0.079	0.316	0.552
1988	0.474	0.079	0.079	0.316	0.552
1989	0.474	0.079	0.079	0.316	0.552
1990	0.474	0.079	0.079	0.316	0.552
1991	0.474	0.079	0.079	0.316	0.552
1992	0.474	0.079	0.079	0.316	0.552
1993	0.474	0.079	0.079	0.316	0.552
1994	0.474	0.079	0.079	0.316	0.552
1995	0.474	0.079	0.079	0.316	0.552
1996	0.474	0.079	0.079	0.316	0.552
1997	0.474	0.079	0.079	0.316	0.552
1998	0.474	0.079	0.079	0.316	0.552
1999	0.474	0.079	0.079	0.316	0.552
2000	0.474	0.079	0.079	0.316	0.552
2001	0.474	0.079	0.079	0.316	0.552
2002	0.474	0.079	0.079	0.316	0.552
2003	0.474	0.079	0.079	0.316	0.552
2004	0.474	0.079	0.079	0.316	0.552
2005	0.474	0.079	0.079	0.316	0.552
2006	0.474	0.079	0.079	0.316	0.552
2007	0.474	0.079	0.079	0.316	0.552
2008	0.474	0.079	0.079	0.316	0.552
2009	0.474	0.079	0.079	0.316	0.552
2010	0.474	0.079	0.079	0.316	0.552

SOURCE: MAP MODEL CASE TAP.083
VARIABLES: B04 B09 B24 B26 B29

2. North Slope Petroleum Development

North Slope developments include employment associated with primary recovery operations from the Sadlerochit formation, secondary recovery (using waterflooding) of that formation, development of the Kuparuk formation west of Prudhoe Bay, and the permanent work force of Atlantic Richfield Company (ARCO) and British Petroleum (BP) at the main Prudhoe base headquarters, and a variety of exploration and development efforts on state leases outside of the Sadlerochit and Kuparuk areas. The key assumptions serving as the basis for the employment forecasts are the following:

- A total of nine rigs continue to drill approximately 50-55 wells at the Prudhoe Bay field and 50 wells at the Kuparuk field a year through 1985.
- The Prudhoe waterflood project is completed in 1984, adding 300 new permanent operating employees.
- Construction employment involved in development of primary and secondary recovery facilities at the Kuparuk field peaks at 1,300 in 1985.
- Construction employment for additional recovery facilities at Kuparuk and Prudhoe, as well as for developing production facilities at other North Slope oil fields under state lease, maintains total construction employment at 1,500 through 1990 and at 1,000 through 2010.

SOURCE: U.S. Army Corps of Engineers, Final EIS, Prudhoe Bay Oilfield Waterflood Project, pp. 2-60; and personal communication, D. A. Casey, ARCO Oil and Gas Co.

TABLE K.4a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
NORTH SLOPE PETROLEUM DEVELOPMENT

(thousands of employees)

	High Wage Exogenous Construction Employment	Mining Employment
1982	2.000	2.300
1983	2.400	2.502
1984	1.800	2.502
1985	2.000	2.502
1986	2.400	2.502
1987	1.800	2.502
1988	1.500	2.502
1989	1.500	2.502
1990	1.500	2.502
1991	1.000	2.502
1992	1.000	2.502
1993	1.000	2.502
1994	1.000	2.502
1995	1.000	2.502
1996	1.000	2.502
1997	1.000	2.502
1998	1.000	2.502
1999	1.000	2.502
2000	1.000	2.502
2001	1.000	2.502
2002	1.000	2.502
2003	1.000	2.502
2004	1.000	2.502
2005	1.000	2.502
2006	1.000	2.502
2007	1.000	2.502
2008	1.000	2.502
2009	1.000	2.502
2010	1.000	2.502

SOURCE: MAP MODEL CASE NSO.082
VARIABLES: EMCNX1 EMP9

TABLE K.4b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
NORTH SLOPE PETROLEUM DEVELOPMENT

(thousands of employees)

	Barrow-North Slope
1982	4.300
1983	4.902
1984	4.302
1985	4.502
1986	4.902
1987	4.302
1988	4.002
1989	4.002
1990	4.002
1991	3.502
1992	3.502
1993	3.502
1994	3.502
1995	3.502
1996	3.502
1997	3.502
1998	3.502
1999	3.502
2000	3.502
2001	3.502
2002	3.502
2003	3.502
2004	3.502
2005	3.502
2006	3.502
2007	3.502
2008	3.502
2009	3.502
2010	3.502

SOURCE: MAP MODEL CASE NSO.082
VARIABLE: B04

3. Upper Cook Inlet Petroleum Production

Petroleum sector employment in the Kenai-Cook Inlet census division was 778 in 1979 (four-quarter average employment taken from Alaska Department of Labor, Statistical Quarterly, 1979 issues), consisting of exploration, development, and production associated with the Kenai oil and gas fields. Currently, the 120,000 barrels per day output of oil is expected to decline drastically over the forecast period, possibly as fast as 15 to 20 percent per year. The decline may be partially slowed, however, by a possible redrilling program being considered by the operators (see Oil and Gas Journal, 2/4/80, p. 36). We assume a gradual employment decline to 383 by 2010 as oil wells are abandoned. Gas production is assumed to remain relatively stable at around 5,000 mmcf/day.

SOURCE: Oil and Gas Journal, 2/4/80; and personal communication, D. A. Casey, ARCO Oil and Gas Co.

TABLE K.5a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
UPPER COOK INLET PETROLEUM

(thousands of employees)

	Mining Employment
1982	0.778
1983	0.759
1984	0.740
1985	0.721
1986	0.703
1987	0.685
1988	0.668
1989	0.652
1990	0.635
1991	0.619
1992	0.604
1993	0.589
1994	0.574
1995	0.560
1996	0.546
1997	0.532
1998	0.519
1999	0.506
2000	0.493
2001	0.481
2002	0.469
2003	0.457
2004	0.446
2005	0.435
2006	0.424
2007	0.413
2008	0.403
2009	0.393
2010	0.383

SOURCE: MAP MODEL CASE UPC.082
VARIABLE: EMP9

TABLE K.5b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
UPPER COOK INLET PETROLEUM

(thousands of employees)

	Kenai-Cook Inlet
1982	0.778
1983	0.759
1984	0.740
1985	0.721
1986	0.703
1987	0.685
1988	0.668
1989	0.652
1990	0.635
1991	0.619
1992	0.604
1993	0.589
1994	0.574
1995	0.560
1996	0.546
1997	0.532
1998	0.519
1999	0.506
2000	0.493
2001	0.481
2002	0.469
2003	0.457
2004	0.446
2005	0.435
2006	0.424
2007	0.413
2008	0.403
2009	0.393
2010	0.383

SOURCE: MAP MODEL CASE UPC.082
VARIABLE: B12

4. Tertiary Recovery of North Slope Oil

There is currently no firm plan for the disposition of North Slope natural gas, and recent studies have demonstrated the various problems faced by all the current proposals (for example, Booz, Allen and Hamilton, Inc., report to the state of Alaska, 1983; and "Use in Alaska of North Slope Natural Gas," Alaska Review of Social and Economic Conditions, April 1983). In light of the dim prospects for transport of the gas to market, an alternative use would be in tertiary recovery of North Slope oil. A pilot tertiary recovery project is currently underway at Prudhoe Bay involving the reinjection of natural gas liquids in a small portion of the field. Alternative tertiary recovery methods are technically feasible but have yet to be attempted in severe Arctic conditions. (See Options for North Slope Gas Utilization, Michael Economides and Russell Osterman, April 1982, for State of Alaska Division of Energy and Power Development.)

This case assumes tertiary recovery project for Pruhoe Bay oil. Since the dimensions of such a project have yet to be worked out, the case is generic in its employment assumptions. Employment is assumed to be on the same order of magnitude as the waterflooding project.

TABLE K.6a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
TERTIARY RECOVERY OF NORTH SLOPE OIL

(thousands of employees)

	Mining Employment
1982	0.000
1983	0.000
1984	0.000
1985	0.000
1986	0.000
1987	0.000
1988	0.000
1989	0.500
1990	1.000
1991	2.000
1992	2.000
1993	1.000
1994	0.500
1995	0.000
1996	0.000
1997	0.000
1998	0.000
1999	0.000
2000	0.000
2001	0.000
2002	0.000
2003	0.000
2004	0.000
2005	0.000
2006	0.000
2007	0.000
2008	0.000
2009	0.000
2010	0.000

SOURCE: MAP MODEL CASE NSO.TRC
VARIABLE: EMP9

TABLE K.6b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
TERTIARY RECOVERY OF NORTH SLOPE OIL

(thousands of employees)

	Barrow-North Slope
1982	0.000
1983	0.000
1984	0.000
1985	0.000
1986	0.000
1987	0.000
1988	0.000
1989	0.500
1990	1.000
1991	2.000
1992	2.000
1993	1.000
1994	0.500
1995	0.000
1996	0.000
1997	0.000
1998	0.000
1999	0.000
2000	0.000
2001	0.000
2002	0.000
2003	0.000
2004	0.000
2005	0.000
2006	0.000
2007	0.000
2008	0.000
2009	0.000
2010	0.000

SOURCE: MAP MODEL CASE NSO.TRC
VARIABLE: B04

5. Federal OCS Exploration and Development

Our assumptions of employment associated with federal OCS exploration and development are based on the current five-year federal OCS lease schedule. For each planning area we assumed a total level of resources to be discovered and developed. We developed employment assumptions based on these resource levels. The basic method used to derive the resource development assumptions is described in pp. 17-28 of Edward D. Porter, "The Five-Year OCS Leasing Schedule, 1982-87, Alaska Impacts," Bureau of Land Management, Alaska OCS office, August 1982. Estimates of recoverable resources and probability of occurrence in each planning area have been updated to May 1983 with information from the Alaska OCS office.

Table K.7 summarizes the current federal OCS five-year leasing schedule and the resources which we assumed to be developed by 2010 in each planning area. This table updates Table 7 in E. D. Porter, op. cit. (p. 26). In the most likely case, we assume that no offshore gas resources are developed. Offshore oil resources are developed only in the Beaufort Sea and the Navarin Basin. Exploration continues in all areas, however, following the lease sale schedule.

Based on the resource estimates for each planning area, we developed employment assumptions for each lease sale. There is a great deal of uncertainty with respect to the actual level of employment which might be associated with any given sale. Employment would depend not only on the resources discovered, but also on factors such as the location of the discovery and the extent to which exploration and development had taken place in connection with earlier sales.

There is no consistent source for developing employment assumptions for all sales. The employment assumptions used by the Minerals Management Service, Alaska OCS office, for environmental impact studies and technical reports are available only for lease sales which have already been studied. These employment assumptions are often based on differing assumptions about resources which are developed than those we have used. In addition, the methodology used to develop them appears to vary widely between different reports. Despite these difficulties with past Minerals Management Service employment assumptions, they remain the best source available. We have used these assumptions as the primary basis for our own OCS employment assumptions, modifying them to take account of differences in assumptions such as resource discoveries and locations.

On the following pages, we present the employment assumptions associated with the OCS planning areas listed in Table K.7, in the order in which they are listed in the table.

TABLE K.7. OCS RESOURCE DEVELOPMENT ASSUMPTIONS

Planning Area	Sales	Dates	Low Case Oil	Low Case Gas	Medium Case Oil	Medium Case Gas	High Case Oil	High Case Gas
Beaufort	71	(1982)	3.8	0	6.1	0	10.8	35.0
	87	(1984)						
	97	(1986)						
Norton	57	(1983)	0	0	0	0	0	0
	100	(1985)						
St. George	70	(1983)	0	0	0	0	1.12	0
	89	(1984)						
	101	(1986)						
Navarin	83	(1984)	0	0	1.14	0	1.14	0
	107	(1986)						
Barrow Arch	85	(1985)	0	0	0	0	.9	0
	109	(1987)						
North Aleutian	92	(1985)	0	0	0	0	.45	2.2
Cook Inlet	88	(1984)	0	0	0	0	.85	5.0
Kodiak and Shumagin	99	(1986)	0	0	0	0	0	0
Total			3.8	0	7.14	0	14.56	42.2

[a]Billion barrels of oil, trillion cubic feet of gas.

5a. Beaufort Sea OCS Employment Assumptions (Sales 71, 87, and 97)

For the most likely case, we assume development of a total of 6.1 billion barrels of oil in the Beaufort Sea. We assumed that roughly half of this oil will be developed on tracts leased in Sale 71, and that half will be developed on tracts leased in Sales 87 and 97. Our employment assumptions are based on unpublished information provided by the Minerals Management Service, Alaska OCS office, in April 1983, which assumed development of 3.0 billion barrels of oil for Sale 87. We used these assumptions for Sales 87 and 97, and assumed slightly lower levels of employment for Sale 71.

TABLE K.8a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
BEAUFORT SEA OCS (SALE 71)

(thousands of employees)
(millions of current $)

	High Wage Exogenous Construction Employment	Mining Employment	Exogenous Transportation Employment	State Property Tax Revenue
1982	0.000	0.000	0.000	0.000
1983	0.341	0.375	0.052	0.000
1984	0.208	0.375	0.052	0.000
1985	0.250	0.535	0.104	0.000
1986	0.250	0.575	0.117	0.000
1987	0.800	0.575	0.384	0.000
1988	0.800	0.546	0.683	0.000
1989	0.340	0.568	0.200	0.000
1990	0.952	1.001	0.411	0.000
1991	0.327	0.980	0.257	51.000
1992	0.873	1.265	0.752	53.000
1993	0.361	1.203	0.461	55.000
1994	0.268	1.448	0.508	57.000
1995	0.268	1.720	0.538	59.000
1996	0.035	1.484	0.610	61.000
1997	0.035	1.350	0.610	63.000
1998	0.035	1.341	0.610	65.000
1999	0.035	1.350	0.610	66.000
2000	0.035	1.341	0.610	68.000
2001	0.035	1.341	0.610	70.000
2002	0.035	1.341	0.610	71.000
2003	0.035	1.341	0.610	72.000
2004	0.035	1.341	0.610	74.000
2005	0.035	1.341	0.610	74.000
2006	0.035	1.341	0.610	75.000
2007	0.028	1.341	0.538	75.000
2008	0.028	1.315	0.538	75.000
2009	0.028	1.315	0.538	75.000
2010	0.028	1.315	0.538	73.000

SOURCE: MAP MODEL CASE OCS.G14
VARIABLES: EMCNX1 EMP9 EMT9X RPPS

TABLE K.8b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
BEAUFORT SEA OCS (SALE 71)

(thousands of employees)

	Anchorage	Barrow-North Slope
1982	0.000	0.000
1983	0.000	0.768
1984	0.000	0.635
1985	0.000	0.889
1986	0.000	0.942
1987	0.000	1.759
1988	0.000	2.029
1989	0.007	1.101
1990	0.011	2.353
1991	0.015	1.549
1992	0.059	2.831
1993	0.087	1.938
1994	0.100	2.124
1995	0.111	2.415
1996	0.120	2.009
1997	0.126	1.869
1998	0.126	1.860
1999	0.126	1.869
2000	0.126	1.860
2001	0.126	1.860
2002	0.126	1.860
2003	0.126	1.860
2004	0.126	1.860
2005	0.126	1.860
2006	0.126	1.860
2007	0.126	1.781
2008	0.126	1.755
2009	0.126	1.755
2010	0.126	1.755

SOURCE: MAP MODEL CASE OCS.G14
VARIABLES: B01 B04

TABLE K.9a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
BEAUFORT SEA OCS (SALES 87, 97)

(thousands of employees)
(millions of current $)

	High Wage Exogenous Construction Employment	Mining Employment	Exogenous Transportation Employment	State Property Tax Revenue
1982	0.000	0.000	0.000	0.000
1983	0.000	0.000	0.000	0.000
1984	0.000	0.000	0.000	0.000
1985	0.341	0.375	0.052	0.000
1986	0.208	0.375	0.052	0.000
1987	0.416	0.535	0.104	0.000
1988	0.468	0.575	0.117	0.000
1989	1.080	0.575	0.384	0.000
1990	1.824	0.546	0.713	0.000
1991	0.340	0.568	0.230	0.000
1992	0.952	1.001	0.501	0.000
1993	0.327	0.980	0.387	72.000
1994	0.873	1.265	0.912	75.000
1995	0.261	1.203	0.651	78.000
1996	0.268	1.448	0.728	81.000
1997	0.268	1.720	0.788	84.000
1998	0.035	1.484	0.860	87.000
1999	0.035	1.350	0.860	89.000
2000	0.035	1.341	0.860	92.000
2001	0.035	1.350	0.860	95.000
2002	0.035	1.341	0.860	97.000
2003	0.035	1.490	0.860	100.000
2004	0.035	1.490	0.860	102.000
2005	0.035	1.490	0.860	104.000
2006	0.035	1.490	0.860	105.000
2007	0.035	1.490	0.860	106.000
2008	0.035	1.490	0.860	107.000
2009	0.028	1.315	0.788	108.000
2010	0.028	1.315	0.788	107.000

SOURCE: MAP MODEL CASE OCS.G01
VARIABLES: EMCNX1 EMP9 EMT9X RPPS

TABLE K.9b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
BEAUFORT SEA OCS (SALES 87, 97)

(thousands of employees)

	Anchorage	Barrow-North Slope
1982	0.000	0.000
1983	0.000	0.000
1984	0.000	0.000
1985	0.000	0.768
1986	0.000	0.635
1987	0.000	1.055
1988	0.000	1.160
1989	0.000	2.039
1990	0.000	3.083
1991	0.007	1.131
1992	0.011	2.443
1993	0.015	1.679
1994	0.059	2.991
1995	0.087	2.028
1996	0.100	2.344
1997	0.111	2.665
1998	0.120	2.259
1999	0.126	2.119
2000	0.126	2.110
2001	0.126	2.119
2002	0.126	2.110
2003	0.126	2.259
2004	0.126	2.259
2005	0.126	2.259
2006	0.126	2.259
2007	0.126	2.259
2008	0.126	2.259
2009	0.126	2.005
2010	0.126	2.005

SOURCE: MAP MODEL CASE OCS.G01
VARIABLES: B02 B04

5b. Norton Basin OCS Employment Assumptions (OCS Sales 57 and 100)

We assume that no oil resources are developed in the Norton Basin. We assume only exploration employment only for Sales 57 and 100. Our Sale 57 exploration employment assumptions are based on an exploration-only scenario from U.S. Department of the Interior, BLM Alaska--OCS office, Bering-Norton Petroleum Development Scenarios, Socioeconomic Studies Program, Technical Report Number 49 (January 1980), p. 106. Our Sale 100 exploration employment assumptions are identical to these for Sale 57, but are assumed to occur two years later.

TABLE K.10a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
Norton Basin OCS (Sale 57)

(thousands of employees)

	High Wage Exogenous Construction Employment	Mining Employment	Exogenous Transportation Employment
1982	0.000	0.000	0.000
1983	0.000	0.000	0.000
1984	0.000	0.046	0.022
1985	0.036	0.092	0.044
1986	0.036	0.046	0.022
1987	0.000	0.000	0.000
1988	0.000	0.000	0.000
1989	0.000	0.000	0.000
1990	0.000	0.000	0.000
1991	0.000	0.000	0.000
1992	0.000	0.000	0.000
1993	0.000	0.000	0.000
1994	0.000	0.000	0.000
1995	0.000	0.000	0.000
1996	0.000	0.000	0.000
1997	0.000	0.000	0.000
1998	0.000	0.000	0.000
1999	0.000	0.000	0.000
2000	0.000	0.000	0.000
2001	0.000	0.000	0.000
2002	0.000	0.000	0.000
2003	0.000	0.000	0.000
2004	0.000	0.000	0.000
2005	0.000	0.000	0.000
2006	0.000	0.000	0.000
2007	0.000	0.000	0.000
2008	0.000	0.000	0.000
2009	0.000	0.000	0.000
2010	0.000	0.000	0.000

SOURCE: MAP MODEL CASE OCS.G10
VARIABLES: EMCNX1 EMP9 EMT9X

TABLE K.10b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
Norton Basin OCS (Sale 57)

(thousands of employees)

	Nome
1982	0.000
1983	0.000
1984	0.068
1985	0.172
1986	0.104
1987	0.000
1988	0.000
1989	0.000
1990	0.000
1991	0.000
1992	0.000
1993	0.000
1994	0.000
1995	0.000
1996	0.000
1997	0.000
1998	0.000
1999	0.000
2000	0.000
2001	0.000
2002	0.000
2003	0.000
2004	0.000
2005	0.000
2006	0.000
2007	0.000
2008	0.000
2009	0.000
2010	0.000

SOURCE: MAP MODEL CASE OCS.G10
VARIABLE: B18

TABLE K.11a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
Norton Basin OCS (Sale 100)

(thousands of employees)

	High Wage Exogenous Construction Employment	Mining Employment	Exogenous Transportation Employment
1982	0.000	0.000	0.000
1983	0.000	0.000	0.000
1984	0.000	0.000	0.000
1985	0.000	0.000	0.000
1986	0.000	0.046	0.022
1987	0.036	0.092	0.044
1988	0.036	0.046	0.022
1989	0.000	0.000	0.000
1990	0.000	0.000	0.000
1991	0.000	0.000	0.000
1992	0.000	0.000	0.000
1993	0.000	0.000	0.000
1994	0.000	0.000	0.000
1995	0.000	0.000	0.000
1996	0.000	0.000	0.000
1997	0.000	0.000	0.000
1998	0.000	0.000	0.000
1999	0.000	0.000	0.000
2000	0.000	0.000	0.000
2001	0.000	0.000	0.000
2002	0.000	0.000	0.000
2003	0.000	0.000	0.000
2004	0.000	0.000	0.000
2005	0.000	0.000	0.000
2006	0.000	0.000	0.000
2007	0.000	0.000	0.000
2008	0.000	0.000	0.000
2009	0.000	0.000	0.000
2010	0.000	0.000	0.000

SOURCE: MAP MODEL CASE OCS.G09
VARIABLES: EMCNX1 EMP9 EMT9X

TABLE K.11b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
Norton Basin OCS (Sale 100)

(thousands of employees)

	Nome
1982	0.000
1983	0.000
1984	0.000
1985	0.000
1986	0.068
1987	0.172
1988	0.104
1989	0.000
1990	0.000
1991	0.000
1992	0.000
1993	0.000
1994	0.000
1995	0.000
1996	0.000
1997	0.000
1998	0.000
1999	0.000
2000	0.000
2001	0.000
2002	0.000
2003	0.000
2004	0.000
2005	0.000
2006	0.000
2007	0.000
2008	0.000
2009	0.000
2010	0.000

SOURCE: MAP MODEL CASE OCS.G09
VARIABLE: B18

5c. St. George Basin OCS Employment Assumptions (OCS Sales 70, 89, and 101

We assume that no oil resources are developed in the St. George Basin. We assume only exploration employment for Sales 70, 89, and 101. Our Sale 70 exploration employment assumptions are based on an exploration-only scenario from U.S. Department of the Interior, BLM Alaska OCS office, St. George Basin Petroleum Development Scenerios: Economic and Demographic Analysis, Socioeconomic Studies Program, Technical Report Number 57 (April 1981), p. 250. Our Sale 89 employment assumptions are identical, but are assumed to occur one year later. Following unsuccessful exploration of tracts leased in the two earlier sales, no exploration occurs in connection with Sale 101.

TABLE K.12a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
St. George Basin OCS (Sale 70)

(thousands of employees)

	Mining Employment	Exogenous Transportation Employment
1982	0.000	0.000
1983	0.000	0.000
1984	0.131	0.057
1985	0.198	0.093
1986	0.232	0.110
1987	0.198	0.093
1988	0.097	0.020
1989	0.000	0.000
1990	0.000	0.000
1991	0.000	0.000
1992	0.000	0.000
1993	0.000	0.000
1994	0.000	0.000
1995	0.000	0.000
1996	0.000	0.000
1997	0.000	0.000
1998	0.000	0.000
1999	0.000	0.000
2000	0.000	0.000
2001	0.000	0.000
2002	0.000	0.000
2003	0.000	0.000
2004	0.000	0.000
2005	0.000	0.000
2006	0.000	0.000
2007	0.000	0.000
2008	0.000	0.000
2009	0.000	0.000
2010	0.000	0.000

SOURCE: MAP MODEL CASE OCS.G11
VARIABLES: EMP9 EMT9X

TABLE K.12b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
St. George Basin OCS (Sale 70)

(thousands of employees)

	Aleutian Islands
1982	0.000
1983	0.000
1984	0.188
1985	0.291
1986	0.342
1987	0.291
1988	0.117
1989	0.000
1990	0.000
1991	0.000
1992	0.000
1993	0.000
1994	0.000
1995	0.000
1996	0.000
1997	0.000
1998	0.000
1999	0.000
2000	0.000
2001	0.000
2002	0.000
2003	0.000
2004	0.000
2005	0.000
2006	0.000
2007	0.000
2008	0.000
2009	0.000
2010	0.000

SOURCE: MAP MODEL CASE OCS.G11
VARIABLE: B01

TABLE K.13a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
St. George Basin OCS (Sale 89)

(thousands of employees)

	Mining Employment	Exogenous Transportation Employment
1982	0.000	0.000
1983	0.000	0.000
1984	0.000	0.000
1985	0.131	0.057
1986	0.198	0.093
1987	0.232	0.110
1988	0.198	0.093
1989	0.097	0.020
1990	0.000	0.000
1991	0.000	0.000
1992	0.000	0.000
1993	0.000	0.000
1994	0.000	0.000
1995	0.000	0.000
1996	0.000	0.000
1997	0.000	0.000
1998	0.000	0.000
1999	0.000	0.000
2000	0.000	0.000
2001	0.000	0.000
2002	0.000	0.000
2003	0.000	0.000
2004	0.000	0.000
2005	0.000	0.000
2006	0.000	0.000
2007	0.000	0.000
2008	0.000	0.000
2009	0.000	0.000
2010	0.000	0.000

SOURCE: MAP MODEL CASE OCS.G12
VARIABLES: EMP9 EMT9X

TABLE K.13b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
St. George Basin OCS (Sale 89)

(thousands of employees)

	Aleutian Islands
1982	0.000
1983	0.000
1984	0.000
1985	0.188
1986	0.291
1987	0.342
1988	0.291
1989	0.117
1990	0.000
1991	0.000
1992	0.000
1993	0.000
1994	0.000
1995	0.000
1996	0.000
1997	0.000
1998	0.000
1999	0.000
2000	0.000
2001	0.000
2002	0.000
2003	0.000
2004	0.000
2005	0.000
2006	0.000
2007	0.000
2008	0.000
2009	0.000
2010	0.000

SOURCE: MAP MODEL CASE OCS.G12
VARIABLE: B01

5d. Navarin Basin OCS Employment Assumptions (OCS Sales 83 and 107)

For our most likely case, we assumed development of 1.14 billion barrels of oil in the Navarin Basin. We assumed that this oil is developed in connection with Sale 83 and that Sale 107 results in only additional exploration.

Our Sale 83 employment assumptions are based on unpublished figures provided to ISER by the Minerals Management, Alaskan OCS office, in connection with the preparation of Socioeconomic Studies Program, Technical Report 78, which examined impacts of Sale 83. The employment figures provided by the OCS office assumed development of both oil and gas resources. We reduced these figures by removing that employment primarily associated with gas development.

Our exploration-only employment assumptions for Sale 107 were based on the same set of figures provided to ISER by the Minerals Management Service, Alaska OCS office.

TABLE K.14a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
Navarin Basin OCS (Sale 83)

(thousands of employees)
(millions of current $)

	High Wage Exogenous Construction Employment	Mining Employment	Exogenous Transportation Employment	State Property Tax Revenue
1982	0.000	0.000	0.000	0.000
1983	0.000	0.000	0.000	0.000
1984	0.000	0.000	0.000	0.000
1985	0.000	0.000	0.000	0.000
1986	0.000	0.240	0.000	0.000
1987	0.000	0.440	0.000	0.000
1988	0.000	0.480	0.000	0.000
1989	0.000	0.480	0.000	0.000
1990	0.000	0.360	0.000	0.000
1991	0.000	0.352	0.000	0.000
1992	3.476	0.664	0.000	0.000
1993	3.476	1.215	0.000	0.000
1994	0.000	1.832	0.174	14.000
1995	0.000	2.228	0.261	14.000
1996	0.000	2.345	0.348	15.000
1997	0.000	2.364	0.348	15.000
1998	0.000	2.166	0.348	15.000
1999	0.000	1.868	0.348	16.000
2000	0.000	1.443	0.348	16.000
2001	0.000	1.114	0.348	16.000
2002	0.000	1.002	0.348	16.000
2003	0.000	1.002	0.348	17.000
2004	0.000	1.002	0.348	17.000
2005	0.000	1.002	0.348	17.000
2006	0.000	1.002	0.348	17.000
2007	0.000	1.002	0.348	16.000
2008	0.000	1.002	0.348	16.000
2009	0.000	1.002	0.348	15.000
2010	0.000	1.002	0.348	15.000

SOURCE: MAP MODEL CASE OCS.G03
VARIABLES: EMCNX1 EMP9 EMT9X RPPS

TABLE K.14b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
Navarin Basin OCS (Sale 83)

(thousands of employees)

	Aleutian Islands	Anchorage
1982	0.000	0.000
1983	0.000	0.000
1984	0.000	0.000
1985	0.000	0.000
1986	0.240	0.000
1987	0.440	0.000
1988	0.480	0.000
1989	0.480	0.000
1990	0.360	0.000
1991	0.352	0.000
1992	4.140	0.000
1993	4.689	0.002
1994	2.002	0.004
1995	2.477	0.012
1996	2.671	0.022
1997	2.682	0.030
1998	2.477	0.037
1999	2.163	0.053
2000	1.737	0.053
2001	1.409	0.053
2002	1.297	0.053
2003	1.297	0.053
2004	1.297	0.053
2005	1.297	0.053
2006	1.297	0.053
2007	1.297	0.053
2008	1.297	0.053
2009	1.297	0.053
2010	1.297	0.053

SOURCE: MAP MODEL CASE OCS.G03
VARIABLES: B01 B02

TABLE K.15a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
Navarin Basin OCS (Sale 107)

(thousands of employees)

	Mining Employment	Exogenous Transportation Employment
1982	0.000	0.000
1983	0.000	0.000
1984	0.000	0.000
1985	0.000	0.000
1986	0.000	0.000
1987	0.000	0.000
1988	0.280	0.078
1989	0.680	0.208
1990	0.280	0.078
1991	0.120	0.026
1992	0.000	0.000
1993	0.000	0.000
1994	0.000	0.000
1995	0.000	0.000
1996	0.000	0.000
1997	0.000	0.000
1998	0.000	0.000
1999	0.000	0.000
2000	0.000	0.000
2001	0.000	0.000
2002	0.000	0.000
2003	0.000	0.000
2004	0.000	0.000
2005	0.000	0.000
2006	0.000	0.000
2007	0.000	0.000
2008	0.000	0.000
2009	0.000	0.000
2010	0.000	0.000

SOURCE: MAP MODEL CASE OCS.G04
VARIABLES: EMP9 EMT9X

TABLE K.15b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
Navarin Basin OCS (Sale 107)

(thousands of employees)

	Aleutian Islands
1982	0.000
1983	0.000
1984	0.000
1985	0.000
1986	0.000
1987	0.000
1988	0.358
1989	0.888
1990	0.358
1991	0.146
1992	0.000
1993	0.000
1994	0.000
1995	0.000
1996	0.000
1997	0.000
1998	0.000
1999	0.000
2000	0.000
2001	0.000
2002	0.000
2003	0.000
2004	0.000
2005	0.000
2006	0.000
2007	0.000
2008	0.000
2009	0.000
2010	0.000

SOURCE: MAP MODEL CASE OCS.G04
VARIABLE: B01

5e. Barrow Arch OCS Employment Assumptions (OCS Sales 85 and 109)

For our most likely case, we assumed that there would be no development of oil resources in the Barrow Arch. We developed exploration-only employment assumptions for OCS Sales 85 and 109 based on figures provided in U.S. Department of the Interior, Bureau of Land Management, Alaska OCS office, Chukchi Sea Petroleum Technology Assessment, Socioeconomic Studies Program, Technical Report Number 79 (December 1982), pp. 5.1-5.6.

TABLE K.16a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
Barrow Arch OCS (Sales 85 and 109)

(thousands of employees)

	High Wage Exogenous Construction Employment	Mining Employment	Exogenous Transportation Employment
1982	0.000	0.000	0.000
1983	0.000	0.000	0.000
1984	0.000	0.000	0.000
1985	0.000	0.030	0.000
1986	0.017	0.057	0.050
1987	0.017	0.057	0.050
1988	0.324	0.027	0.100
1989	0.324	0.067	0.100
1990	0.000	0.067	0.050
1991	0.000	0.067	0.050
1992	0.000	0.000	0.000
1993	0.000	0.000	0.000
1994	0.000	0.000	0.000
1995	0.000	0.000	0.000
1996	0.000	0.000	0.000
1997	0.000	0.000	0.000
1998	0.000	0.000	0.000
1999	0.000	0.000	0.000
2000	0.000	0.000	0.000
2001	0.000	0.000	0.000
2002	0.000	0.000	0.000
2003	0.000	0.000	0.000
2004	0.000	0.000	0.000
2005	0.000	0.000	0.000
2006	0.000	0.000	0.000
2007	0.000	0.000	0.000
2008	0.000	0.000	0.000
2009	0.000	0.000	0.000
2010	0.000	0.000	0.000

SOURCE: MAP MODEL CASE OCS.G13
VARIABLES: EMCNX1 EMP9 EMT9X

TABLE K.16b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
Barrow Arch OCS (Sales 85 and 109)

(thousands of employees)

	Barrow-North Slope
1982	0.000
1983	0.000
1984	0.000
1985	0.030
1986	0.124
1987	0.124
1988	0.451
1989	0.491
1990	0.117
1991	0.117
1992	0.000
1993	0.000
1994	0.000
1995	0.000
1996	0.000
1997	0.000
1998	0.000
1999	0.000
2000	0.000
2001	0.000
2002	0.000
2003	0.000
2004	0.000
2005	0.000
2006	0.000
2007	0.000
2008	0.000
2009	0.000
2010	0.000

SOURCE: MAP MODEL CASE OCS.G13
VARIABLE: B04

5f. North Aleutian Shelf OCS Employment Assumptions (Sale 92)

For our most likely case, we assumed that there would be no development of oil resources from the North Aleutian Shelf. Our exploration-only employment assumptions are based on figures provided for exploration employment in U.S. Department of the Interior, Bureau of Land Management, Alaska OCS office, North Aleutian Shelf Statewide and Regional Demographic and Economic Systems Impacts Analysis, Socioeconomic Studies Program, Technical Report Number 68 (June 1982), p. 285.

TABLE K.17a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
North Aleutian Shelf OCS (Sale 92)

(thousands of employees)

	Mining Employment	Exogenous Transportation Employment
1982	0.000	0.000
1983	0.000	0.000
1984	0.000	0.000
1985	0.000	0.000
1986	0.125	0.059
1987	0.125	0.059
1988	0.078	0.059
1989	0.000	0.000
1990	0.000	0.000
1991	0.000	0.000
1992	0.000	0.000
1993	0.000	0.000
1994	0.000	0.000
1995	0.000	0.000
1996	0.000	0.000
1997	0.000	0.000
1998	0.000	0.000
1999	0.000	0.000
2000	0.000	0.000
2001	0.000	0.000
2002	0.000	0.000
2003	0.000	0.000
2004	0.000	0.000
2005	0.000	0.000
2006	0.000	0.000
2007	0.000	0.000
2008	0.000	0.000
2009	0.000	0.000
2010	0.000	0.000

SOURCE: MAP MODEL CASE OCS.G05
VARIABLES: EMP9 EMT9X

TABLE K.17b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
North Aleutian Shelf OCS (Sale 92)

(thousands of employees)

	Aleutian Islands
1982	0.000
1983	0.000
1984	0.000
1985	0.000
1986	0.184
1987	0.184
1988	0.137
1989	0.000
1990	0.000
1991	0.000
1992	0.000
1993	0.000
1994	0.000
1995	0.000
1996	0.000
1997	0.000
1998	0.000
1999	0.000
2000	0.000
2001	0.000
2002	0.000
2003	0.000
2004	0.000
2005	0.000
2006	0.000
2007	0.000
2008	0.000
2009	0.000
2010	0.000

SOURCE: MAP MODEL CASE OCS.G05
VARIABLE: B01

5g. Cook Inlet, Kodiak, and Shumagin OCS Employment Assumptions (Sales 88, 86, and 99)

For our most likely case, we assumed that there would be no development of oil resources in the Cook Inlet, Kodiak, or Shumagin federal OCS. Our OCS exploration-only employment assumptions for Sales 88 and 99 are based on an exploration-only scenario provided in U.S. Department of the Interior, Bureau of Land Management, Alaska OCS office, Lower Cook Inlet and Shelikof Strait Petroleum Development Scenarios, Socioeconomic Studies Program, Technical Report Number 43 (July 1979), p. 66. Given the assumed lack of development resulting from Kodiak and Cook Inlet sales, we assumed that there would be no exploration employment associated with Sale 86 (Shelikof Strait).

TABLE K.18a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
Cook Inlet OCS (Sale 88)

(thousands of employees)

	Mining Employment	Exogenous Transportation Employment
1982	0.000	0.000
1983	0.000	0.000
1984	0.000	0.000
1985	0.202	0.099
1986	0.271	0.132
1987	0.056	0.028
1988	0.000	0.000
1989	0.000	0.000
1990	0.000	0.000
1991	0.000	0.000
1992	0.000	0.000
1993	0.000	0.000
1994	0.000	0.000
1995	0.000	0.000
1996	0.000	0.000
1997	0.000	0.000
1998	0.000	0.000
1999	0.000	0.000
2000	0.000	0.000
2001	0.000	0.000
2002	0.000	0.000
2003	0.000	0.000
2004	0.000	0.000
2005	0.000	0.000
2006	0.000	0.000
2007	0.000	0.000
2008	0.000	0.000
2009	0.000	0.000
2010	0.000	0.000

SOURCE: MAP MODEL CASE OCS.G06
VARIABLES: EMP9 EMT9X

TABLE K.18b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
Cook Inlet OCS (Sale 88)

(thousands of employees)

	Kenai-Cook Inlet
1982	0.000
1983	0.000
1984	0.000
1985	0.301
1986	0.403
1987	0.084
1988	0.000
1989	0.000
1990	0.000
1991	0.000
1992	0.000
1993	0.000
1994	0.000
1995	0.000
1996	0.000
1997	0.000
1998	0.000
1999	0.000
2000	0.000
2001	0.000
2002	0.000
2003	0.000
2004	0.000
2005	0.000
2006	0.000
2007	0.000
2008	0.000
2009	0.000
2010	0.000

SOURCE: MAP MODEL CASE OCS.G06
VARIABLE: B12

TABLE K.19a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
Kodiak OCS (Sale 99)

(thousands of employees)

	Mining Employment	Exogenous Transportation Employment
1982	0.000	0.000
1983	0.000	0.000
1984	0.000	0.000
1985	0.000	0.000
1986	0.000	0.000
1987	0.202	0.099
1988	0.271	0.132
1989	0.056	0.028
1990	0.000	0.000
1991	0.000	0.000
1992	0.000	0.000
1993	0.000	0.000
1994	0.000	0.000
1995	0.000	0.000
1996	0.000	0.000
1997	0.000	0.000
1998	0.000	0.000
1999	0.000	0.000
2000	0.000	0.000
2001	0.000	0.000
2002	0.000	0.000
2003	0.000	0.000
2004	0.000	0.000
2005	0.000	0.000
2006	0.000	0.000
2007	0.000	0.000
2008	0.000	0.000
2009	0.000	0.000
2010	0.000	0.000

SOURCE: MAP MODEL CASE OCS.G07
VARIABLES: EMP9 EMT9X

TABLE K.19b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
Kodiak OCS (Sale 99)

(thousands of employees)

	Kodiak
1982	0.000
1983	0.000
1984	0.000
1985	0.000
1986	0.000
1987	0.301
1988	0.403
1989	0.084
1990	0.000
1991	0.000
1992	0.000
1993	0.000
1994	0.000
1995	0.000
1996	0.000
1997	0.000
1998	0.000
1999	0.000
2000	0.000
2001	0.000
2002	0.000
2003	0.000
2004	0.000
2005	0.000
2006	0.000
2007	0.000
2008	0.000
2009	0.000
2010	0.000

SOURCE: MAP MODEL CASE OCS.G07
VARIABLE: B15

5h. Federal OCS Development: State Property Tax Revenue Assumptions

We calculated nominal state property tax revenue assumptions as 2 percent of taxable value of installed facilities onshore or offshore within the three-mile limit using the following formula to calculate taxable value:

$$\left(\begin{array}{l}\text{Taxable}\\\text{value}\end{array}\right) = \left(\begin{array}{l}\text{Cost of}\\\text{facilities}\end{array}\right)\left(1 - \frac{\text{year - completion date}}{\text{depreciation period}}\right)\left(\begin{array}{l}\text{1 +}\\\text{inflation}\\\text{rate}\end{array}\right)\left(\text{year - completion date}\right)$$

We assumed that oil facilities would appreciate in value at 7.5 percent per year. We assumed construction of facilities resulting in significant property tax revenues as follows:

	Area	facilities (millions $)	Completion Date	Depreciation Period (years)
Sale 71	Beaufort	2,536 (a)	1991	30
Sale 87	Beaufort	3,623 (b)	1993	30
Sale 83	Navarin	693 (c)	1994	24

(a) Assumed to be 70% of cost of Sale 87 facilities and to be completed two years earlier.

(b) Minerals Management Service, Alaska OCS office.

(c) OCS Technical Report 78, p. M-2.

Our resulting revenue assumptions are shown in Table K.20; they are also shown in the statewide economic assumptions provided earlier for each lease sale area.

TABLE K.20. OCS PROPERTY TAX REVENUE ASSUMPTIONS
(million $)

	Sale 83 (Navarin)	Sale 71 (Beaufort)	Sale 83 (Beaufort)
1991	0	51	0
1992	0	53	0
1993	0	55	72
1994	14	57	75
1995	14	59	78
1996	15	61	81
1997	15	63	84
1998	15	65	87
1999	16	66	89
2000	16	68	92
2001	16	70	95
2002	16	71	97
2003	17	72	100
2004	17	74	102
2005	17	74	104
2006	17	75	105
2007	16	75	106
2008	16	75	107
2009	15	75	108
2010	15	73	107

SOURCE: See text.

6. Anchorage Oil Headquarters

Opening of the new ARCO headquarter building will lead a trend established over the past several years as ARCO and other oil companies with extensive Alaska operations shift supervisory personnel to Anchorage from outside the state. We expect a permanent addition of 1,150 to mining employment in Anchorage by 1986 to continue to 2010.

SOURCE: Municipality of Anchorage, Quarterly Economic Indicators, Fourth quarter 1981; and Alaska Department of Labor, Alaska Economic Trends, March 1983.

TABLE K.21a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
ANCHORAGE OIL HEADQUARTERS

(thousands of employees)

	Mining Employment
1982	0.000
1983	0.366
1984	0.724
1985	0.988
1986	1.150
1987	1.150
1988	1.150
1989	1.150
1990	1.150
1991	1.150
1992	1.150
1993	1.150
1994	1.150
1995	1.150
1996	1.150
1997	1.150
1998	1.150
1999	1.150
2000	1.150
2001	1.150
2002	1.150
2003	1.150
2004	1.150
2005	1.150
2006	1.150
2007	1.150
2008	1.150
2009	1.150
2010	1.150

SOURCE: MAP MODEL CASE OHQ.083
VARIABLE: EMP9

TABLE K.21b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
ANCHORAGE OIL HEADQUARTERS

(thousands of employees)

	Anchorage
1982	0.000
1983	0.366
1984	0.724
1985	0.988
1986	1.150
1987	1.150
1988	1.150
1989	1.150
1990	1.150
1991	1.150
1992	1.150
1993	1.150
1994	1.150
1995	1.150
1996	1.150
1997	1.150
1998	1.150
1999	1.150
2000	1.150
2001	1.150
2002	1.150
2003	1.150
2004	1.150
2005	1.150
2006	1.150
2007	1.150
2008	1.150
2009	1.150
2010	1.150

SOURCE: MAP MODEL CASE OHQ.083
VARIABLE: B02

7. Beluga-Chuitna Coal Production

USGS has long recognized the potential economic significance of a large number of beds of subbituminous coal on the west side of Cook Inlet near Tyonek (see USGS, Coal Resources of Alaska, 1967). Recently, several alternative proposals for developing the Beluga-Chuitna fields for export to Japan or other Pacific rim locations have been considered (see Pacific Northwest Laboratory, Beluga Coal Field Development: Social Effects and Management Alternatives, 1979; and Bechtel, Preliminary Feasibility Study: Coal Export Program, Chuitna River Field, Alaska, 1980).

Some scenarios for development of coal resources in this area have discussed an 11-million-ton-per-year coal mine for export or use as input to a synthetic fuel production process becoming operational as early as 1986. We assume a more modest export program implemented on a slower timetable. Production begins in 1994 and eventually reaches 4.4 million tons per year. Construction begins in 1989, with peak employment of 400 in 1991. Operations employment is 524 distributed 80 percent in mining and 20 percent in transportation.

SOURCE: Construction employment based on Battelle Pacific Northwest Laboratories, Beluga Coal Field Development: Social Effects and Management Alternatives, 1979. Other employment based on Bechtel, Preliminary Feasibility Study: Coal Export Program, Chuitna River Field, Alaska, 1980.

TABLE K.22a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
BELUGA-CHUITNA COAL

(thousands of employees)

	Low Wage Exogenous Construction Employment	Mining Employment	Exogenous Transportation Employment
1982	0.000	0.000	0.000
1983	0.000	0.000	0.000
1984	0.000	0.000	0.000
1985	0.000	0.000	0.000
1986	0.000	0.000	0.000
1987	0.000	0.000	0.000
1988	0.000	0.000	0.000
1989	0.150	0.000	0.000
1990	0.300	0.000	0.000
1991	0.400	0.000	0.000
1992	0.350	0.000	0.000
1993	0.200	0.000	0.000
1994	0.100	0.210	0.053
1995	0.000	0.419	0.105
1996	0.000	0.419	0.105
1997	0.000	0.419	0.105
1998	0.000	0.419	0.105
1999	0.000	0.419	0.105
2000	0.000	0.419	0.105
2001	0.000	0.419	0.105
2002	0.000	0.419	0.105
2003	0.000	0.419	0.105
2004	0.000	0.419	0.105
2005	0.000	0.419	0.105
2006	0.000	0.419	0.105
2007	0.000	0.419	0.105
2008	0.000	0.419	0.105
2009	0.000	0.419	0.105
2010	0.000	0.419	0.105

SOURCE: MAP MODEL CASE BCL.04T
VARIABLES: EMCNX2 EMP9 EMT9X

TABLE K.22b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
BELUGA-CHUITNA COAL

(thousands of employees)

	Kenai-Cook Inlet
1982	0.000
1983	0.000
1984	0.000
1985	0.000
1986	0.000
1987	0.000
1988	0.000
1989	0.150
1990	0.300
1991	0.400
1992	0.350
1993	0.200
1994	0.363
1995	0.524
1996	0.524
1997	0.524
1998	0.524
1999	0.524
2000	0.524
2001	0.524
2002	0.524
2003	0.524
2004	0.524
2005	0.524
2006	0.524
2007	0.524
2008	0.524
2009	0.524
2010	0.524

SOURCE: MAP MODEL CASE BCL.04T
VARIABLE: B12

8. Tyee and Terror Lakes Hydro

The Tyee Lake project near Petersburg and Wrangell is scheduled for completion in December 1983. Construction employment will peak at 148 in 1983. The Terror Lake project near Kodiak will be completed by the end of 1984, with peak construction employment expected to reach 372 in 1983.

SOURCE: Personal communication: John Stafford, Alaska Power Authority; and John Longaeve, Alaska Power Authority.

TABLE K.23a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
TYEE AND TERROR LAKES HYDRO

(thousands of employees)

	High Wage Exogenous Construction Employment
1982	0.179
1983	0.520
1984	0.195
1985	0.000
1986	0.000
1987	0.000
1988	0.000
1989	0.000
1990	0.000
1991	0.000
1992	0.000
1993	0.000
1994	0.000
1995	0.000
1996	0.000
1997	0.000
1998	0.000
1999	0.000
2000	0.000
2001	0.000
2002	0.000
2003	0.000
2004	0.000
2005	0.000
2006	0.000
2007	0.000
2008	0.000
2009	0.000
2010	0.000

SOURCE: MAP MODEL CASE SHP.PJH
VARIABLE: EMCNX1

TABLE K.23b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
TYEE AND TERROR LAKES HYDRO

(thousands of employees)

	Southeast Alaska	Kodiak
1982	0.120	0.059
1983	0.148	0.372
1984	0.000	0.195
1985	0.000	0.000
1986	0.000	0.000
1987	0.000	0.000
1988	0.000	0.000
1989	0.000	0.000
1990	0.000	0.000
1991	0.000	0.000
1992	0.000	0.000
1993	0.000	0.000
1994	0.000	0.000
1995	0.000	0.000
1996	0.000	0.000
1997	0.000	0.000
1998	0.000	0.000
1999	0.000	0.000
2000	0.000	0.000
2001	0.000	0.000
2002	0.000	0.000
2003	0.000	0.000
2004	0.000	0.000
2005	0.000	0.000
2006	0.000	0.000
2007	0.000	0.000
2008	0.000	0.000
2009	0.000	0.000
2010	0.000	0.000

SOURCE: MAP MODEL CASE SHP.PJH
VARIABLES: B11 B15

9. APA Hydro Projects

In addition to the Tyee and Terror Lake projects currently under construction, a number of other state-sponsored power projects are likely to be constructed in the 1980s. These are: Swan Lake near Ketchikan (under construction), the power intertie between Talkeetna and Healy in Southcentral Alaska, the Bradley Lake project near Homer, and the Silver Lake project between Cordova and Valdez. Eighty percent of the intertie construction employment is assumed to be in the Mat-Su region, with 20 percent in the Interior. We assume, as well, that the Chackachamna project on the west side of Cook Inlet is constructed in the early 1990s.

We assume a schedule for construction of the five projects as follows:

Project	Region	Start (year)	Finish (year)	Average Work Force
Swan Lake	Southeast	1981	1984	125
Bradley Lake	Kenai-Cook Inlet	1984	1987	175
Silver Lake	Cordova-McCarthy	1985	1988	75
Chackachamna	Kenai-Cook Inlet	1988	1993	725
Intertie	80% Mat-Su	1983	1984	100
	20% Interior	1983	1984	25

SOURCE: Personal communication: Robert Mohn, Alaska Power Authority.

TABLE K.24a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
APA HYDRO PROJECTS

(thousands of employees)

	Low Wage Exogenous Construction Employment
1982	0.125
1983	0.250
1984	0.276
1985	0.213
1986	0.250
1987	0.163
1988	0.401
1989	0.725
1990	0.725
1991	0.725
1992	0.725
1993	0.363
1994	0.000
1995	0.000
1996	0.000
1997	0.000
1998	0.000
1999	0.000
2000	0.000
2001	0.000
2002	0.000
2003	0.000
2004	0.000
2005	0.000
2006	0.000
2007	0.000
2008	0.000
2009	0.000
2010	0.000

SOURCE: MAP MODEL CASE SHP.082
VARIABLE: EMCNX2

TABLE K.24b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
APA HYDRO PROJECTS

(thousands of employees)

	Cordova-McCarthy	Southeast Alaska	Kenai-Cook Inlet	Matanuska-Susitna	Yukon-Koyukuk
1982	0.000	0.125	0.000	0.000	0.000
1983	0.000	0.125	0.000	0.100	0.025
1984	0.000	0.063	0.088	0.100	0.025
1985	0.038	0.000	0.175	0.000	0.000
1986	0.075	0.000	0.175	0.000	0.000
1987	0.075	0.000	0.088	0.000	0.000
1988	0.038	0.000	0.363	0.000	0.000
1989	0.000	0.000	0.725	0.000	0.000
1990	0.000	0.000	0.725	0.000	0.000
1991	0.000	0.000	0.725	0.000	0.000
1992	0.000	0.000	0.725	0.000	0.000
1993	0.000	0.000	0.363	0.000	0.000
1994	0.000	0.000	0.000	0.000	0.000
1995	0.000	0.000	0.000	0.000	0.000
1996	0.000	0.000	0.000	0.000	0.000
1997	0.000	0.000	0.000	0.000	0.000
1998	0.000	0.000	0.000	0.000	0.000
1999	0.000	0.000	0.000	0.000	0.000
2000	0.000	0.000	0.000	0.000	0.000
2001	0.000	0.000	0.000	0.000	0.000
2002	0.000	0.000	0.000	0.000	0.000
2003	0.000	0.000	0.000	0.000	0.000
2004	0.000	0.000	0.000	0.000	0.000
2005	0.000	0.000	0.000	0.000	0.000
2006	0.000	0.000	0.000	0.000	0.000
2007	0.000	0.000	0.000	0.000	0.000
2008	0.000	0.000	0.000	0.000	0.000
2009	0.000	0.000	0.000	0.000	0.000
2010	0.000	0.000	0.000	0.000	0.000

SOURCE: MAP MODEL CASE SHP.082
VARIABLES: B08 B11 B12 B17 B29

10. U.S. Borax Mine near Ketchikan

The U.S. Borax molybdenum mine near Ketchikan is developed and brought into production by 1987. The world market for molybdenum remains somewhat soft, so the mine does not initially operate at full capacity. Beginning in 1987, 40,000 tons per day are mined, employing 700 miners and 90 support personnel through 2010.

SOURCE: Personal communication: Don Finney, U.S. Borax, Ketchikan.

TABLE K.25a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
U.S. BORAX MINE NEAR KETCHIKAN

(thousands of employees)

	Low Wage Exogenous Construction Employment	Mining Employment
1982	0.000	0.041
1983	0.040	0.041
1984	0.350	0.058
1985	0.500	0.058
1986	0.400	0.058
1987	0.300	0.428
1988	0.000	0.790
1989	0.000	0.790
1990	0.000	0.790
1991	0.000	0.790
1992	0.000	0.790
1993	0.000	0.790
1994	0.000	0.790
1995	0.000	0.790
1996	0.000	0.790
1997	0.000	0.790
1998	0.000	0.790
1999	0.000	0.790
2000	0.000	0.790
2001	0.000	0.790
2002	0.000	0.790
2003	0.000	0.790
2004	0.000	0.790
2005	0.000	0.790
2006	0.000	0.790
2007	0.000	0.790
2008	0.000	0.790
2009	0.000	0.790
2010	0.000	0.790

SOURCE: MAP MODEL CASE BXM.PJM
VARIABLES: EMCNX2 EMP9

TABLE K.25b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
U.S. BORAX MINE NEAR KETCHIKAN

(thousands of employees)

	Southeast Alaska
1982	0.041
1983	0.081
1984	0.408
1985	0.558
1986	0.458
1987	0.728
1988	0.790
1989	0.790
1990	0.790
1991	0.790
1992	0.790
1993	0.790
1994	0.790
1995	0.790
1996	0.790
1997	0.790
1998	0.790
1999	0.790
2000	0.790
2001	0.790
2002	0.790
2003	0.790
2004	0.790
2005	0.790
2006	0.790
2007	0.790
2008	0.790
2009	0.790
2010	0.790

SOURCE: MAP MODEL CASE BXM.PJM
VARIABLE: B11

11. Greens Creek Mine

Production of the Greens Creek mine on Admiralty Island begins by 1986. Mining employment averages 315 from 1986 through 1996, while construction employment in mine development peaks at 190 in 1985. This assumes an eleven-year life for the mine and housing for miners in Juneau (Greens Creek Mine Draft EIS, pp. 4-102, 2-42).

SOURCE: Greens Creek Mine Draft EIS, U.S.D.A. Forest Service, August 1982, pp. 4-93.

TABLE K.26a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
GREENS CREEK MINE

(thousands of employees)

	Mining Employment
1982	0.000
1983	0.000
1984	0.000
1985	0.000
1986	0.315
1987	0.315
1988	0.315
1989	0.315
1990	0.315
1991	0.315
1992	0.315
1993	0.315
1994	0.315
1995	0.315
1996	0.315
1997	0.000
1998	0.000
1999	0.000
2000	0.000
2001	0.000
2002	0.000
2003	0.000
2004	0.000
2005	0.000
2006	0.000
2007	0.000
2008	0.000
2009	0.000
2010	0.000

SOURCE: MAP MODEL CASE GCM.082
VARIABLE: EMP9

TABLE K.26b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
GREENS CREEK MINE

(thousands of employees)

	Southeast Alaska
1982	0.000
1983	0.015
1984	0.120
1985	0.190
1986	0.315
1987	0.315
1988	0.315
1989	0.315
1990	0.315
1991	0.315
1992	0.315
1993	0.315
1994	0.315
1995	0.315
1996	0.315
1997	0.000
1998	0.000
1999	0.000
2000	0.000
2001	0.000
2002	0.000
2003	0.000
2004	0.000
2005	0.000
2006	0.000
2007	0.000
2008	0.000
2009	0.000
2010	0.000

SOURCE: MAP MODEL CASE GCM.082
VARIABLE: B11

12. Red Dog Mine

The Red Dog lead, zinc, and silver mine is expected to be developed jointly by NANA and COMINCO in the Western Brooks Range. We assume construction beginning in 1984, with average annual employment of 150-200 in the Kobuk census division. Full production by 1988 will employ approximately 450.

SOURCE: Personal communication: Bradford Tuck.

TABLE K.27a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
RED DOG MINE

(thousands of employees)

	Low Wage Exogenous Construction Employment	Mining Employment
1982	0.000	0.025
1983	0.000	0.025
1984	0.100	0.035
1985	0.150	0.021
1986	0.200	0.026
1987	0.150	0.021
1988	0.000	0.448
1989	0.000	0.448
1990	0.000	0.448
1991	0.000	0.448
1992	0.000	0.448
1993	0.000	0.448
1994	0.000	0.448
1995	0.000	0.448
1996	0.000	0.448
1997	0.000	0.448
1998	0.000	0.448
1999	0.000	0.448
2000	0.000	0.448
2001	0.000	0.448
2002	0.000	0.448
2003	0.000	0.448
2004	0.000	0.448
2005	0.000	0.448
2006	0.000	0.448
2007	0.000	0.448
2008	0.000	0.448
2009	0.000	0.448
2010	0.000	0.448

SOURCE: MAP MODEL CASE RED.PJH
VARIABLES: EMCNX2 EMP9

TABLE K.27b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
RED DOG MINE

(thousands of employees)

	Kobuk
1982	0.025
1983	0.025
1984	0.135
1985	0.171
1986	0.226
1987	0.171
1988	0.448
1989	0.448
1990	0.448
1991	0.448
1992	0.448
1993	0.448
1994	0.448
1995	0.448
1996	0.448
1997	0.448
1998	0.448
1999	0.448
2000	0.448
2001	0.448
2002	0.448
2003	0.448
2004	0.448
2005	0.448
2006	0.448
2007	0.448
2008	0.448
2009	0.448
2010	0.448

SOURCE: MAP MODEL CASE RED.PJH
VARIABLE: B14

13. Other Mining

In 1980, the latest year for which complete figures are available, 3,850 people were employed in mining in addition to work on the special projects discussed above. Of these, 2,660 were in Anchorage, and 47 were located in Fairbanks (Alaska Department of Labor, Statistical Quarterly). From 1980 to 1982, the Alaska Department of Labor projects that mining employment has increased to 3,900 in Anchorage, and to approximately 200 in Fairbanks. This employment consists of a broad combination of administrative personnel in Anchorage associated with minerals industries, a variety of petroleum and hard-rock mineral exploration activities located around the state, and ongoing hard-rock mining.

We assume that such employment increases at 1 percent annually through 2010, maintaining the current regional distribution of employment.

SOURCE: Alaska Department of Labor, Statistical Quarterly, and Alaska Economic Trends, March 1980.

TABLE K.28a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
OTHER MINING

(thousands of employees)

	Mining Employment
1982	5.267
1983	5.319
1984	5.372
1985	5.426
1986	5.481
1987	5.535
1988	5.591
1989	5.647
1990	5.703
1991	5.760
1992	5.818
1993	5.876
1994	5.934
1995	5.994
1996	6.054
1997	6.114
1998	6.175
1999	6.237
2000	6.299
2001	6.362
2002	6.426
2003	6.490
2004	6.555
2005	6.621
2006	6.687
2007	6.754
2008	6.821
2009	6.890
2010	6.958

SOURCE: MAP MODEL CASE OMN.083
VARIABLE: EMP9

TABLE K.28b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
OTHER MINING

(thousands of employees)

	Aleutian Islands	Anchorage	Barrow-North Slope	Bethel	Cordova-McCarthy
1982	0.016	3.900	0.821	0.004	0.054
1983	0.016	3.939	0.829	0.004	0.054
1984	0.016	3.978	0.838	0.004	0.055
1985	0.016	4.018	0.846	0.004	0.055
1986	0.016	4.058	0.855	0.004	0.056
1987	0.016	4.099	0.863	0.004	0.056
1988	0.016	4.140	0.872	0.004	0.057
1989	0.017	4.181	0.880	0.005	0.058
1990	0.017	4.223	0.889	0.005	0.058
1991	0.017	4.265	0.898	0.005	0.059
1992	0.017	4.308	0.907	0.005	0.059
1993	0.017	4.351	0.916	0.005	0.060
1994	0.017	4.395	0.925	0.005	0.061
1995	0.018	4.439	0.934	0.005	0.061
1996	0.018	4.483	0.944	0.005	0.062
1997	0.018	4.528	0.953	0.005	0.062
1998	0.018	4.573	0.963	0.005	0.063
1999	0.018	4.619	0.972	0.005	0.064
2000	0.019	4.665	0.982	0.005	0.064
2001	0.019	4.712	0.992	0.005	0.065
2002	0.019	4.759	1.002	0.005	0.066
2003	0.019	4.806	1.012	0.005	0.066
2004	0.019	4.854	1.022	0.005	0.067
2005	0.020	4.903	1.032	0.005	0.068
2006	0.020	4.952	1.042	0.005	0.068
2007	0.020	5.002	1.053	0.005	0.069
2008	0.020	5.052	1.063	0.005	0.070
2009	0.020	5.102	1.074	0.006	0.070
2010	0.021	5.153	1.085	0.006	0.071

SOURCE: MAP MODEL CASE OMN.083
VARIABLES: B01 B02 B04 B05 B08

TABLE K.28b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
OTHER MINING

(continued)

	Fairbanks	Southeast Alaska	Kobuk	Kuskokwim	Matanuska-Susitna
1982	0.200	0.040	0.002	0.004	0.003
1983	0.202	0.041	0.002	0.004	0.003
1984	0.204	0.041	0.002	0.004	0.003
1985	0.206	0.041	0.002	0.004	0.003
1986	0.208	0.042	0.002	0.004	0.003
1987	0.210	0.042	0.002	0.004	0.003
1988	0.212	0.043	0.002	0.004	0.003
1989	0.214	0.043	0.002	0.005	0.003
1990	0.217	0.043	0.002	0.005	0.004
1991	0.219	0.044	0.002	0.005	0.004
1992	0.221	0.044	0.002	0.005	0.004
1993	0.223	0.045	0.002	0.005	0.004
1994	0.225	0.045	0.002	0.005	0.004
1995	0.228	0.046	0.002	0.005	0.004
1996	0.230	0.046	0.002	0.005	0.004
1997	0.232	0.047	0.002	0.005	0.004
1998	0.235	0.047	0.002	0.005	0.004
1999	0.237	0.048	0.002	0.005	0.004
2000	0.239	0.048	0.002	0.005	0.004
2001	0.242	0.048	0.002	0.005	0.004
2002	0.244	0.049	0.002	0.005	0.004
2003	0.246	0.049	0.002	0.005	0.004
2004	0.249	0.050	0.002	0.005	0.004
2005	0.251	0.050	0.002	0.005	0.004
2006	0.254	0.051	0.002	0.005	0.004
2007	0.256	0.051	0.002	0.005	0.004
2008	0.259	0.052	0.003	0.005	0.004
2009	0.262	0.052	0.003	0.006	0.004
2010	0.264	0.053	0.003	0.006	0.004

SOURCE: MAP MODEL CASE OMN.083
VARIABLES: B09 B11 B14 B16 B17

TABLE K.28b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
OTHER MINING

(continued)

	Nome	Seward	Upper Yukon	Valdez-Chitina-Whittier	Yukon-Koyukuk
1982	0.100	0.017	0.010	0.004	0.091
1983	0.101	0.018	0.010	0.004	0.091
1984	0.102	0.018	0.011	0.004	0.092
1985	0.103	0.018	0.011	0.004	0.093
1986	0.104	0.018	0.011	0.004	0.094
1987	0.105	0.018	0.011	0.004	0.095
1988	0.106	0.019	0.011	0.004	0.096
1989	0.107	0.019	0.011	0.005	0.097
1990	0.108	0.019	0.011	0.005	0.098
1991	0.109	0.019	0.011	0.005	0.099
1992	0.110	0.019	0.011	0.005	0.100
1993	0.112	0.019	0.012	0.005	0.101
1994	0.113	0.020	0.012	0.005	0.102
1995	0.114	0.020	0.012	0.005	0.103
1996	0.115	0.020	0.012	0.005	0.104
1997	0.116	0.020	0.012	0.005	0.105
1998	0.117	0.020	0.012	0.005	0.106
1999	0.118	0.021	0.012	0.005	0.107
2000	0.120	0.021	0.012	0.005	0.108
2001	0.121	0.021	0.013	0.005	0.109
2002	0.122	0.021	0.013	0.005	0.111
2003	0.123	0.022	0.013	0.005	0.112
2004	0.124	0.022	0.013	0.005	0.113
2005	0.126	0.022	0.013	0.005	0.114
2006	0.127	0.022	0.013	0.005	0.115
2007	0.128	0.022	0.013	0.005	0.116
2008	0.129	0.023	0.013	0.005	0.117
2009	0.131	0.023	0.014	0.006	0.118
2010	0.132	0.023	0.014	0.006	0.120

SOURCE: MAP MODEL CASE OMN.083
VARIABLES: B18 B21 B25 B26 B29

14. Agriculture

Agriculture experiences moderate growth. In light of declining state revenues, state support of agriculture declines. Development is limited to the Delta region in the Tanana Valley, with marginal development taking place in the Nenana area. Growth in the Matanuska Valley is minimal, and Point MacKenzie development in dairy farming will also be minimal. Dairy price supports, politically vulnerable, will be reduced making long run competition for Alaskan dairy products very difficult. No growth takes place in the Susitna Valley.

Eighty thousand acres of the Delta projects as well as half of the average of the Nenana projects (87,500 acres) are assumed to be brought into production gradually by the year 2000. The employment figures for that acreage are determined assuming that two agricultural jobs are created by each 1,000 acres brought into grain production. This yields a 10.6 percent rate of growth over the 20-year period. Beyond the year 2000, a 3 percent rate of growth is assumed.

Total production in the Matanuska-Susitna region is assumed to grow by 2 percent per year. Dairy farms and truck farms at Point MacKenzie grow marginally.

SOURCE: State of Alaska, Agricultural Action Council, First Report; and Mike Herker, Financing Agricultural Projects in Alaska.

TABLE K.29a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
AGRICULTURE

(thousands of employees)

	Agriculture Employment
1982	0.194
1983	0.203
1984	0.211
1985	0.219
1986	0.228
1987	0.239
1988	0.250
1989	0.263
1990	0.276
1991	0.291
1992	0.306
1993	0.325
1994	0.343
1995	0.365
1996	0.389
1997	0.414
1998	0.442
1999	0.474
2000	0.508
2001	0.527
2002	0.546
2003	0.568
2004	0.589
2005	0.611
2006	0.634
2007	0.660
2008	0.686
2009	0.712
2010	0.740

SOURCE: MAP MODEL CASE AGR.PJM
VARIABLE: EMAGRI

TABLE K.29b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
AGRICULTURE

(thousands of employees)

	Aleutian Islands	Fairbanks	Kenai-Cook Inlet	Kodiak	Matanuska-Susitna
1982	0.013	0.053	0.008	0.005	0.115
1983	0.013	0.060	0.009	0.005	0.116
1984	0.013	0.066	0.009	0.006	0.117
1985	0.013	0.073	0.009	0.006	0.118
1986	0.013	0.080	0.009	0.006	0.120
1987	0.013	0.089	0.010	0.006	0.121
1988	0.013	0.099	0.010	0.006	0.122
1989	0.013	0.110	0.010	0.007	0.123
1990	0.013	0.121	0.011	0.007	0.124
1991	0.013	0.134	0.011	0.007	0.126
1992	0.013	0.148	0.011	0.007	0.127
1993	0.013	0.165	0.012	0.007	0.128
1994	0.013	0.182	0.012	0.007	0.129
1995	0.013	0.201	0.012	0.008	0.131
1996	0.013	0.223	0.013	0.008	0.132
1997	0.013	0.247	0.013	0.008	0.133
1998	0.013	0.273	0.013	0.008	0.135
1999	0.013	0.302	0.014	0.009	0.136
2000	0.013	0.335	0.014	0.009	0.137
2001	0.013	0.351	0.015	0.009	0.139
2002	0.013	0.369	0.015	0.009	0.140
2003	0.013	0.387	0.016	0.010	0.142
2004	0.013	0.407	0.016	0.010	0.143
2005	0.013	0.427	0.017	0.010	0.144
2006	0.013	0.448	0.017	0.010	0.146
2007	0.013	0.471	0.018	0.011	0.147
2008	0.013	0.495	0.018	0.011	0.149
2009	0.013	0.519	0.019	0.011	0.150
2010	0.013	0.545	0.019	0.012	0.151

SOURCE: MAP MODEL CASE AGR.PJM
VARIABLES: B01 B09 B12 B15 B17

15. Forest and Lumber Products

Employment in the forest and lumber products industry expands to over 3,200 by 1990, remains stable for a decade, and then declines to 2,800 by the year 2010. Timber harvests in national forests (primarily, Tongass in Southeast) remains at its long run sustained yield at 450 MMBF annually. The harvest on national forest land is the only harvest that contributes to jobs in the processing side of the industry, as most other harvesting has no primary processing requirements. The major harvest, other than that in Tongass National Forest, comes from Native regional and village corporation land located in Southeast, the Prince William Sound area, and on Afognak Island. Total harvestable timber on these lands, which is mature timber, is approximately 18.4 MMMBF, of which most will be harvested by the year 2010. All that will remain to be harvested of this timber is about 3 MMMBF in Southeast Alaska, which will be harvested over the 2010-2020 decade. Employment in the areas outside of these major areas is expected to grow according to local needs, which will be moderate. Over the next three decades most local domestic lumber needs, aside from a few rough cut mills, will be supplied by imported kiln dried lumber.

SOURCE: Alaska Department of Labor, Alaska Economic Trends; J. Mehrkins, 1982 Timber Supply and Demand, Draft, U.S.F.S., Juneau, November 1982; Land Settlement Alternatives for the Chugach Region, ISER, October 1981; and E. L. Arobio, A. F. Gasbarro, and W. G. Workman, Chugach Land Management Plan: Supply and Demand Assessment for Resources of the Chugach National Forest, U.S.F.S., June 1979.

TABLE K.30a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
FOREST AND LUMBER PRODUCTS

(thousands of employees)

	Low Wage Exogenous Manufacturing Employment
1982	2.037
1983	2.325
1984	2.472
1985	2.657
1986	2.843
1987	3.027
1988	3.119
1989	3.167
1990	3.214
1991	3.214
1992	3.218
1993	3.218
1994	3.218
1995	3.219
1996	3.219
1997	3.219
1998	3.221
1999	3.222
2000	3.202
2001	3.106
2002	2.903
2003	2.880
2004	2.859
2005	2.838
2006	2.769
2007	2.770
2008	2.770
2009	2.774
2010	2.776

SOURCE: MAP MODEL CASE FLL.083
VARIABLE: EMMX2

TABLE K.30b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
FOREST AND LUMBER PRODUCTS

(thousands of employees)

	Anchorage	Cordova-McCarthy	Fairbanks	Southeast Alaska	Kenai-Cook Inlet
1982	0.030	0.025	0.018	1.730	0.012
1983	0.030	0.025	0.018	2.000	0.012
1984	0.030	0.025	0.020	2.126	0.012
1985	0.030	0.071	0.020	2.264	0.013
1986	0.032	0.140	0.020	2.379	0.013
1987	0.032	0.232	0.020	2.471	0.013
1988	0.032	0.255	0.020	2.540	0.013
1989	0.032	0.255	0.020	2.586	0.013
1990	0.032	0.255	0.020	2.632	0.014
1991	0.032	0.255	0.020	2.632	0.014
1992	0.034	0.255	0.022	2.632	0.014
1993	0.034	0.255	0.022	2.632	0.014
1994	0.034	0.255	0.022	2.632	0.014
1995	0.034	0.255	0.022	2.632	0.015
1996	0.034	0.255	0.022	2.632	0.015
1997	0.034	0.255	0.022	2.632	0.015
1998	0.036	0.255	0.022	2.632	0.015
1999	0.036	0.255	0.022	2.632	0.015
2000	0.036	0.232	0.024	2.632	0.016
2001	0.036	0.186	0.024	2.632	0.016
2002	0.036	0.163	0.024	2.632	0.016
2003	0.036	0.140	0.024	2.632	0.016
2004	0.038	0.117	0.024	2.632	0.016
2005	0.038	0.094	0.024	2.632	0.017
2006	0.038	0.025	0.024	2.632	0.017
2007	0.038	0.025	0.024	2.632	0.017
2008	0.038	0.025	0.024	2.632	0.017
2009	0.038	0.025	0.026	2.632	0.018
2010	0.040	0.025	0.026	2.632	0.018

SOURCE: MAP MODEL CASE FLL.083
VARIABLES: B02 B08 B09 B11 B12

TABLE K.30b. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
FOREST AND LUMBER PRODUCTS

(continued)

	Kodiak	Seward
1982	0.212	0.010
1983	0.230	0.010
1984	0.249	0.010
1985	0.249	0.010
1986	0.249	0.010
1987	0.249	0.010
1988	0.249	0.010
1989	0.249	0.012
1990	0.249	0.012
1991	0.249	0.012
1992	0.249	0.012
1993	0.249	0.012
1994	0.249	0.012
1995	0.249	0.012
1996	0.249	0.012
1997	0.249	0.012
1998	0.249	0.012
1999	0.249	0.013
2000	0.249	0.013
2001	0.199	0.013
2002	0.019	0.013
2003	0.019	0.013
2004	0.019	0.013
2005	0.020	0.013
2006	0.020	0.013
2007	0.020	0.014
2008	0.020	0.014
2009	0.021	0.014
2010	0.021	0.014

SOURCE: MAP MODEL CASE FLL.083
VARIABLES: B15 B21

16. Pulp Mill Employment

Capacity in the two pulp mills in the Southeast region remains at its current level, with no new plants likely to be feasible anywhere in the state. Assured timber supplies through the Ketchikan and Sitka long-term contracts as well as low-quality logs harvested from Native corporation lands should provide sufficient supplies of low-cost raw material to keep the existing mills running profitably at near full capacity through 2010. A gradual decline in employment of 1 percent per year, beginning in 1984, results from the continued introduction of new labor-saving equipment.

SOURCE: J. Mehrkins, 1982 Timber Supply and Demand, Draft, U.S.F.S., Juneau, November 1982.

TABLE K.31a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
PULP MILL EMPLOYMENT

(thousands of employees)

	Low Wage Exogenous Manufacturing Employment
1982	0.930
1983	0.980
1984	0.970
1985	0.960
1986	0.951
1987	0.941
1988	0.932
1989	0.923
1990	0.913
1991	0.904
1992	0.895
1993	0.886
1994	0.877
1995	0.869
1996	0.860
1997	0.851
1998	0.843
1999	0.834
2000	0.826
2001	0.818
2002	0.810
2003	0.802
2004	0.794
2005	0.786
2006	0.778
2007	0.770
2008	0.762
2009	0.755
2010	0.747

SOURCE: MAP MODEL CASE FPU.082
VARIABLE: EMMX2

TABLE K.31b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
PULP MILL EMPLOYMENT

(thousands of employees)

	Southeast Alaska
1982	0.930
1983	0.980
1984	0.970
1985	0.960
1986	0.951
1987	0.941
1988	0.932
1989	0.923
1990	0.913
1991	0.904
1992	0.895
1993	0.886
1994	0.877
1995	0.869
1996	0.860
1997	0.851
1998	0.843
1999	0.834
2000	0.826
2001	0.818
2002	0.810
2003	0.802
2004	0.794
2005	0.786
2006	0.778
2007	0.770
2008	0.762
2009	0.755
2010	0.747

SOURCE: MAP MODEL CASE FPU.082
VARIABLE: B11

17. Commercial Fishing (Nonbottomfish)

Existing fisheries harvesting employment returns to and remains constant at its 1980 level of 6,363 measured on an average annual basis. Processing employment also returns to its 1980 level of 7,123. This assumes any increase in the productivity of fisheries can be matched by corresponding increases in food processing productivity.

SOURCE: G. Rogers and R. Listowski, Measuring the Socioeconomic Impacts of Alaska's Fisheries, ISER, April 1980; and Alaska Department of Labor, Alaska Economic Trends.

TABLE K.32a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
COMMERCIAL FISHING (NONBOTTOMFISH)

(thousands of employees)

	Fish Harvesting Employment	Low Wage Exogenous Manufacturing Employment
1982	5.179	5.800
1983	6.363	7.123
1984	6.363	7.123
1985	6.363	7.123
1986	6.363	7.123
1987	6.363	7.123
1988	6.363	7.123
1989	6.363	7.123
1990	6.363	7.123
1991	6.363	7.123
1992	6.363	7.123
1993	6.363	7.123
1994	6.363	7.123
1995	6.363	7.123
1996	6.363	7.123
1997	6.363	7.123
1998	6.363	7.123
1999	6.363	7.123
2000	6.363	7.123
2001	6.363	7.123
2002	6.363	7.123
2003	6.363	7.123
2004	6.363	7.123
2005	6.363	7.123
2006	6.363	7.123
2007	6.363	7.123
2008	6.363	7.123
2009	6.363	7.123
2010	6.363	7.123

SOURCE: MAP MODEL CASE TCF.002
VARIABLES: EMFISH EMMX2

TABLE K.32b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
COMMERCIAL FISHING (NONBOTTOMFISH)

(thousands of employees)

	Aleutian Islands	Anchorage	Bethel	Bristol Bay Borough	Cordova-McCarthy
1982	1.770	0.390	0.221	1.327	0.589
1983	2.174	0.479	0.271	1.630	0.723
1984	2.174	0.479	0.271	1.630	0.723
1985	2.174	0.479	0.271	1.630	0.723
1986	2.174	0.479	0.271	1.630	0.723
1987	2.174	0.479	0.271	1.630	0.723
1988	2.174	0.479	0.271	1.630	0.723
1989	2.174	0.479	0.271	1.630	0.723
1990	2.174	0.479	0.271	1.630	0.723
1991	2.174	0.479	0.271	1.630	0.723
1992	2.174	0.479	0.271	1.630	0.723
1993	2.174	0.479	0.271	1.630	0.723
1994	2.174	0.479	0.271	1.630	0.723
1995	2.174	0.479	0.271	1.630	0.723
1996	2.174	0.479	0.271	1.630	0.723
1997	2.174	0.479	0.271	1.630	0.723
1998	2.174	0.479	0.271	1.630	0.723
1999	2.174	0.479	0.271	1.630	0.723
2000	2.174	0.479	0.271	1.630	0.723
2001	2.174	0.479	0.271	1.630	0.723
2002	2.174	0.479	0.271	1.630	0.723
2003	2.174	0.479	0.271	1.630	0.723
2004	2.174	0.479	0.271	1.630	0.723
2005	2.174	0.479	0.271	1.630	0.723
2006	2.174	0.479	0.271	1.630	0.723
2007	2.174	0.479	0.271	1.630	0.723
2008	2.174	0.479	0.271	1.630	0.723
2009	2.174	0.479	0.271	1.630	0.723
2010	2.174	0.479	0.271	1.630	0.723

SOURCE: MAP MODEL CASE TCF.002
VARIABLES: B01 B02 B05 B06 B08

TABLE K.32b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
COMMERCIAL FISHING (NONBOTTOMFISH)

(continued)

	Southeast Alaska	Kenai-Cook Inlet	Kobuk	Kodiak	Kuskokwim
1982	2.943	1.020	0.035	2.366	0.004
1983	3.615	1.253	0.043	2.907	0.004
1984	3.615	1.253	0.043	2.907	0.004
1985	3.615	1.253	0.043	2.907	0.004
1986	3.615	1.253	0.043	2.907	0.004
1987	3.615	1.253	0.043	2.907	0.004
1988	3.615	1.253	0.043	2.907	0.004
1989	3.615	1.253	0.043	2.907	0.004
1990	3.615	1.253	0.043	2.907	0.004
1991	3.615	1.253	0.043	2.907	0.004
1992	3.615	1.253	0.043	2.907	0.004
1993	3.615	1.253	0.043	2.907	0.004
1994	3.615	1.253	0.043	2.907	0.004
1995	3.615	1.253	0.043	2.907	0.004
1996	3.615	1.253	0.043	2.907	0.004
1997	3.615	1.253	0.043	2.907	0.004
1998	3.615	1.253	0.043	2.907	0.004
1999	3.615	1.253	0.043	2.907	0.004
2000	3.615	1.253	0.043	2.907	0.004
2001	3.615	1.253	0.043	2.907	0.004
2002	3.615	1.253	0.043	2.907	0.004
2003	3.615	1.253	0.043	2.907	0.004
2004	3.615	1.253	0.043	2.907	0.004
2005	3.615	1.253	0.043	2.907	0.004
2006	3.615	1.253	0.043	2.907	0.004
2007	3.615	1.253	0.043	2.907	0.004
2008	3.615	1.253	0.043	2.907	0.004
2009	3.615	1.253	0.043	2.907	0.004
2010	3.615	1.253	0.043	2.907	0.004

SOURCE: MAP MODEL CASE TCF.002
VARIABLES: B11 B12 B14 B15 B16

TABLE K.32b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
COMMERCIAL FISHING (NONBOTTOMFISH)

(continued)

	Nome	Seward	Valdez-Chitina-Whittier	Wade Hampton
1982	0.044	0.048	0.043	0.179
1983	0.054	0.059	0.053	0.220
1984	0.054	0.059	0.053	0.220
1985	0.054	0.059	0.053	0.220
1986	0.054	0.059	0.053	0.220
1987	0.054	0.059	0.053	0.220
1988	0.054	0.059	0.053	0.220
1989	0.054	0.059	0.053	0.220
1990	0.054	0.059	0.053	0.220
1991	0.054	0.059	0.053	0.220
1992	0.054	0.059	0.053	0.220
1993	0.054	0.059	0.053	0.220
1994	0.054	0.059	0.053	0.220
1995	0.054	0.059	0.053	0.220
1996	0.054	0.059	0.053	0.220
1997	0.054	0.059	0.053	0.220
1998	0.054	0.059	0.053	0.220
1999	0.054	0.059	0.053	0.220
2000	0.054	0.059	0.053	0.220
2001	0.054	0.059	0.053	0.220
2002	0.054	0.059	0.053	0.220
2003	0.054	0.059	0.053	0.220
2004	0.054	0.059	0.053	0.220
2005	0.054	0.059	0.053	0.220
2006	0.054	0.059	0.053	0.220
2007	0.054	0.059	0.053	0.220
2008	0.054	0.059	0.053	0.220
2009	0.054	0.059	0.053	0.220
2010	0.054	0.059	0.053	0.220

SOURCE: MAP MODEL CASE TCF.002
VARIABLES: B18 B21 B26 B27

18. Catcher-Processor-Dominated Bottomfishing

The total U.S. share of the Alaska bottomfish catch expands at a constant rate until it reaches 100 percent of the allowable harvest by 2000. Seventy percent of the catch will be processed by catcher-processor vessels, and 30 percent by onshore plants. Because catcher-processor vessels operating in Alaska waters are mostly owned and operated by fishermen residing outside the state, the Alaska total employment growth is modest. We assume only 10 percent of fishing employees in joint-venture trawlers and catcher-processor vessels are Alaska residents, while 50 percent of workers in the shore-based processing plants and 50 percent of the fishermen in the shore-based fishery are residents.

SOURCE: Navarin Basin Statewide and Regional Demographic and Economic Systems Impacts Forecast, Technical Report Number 78, Alaska OCS Socioeconomic Studies Program, U.S. Bureau of Land Management, March 1983, Appendix K.

TABLE K.33a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
CATCHER-PROCESSOR-DOMINATED BOTTOMFISHING

(thousands of employees)

	Fish Harvesting Employment	Low Wage Exogenous Manufacturing Employment
1982	0.038	0.004
1983	0.058	0.005
1984	0.081	0.006
1985	0.108	0.009
1986	0.136	0.012
1987	0.164	0.016
1988	0.181	0.022
1989	0.216	0.027
1990	0.229	0.042
1991	0.245	0.058
1992	0.266	0.079
1993	0.292	0.108
1994	0.326	0.148
1995	0.368	0.202
1996	0.421	0.276
1997	0.488	0.378
1998	0.572	0.517
1999	0.678	0.708
2000	0.733	0.971
2001	0.733	0.971
2002	0.733	0.971
2003	0.733	0.971
2004	0.733	0.971
2005	0.733	0.971
2006	0.733	0.971
2007	0.733	0.971
2008	0.733	0.971
2009	0.733	0.971
2010	0.733	0.971

SOURCE: MAP MODEL CASE BCF.183
VARIABLES: EMFISH EMMX2

TABLE K.33b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
CATCHER-PROCESSOR-DOMINATED BOTTOMFISHING

(thousands of employees)

	Aleutian Islands	Anchorage
1982	0.034	0.008
1983	0.051	0.012
1984	0.071	0.016
1985	0.095	0.022
1986	0.120	0.028
1987	0.146	0.034
1988	0.165	0.038
1989	0.200	0.043
1990	0.220	0.051
1991	0.246	0.057
1992	0.280	0.065
1993	0.325	0.075
1994	0.385	0.089
1995	0.463	0.107
1996	0.566	0.131
1997	0.703	0.163
1998	0.884	0.205
1999	1.125	0.261
2000	1.383	0.321
2001	1.383	0.321
2002	1.383	0.321
2003	1.383	0.321
2004	1.383	0.321
2005	1.383	0.321
2006	1.383	0.321
2007	1.383	0.321
2008	1.383	0.321
2009	1.383	0.321
2010	1.383	0.321

SOURCE: MAP MODEL CASE BCF.183
VARIABLES: B01 B02

19. Federal Military

Military employment has declined erratically and slowly over the past 15 years. We assume that future military employment remains at its 1980 average level with the same distribution around the state as at that time.

SOURCE: Alaska Department of Labor, Statistical Quarterly, U.S. Census, 1980; and Alaska Air Command.

TABLE K.34a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
FEDERAL MILITARY

(thousands of employees)

	Active Duty Military Employment
1982	23.323
1983	23.323
1984	23.323
1985	23.323
1986	23.323
1987	23.323
1988	23.323
1989	23.323
1990	23.323
1991	23.323
1992	23.323
1993	23.323
1994	23.323
1995	23.323
1996	23.323
1997	23.323
1998	23.323
1999	23.323
2000	23.323
2001	23.323
2002	23.323
2003	23.323
2004	23.323
2005	23.323
2006	23.323
2007	23.323
2008	23.323
2009	23.323
2010	23.323

SOURCE: MAP MODEL CASE GFM.082
VARIABLE: EMGM

TABLE K.34b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
FEDERAL MILITARY

(thousands of employees)

	Aleutian Islands	Anchorage	Barrow-North Slope	Bethel	Bristol Bay Borough
1982	2.176	11.864	0.016	0.014	0.369
1983	2.176	11.864	0.016	0.014	0.369
1984	2.176	11.864	0.016	0.014	0.369
1985	2.176	11.864	0.016	0.014	0.369
1986	2.176	11.864	0.016	0.014	0.369
1987	2.176	11.864	0.016	0.014	0.369
1988	2.176	11.864	0.016	0.014	0.369
1989	2.176	11.864	0.016	0.014	0.369
1990	2.176	11.864	0.016	0.014	0.369
1991	2.176	11.864	0.016	0.014	0.369
1992	2.176	11.864	0.016	0.014	0.369
1993	2.176	11.864	0.016	0.014	0.369
1994	2.176	11.864	0.016	0.014	0.369
1995	2.176	11.864	0.016	0.014	0.369
1996	2.176	11.864	0.016	0.014	0.369
1997	2.176	11.864	0.016	0.014	0.369
1998	2.176	11.864	0.016	0.014	0.369
1999	2.176	11.864	0.016	0.014	0.369
2000	2.176	11.864	0.016	0.014	0.369
2001	2.176	11.864	0.016	0.014	0.369
2002	2.176	11.864	0.016	0.014	0.369
2003	2.176	11.864	0.016	0.014	0.369
2004	2.176	11.864	0.016	0.014	0.369
2005	2.176	11.864	0.016	0.014	0.369
2006	2.176	11.864	0.016	0.014	0.369
2007	2.176	11.864	0.016	0.014	0.369
2008	2.176	11.864	0.016	0.014	0.369
2009	2.176	11.864	0.016	0.014	0.369
2010	2.176	11.864	0.016	0.014	0.369

SOURCE: MAP MODEL CASE GFM.082
VARIABLES: G01 G02 G04 G05 G06

TABLE K.34b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
FEDERAL MILITARY

(continued)

	Cordova-McCarthy	Fairbanks	Southeast Alaska	Kenai-Cook Inlet	Kobuk
1982	0.054	5.579	0.686	0.056	0.016
1983	0.054	5.579	0.686	0.056	0.016
1984	0.054	5.579	0.686	0.056	0.016
1985	0.054	5.579	0.686	0.056	0.016
1986	0.054	5.579	0.686	0.056	0.016
1987	0.054	5.579	0.686	0.056	0.016
1988	0.054	5.579	0.686	0.056	0.016
1989	0.054	5.579	0.686	0.056	0.016
1990	0.054	5.579	0.686	0.056	0.016
1991	0.054	5.579	0.686	0.056	0.016
1992	0.054	5.579	0.686	0.056	0.016
1993	0.054	5.579	0.686	0.056	0.016
1994	0.054	5.579	0.686	0.056	0.016
1995	0.054	5.579	0.686	0.056	0.016
1996	0.054	5.579	0.686	0.056	0.016
1997	0.054	5.579	0.686	0.056	0.016
1998	0.054	5.579	0.686	0.056	0.016
1999	0.054	5.579	0.686	0.056	0.016
2000	0.054	5.579	0.686	0.056	0.016
2001	0.054	5.579	0.686	0.056	0.016
2002	0.054	5.579	0.686	0.056	0.016
2003	0.054	5.579	0.686	0.056	0.016
2004	0.054	5.579	0.686	0.056	0.016
2005	0.054	5.579	0.686	0.056	0.016
2006	0.054	5.579	0.686	0.056	0.016
2007	0.054	5.579	0.686	0.056	0.016
2008	0.054	5.579	0.686	0.056	0.016
2009	0.054	5.579	0.686	0.056	0.016
2010	0.054	5.579	0.686	0.056	0.016

SOURCE: MAP MODEL CASE GFM.082
VARIABLES: G08 G09 G11 G12 G14

TABLE K.34b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
FEDERAL MILITARY

(continued)

	Kodiak	Kuskokwim	Matanuska-Susitna	Nome	Seward
1982	0.891	0.054	0.147	0.042	0.014
1983	0.891	0.054	0.147	0.042	0.014
1984	0.891	0.054	0.147	0.042	0.014
1985	0.891	0.054	0.147	0.042	0.014
1986	0.891	0.054	0.147	0.042	0.014
1987	0.891	0.054	0.147	0.042	0.014
1988	0.891	0.054	0.147	0.042	0.014
1989	0.891	0.054	0.147	0.042	0.014
1990	0.891	0.054	0.147	0.042	0.014
1991	0.891	0.054	0.147	0.042	0.014
1992	0.891	0.054	0.147	0.042	0.014
1993	0.891	0.054	0.147	0.042	0.014
1994	0.891	0.054	0.147	0.042	0.014
1995	0.891	0.054	0.147	0.042	0.014
1996	0.891	0.054	0.147	0.042	0.014
1997	0.891	0.054	0.147	0.042	0.014
1998	0.891	0.054	0.147	0.042	0.014
1999	0.891	0.054	0.147	0.042	0.014
2000	0.891	0.054	0.147	0.042	0.014
2001	0.891	0.054	0.147	0.042	0.014
2002	0.891	0.054	0.147	0.042	0.014
2003	0.891	0.054	0.147	0.042	0.014
2004	0.891	0.054	0.147	0.042	0.014
2005	0.891	0.054	0.147	0.042	0.014
2006	0.891	0.054	0.147	0.042	0.014
2007	0.891	0.054	0.147	0.042	0.014
2008	0.891	0.054	0.147	0.042	0.014
2009	0.891	0.054	0.147	0.042	0.014
2010	0.891	0.054	0.147	0.042	0.014

SOURCE: MAP MODEL CASE GFM.082
VARIABLES: G15 G16 G17 G18 G21

TABLE K.34b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
FEDERAL MILITARY

(continued)

	Southeast Fairbanks	Upper Yukon	Valdez-Chitina-Whittier	Wade Hampton	Yukon-Koyukuk
1982	0.849	0.028	0.042	0.014	0.413
1983	0.849	0.028	0.042	0.014	0.413
1984	0.849	0.028	0.042	0.014	0.413
1985	0.849	0.028	0.042	0.014	0.413
1986	0.849	0.028	0.042	0.014	0.413
1987	0.849	0.028	0.042	0.014	0.413
1988	0.849	0.028	0.042	0.014	0.413
1989	0.849	0.028	0.042	0.014	0.413
1990	0.849	0.028	0.042	0.014	0.413
1991	0.849	0.028	0.042	0.014	0.413
1992	0.849	0.028	0.042	0.014	0.413
1993	0.849	0.028	0.042	0.014	0.413
1994	0.849	0.028	0.042	0.014	0.413
1995	0.849	0.028	0.042	0.014	0.413
1996	0.849	0.028	0.042	0.014	0.413
1997	0.849	0.028	0.042	0.014	0.413
1998	0.849	0.028	0.042	0.014	0.413
1999	0.849	0.028	0.042	0.014	0.413
2000	0.849	0.028	0.042	0.014	0.413
2001	0.849	0.028	0.042	0.014	0.413
2002	0.849	0.028	0.042	0.014	0.413
2003	0.849	0.028	0.042	0.014	0.413
2004	0.849	0.028	0.042	0.014	0.413
2005	0.849	0.028	0.042	0.014	0.413
2006	0.849	0.028	0.042	0.014	0.413
2007	0.849	0.028	0.042	0.014	0.413
2008	0.849	0.028	0.042	0.014	0.413
2009	0.849	0.028	0.042	0.014	0.413
2010	0.849	0.028	0.042	0.014	0.413

SOURCE: MAP MODEL CASE GFM.082
VARIABLES: G24 G25 G26 G27 G29

20. Federal Civilian

Federal civilian government employment has grown historically in Alaska at about 0.5 percent annually over the past two decades. We assume this trend continues through 2010, with the regional distribution similar to the 1980 distribution.

SOURCE: Alaska Department of Labor, Statistical Quarterly, and Alaska Economic Trends, March 1983.

TABLE K.35a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
FEDERAL CIVILIAN

(thousands of employees)

	Civilian Federal Employment
1982	17.900
1983	17.989
1984	18.079
1985	18.170
1986	18.261
1987	18.352
1988	18.444
1989	18.536
1990	18.629
1991	18.722
1992	18.815
1993	18.909
1994	19.004
1995	19.099
1996	19.194
1997	19.290
1998	19.387
1999	19.484
2000	19.581
2001	19.679
2002	19.777
2003	19.876
2004	19.976
2005	20.076
2006	20.176
2007	20.277
2008	20.378
2009	20.480
2010	20.583

SOURCE: MAP MODEL CASE GFC.083
VARIABLE: EMGC

TABLE K.35b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
FEDERAL CIVILIAN

(thousands of employees)

	Aleutian Islands	Anchorage	Barrow-North Slope	Bethel	Bristol Bay Borough
1982	0.702	9.738	0.247	0.410	0.192
1983	0.705	9.786	0.248	0.412	0.192
1984	0.709	9.835	0.249	0.414	0.193
1985	0.712	9.884	0.251	0.416	0.194
1986	0.716	9.934	0.252	0.418	0.195
1987	0.719	9.983	0.253	0.420	0.196
1988	0.723	10.033	0.255	0.422	0.197
1989	0.727	10.084	0.256	0.424	0.198
1990	0.730	10.134	0.257	0.427	0.199
1991	0.734	10.185	0.258	0.429	0.200
1992	0.738	10.236	0.260	0.431	0.201
1993	0.741	10.287	0.261	0.433	0.202
1994	0.745	10.338	0.262	0.435	0.203
1995	0.749	10.390	0.264	0.437	0.204
1996	0.752	10.442	0.265	0.440	0.205
1997	0.756	10.494	0.266	0.442	0.206
1998	0.760	10.546	0.268	0.444	0.207
1999	0.764	10.599	0.269	0.446	0.208
2000	0.768	10.652	0.270	0.448	0.210
2001	0.771	10.705	0.272	0.451	0.211
2002	0.775	10.759	0.273	0.453	0.212
2003	0.779	10.813	0.274	0.455	0.213
2004	0.783	10.867	0.276	0.457	0.214
2005	0.787	10.921	0.277	0.460	0.215
2006	0.791	10.976	0.278	0.462	0.216
2007	0.795	11.031	0.280	0.464	0.217
2008	0.799	11.086	0.281	0.467	0.218
2009	0.803	11.141	0.283	0.469	0.219
2010	0.807	11.197	0.284	0.471	0.220

SOURCE: MAP MODEL CASE GFC.083
VARIABLES: G01 G02 G04 G05 G06

TABLE K.35b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
FEDERAL CIVILIAN

(continued)

	Cordova-McCarthy	Fairbanks	Southeast Alaska	Kenai Cook Inlet	Kobuk
1982	0.036	2.314	2.402	0.104	0.247
1983	0.036	2.326	2.414	0.104	0.248
1984	0.036	2.338	2.426	0.105	0.249
1985	0.036	2.349	2.438	0.105	0.251
1986	0.037	2.361	2.451	0.106	0.252
1987	0.037	2.373	2.463	0.106	0.253
1988	0.037	2.385	2.475	0.107	0.255
1989	0.037	2.397	2.488	0.108	0.256
1990	0.037	2.409	2.500	0.108	0.257
1991	0.037	2.421	2.512	0.109	0.258
1992	0.038	2.433	2.525	0.109	0.260
1993	0.038	2.445	2.538	0.110	0.261
1994	0.038	2.457	2.550	0.110	0.262
1995	0.038	2.469	2.563	0.111	0.264
1996	0.038	2.482	2.576	0.111	0.265
1997	0.039	2.494	2.589	0.112	0.266
1998	0.039	2.507	2.602	0.112	0.268
1999	0.039	2.519	2.615	0.113	0.269
2000	0.039	2.532	2.628	0.114	0.270
2001	0.039	2.545	2.641	0.114	0.272
2002	0.040	2.557	2.654	0.115	0.273
2003	0.040	2.570	2.667	0.115	0.274
2004	0.040	2.583	2.681	0.116	0.276
2005	0.040	2.596	2.694	0.116	0.277
2006	0.040	2.609	2.708	0.117	0.278
2007	0.041	2.622	2.721	0.118	0.280
2008	0.041	2.635	2.735	0.118	0.281
2009	0.041	2.648	2.748	0.119	0.283
2010	0.041	2.661	2.762	0.119	0.284

SOURCE: MAP MODEL CASE GFC.083
VARIABLES: G08 G09 G11 G12 G14

TABLE K.35b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
FEDERAL CIVILIAN

(continued)

	Kodiak	Kuskokwim	Matanuska Susitna	Nome	Seward
1982	0.285	0.077	0.097	0.177	0.068
1983	0.286	0.077	0.097	0.178	0.068
1984	0.287	0.078	0.098	0.179	0.069
1985	0.289	0.078	0.098	0.180	0.069
1986	0.290	0.079	0.099	0.181	0.069
1987	0.292	0.079	0.099	0.182	0.070
1988	0.293	0.079	0.100	0.183	0.070
1989	0.295	0.080	0.100	0.184	0.070
1990	0.296	0.080	0.101	0.184	0.071
1991	0.298	0.081	0.101	0.185	0.071
1992	0.299	0.081	0.102	0.186	0.071
1993	0.301	0.081	0.102	0.187	0.072
1994	0.302	0.082	0.103	0.188	0.072
1995	0.304	0.082	0.103	0.189	0.073
1996	0.305	0.083	0.104	0.190	0.073
1997	0.307	0.083	0.104	0.191	0.073
1998	0.308	0.083	0.105	0.192	0.074
1999	0.310	0.084	0.105	0.193	0.074
2000	0.311	0.084	0.106	0.194	0.074
2001	0.313	0.085	0.106	0.195	0.075
2002	0.314	0.085	0.107	0.196	0.075
2003	0.316	0.085	0.107	0.197	0.076
2004	0.318	0.086	0.108	0.198	0.076
2005	0.319	0.086	0.108	0.199	0.076
2006	0.321	0.087	0.109	0.200	0.077
2007	0.322	0.087	0.109	0.201	0.077
2008	0.324	0.088	0.110	0.202	0.077
2009	0.326	0.088	0.111	0.203	0.078
2010	0.327	0.089	0.111	0.204	0.078

SOURCE: MAP MODEL CASE GFC.083
VARIABLES: G15 G16 G17 G18 G21

TABLE K.35b. REGIONAL BASE CASE ECONOMIC ASSUMPTIONS
FEDERAL CIVILIAN

(continued)

	Southeast Fairbanks	Upper Yukon	Valdez-Chitna Whittier	Wade Hampton	Yukon Koyukuk
1982	0.335	0.034	0.045	0.134	0.258
1983	0.336	0.034	0.045	0.135	0.259
1984	0.338	0.034	0.045	0.136	0.260
1985	0.340	0.035	0.045	0.136	0.262
1986	0.341	0.035	0.046	0.137	0.263
1987	0.343	0.035	0.046	0.138	0.264
1988	0.345	0.035	0.046	0.138	0.266
1989	0.347	0.035	0.046	0.139	0.267
1990	0.348	0.035	0.047	0.140	0.268
1991	0.350	0.036	0.047	0.140	0.270
1992	0.352	0.036	0.047	0.141	0.271
1993	0.354	0.036	0.047	0.142	0.272
1994	0.355	0.036	0.048	0.143	0.274
1995	0.357	0.036	0.048	0.143	0.275
1996	0.359	0.036	0.048	0.144	0.276
1997	0.361	0.037	0.048	0.145	0.278
1998	0.363	0.037	0.048	0.145	0.279
1999	0.364	0.037	0.049	0.146	0.281
2000	0.366	0.037	0.049	0.147	0.282
2001	0.368	0.037	0.049	0.148	0.283
2002	0.370	0.038	0.049	0.148	0.285
2003	0.372	0.038	0.050	0.149	0.286
2004	0.374	0.038	0.050	0.150	0.288
2005	0.375	0.038	0.050	0.151	0.289
2006	0.377	0.038	0.050	0.151	0.291
2007	0.379	0.039	0.051	0.152	0.292
2008	0.381	0.039	0.051	0.153	0.293
2009	0.383	0.039	0.051	0.154	0.295
2010	0.385	0.039	0.051	0.154	0.296

SOURCE: MAP MODEL CASE GFC.083
VARIABLES: G24 G25 G26 G27 G29

21. Tourism

THe number of visitors to Alaska has increased by an average of approximately 50,000 per year over the past five years. We project this trend to continue as a linear (rather than exponential) trend through 2010, projected from a 1981 base of 630,000.

SOURCE: Alaska Department of Commerce, Division of Tourism.

TABLE K.36a. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
TOURISM

	Tourists Entering Alaska (000)
1982	680.000
1983	730.000
1984	780.000
1985	830.000
1986	880.000
1987	930.000
1988	980.000
1989	1030.000
1990	1080.000
1991	1130.000
1992	1180.000
1993	1230.000
1994	1280.000
1995	1330.000
1996	1380.000
1997	1430.000
1998	1480.000
1999	1530.000
2000	1580.000
2001	1630.000
2002	1680.000
2003	1730.000
2004	1780.000
2005	1830.000
2006	1880.000
2007	1930.000
2008	1980.000
2009	2030.000
2010	2080.000

SOURCE: MAP MODEL CASE TRS.082
VARIABLE: TOURIST

22. Petroleum Revenues

In addition to basic employment assumptions, major elements of state petroleum revenues are located in the scenario model files. Royalty and production tax revenue projections are taken from Petroleum Production Revenue Forecast, a quarterly publication of Alaska Department of Revenue, Petroleum Revenue Division, which publishes the results of simulations using the model PETREV. State corporate petroleum tax revenue is assumed to grow at 7 percent nominal growth rate over time, consistent with the increasing physical presence of the industry in the state. Non-OCS related state property tax revenue increases at 3.5 percent annually reflecting the net effects of both inflation, depreciation of the existing stock of taxable petroleum property within the state. State bonus payment revenue is a function of state lease sales and consequently subject to very substantial year-to-year fluctuation. This source of revenue is assumed to fall to zero over an approximately 15-year period.

TABLE K.37. STATEWIDE BASE CASE ECONOMIC ASSUMPTIONS
50 % PROBABILITY PETROLEUM REVENUES

(millions of current $)

	State Bonus Payment Revenue	State Property Tax Revenue	State Royalty Income	State Production Tax Revenue	State Corporate Petroleum Tax Revenue
1982	6.700	142.700	1530.000	1590.000	668.900
1983	26.100	148.600	1430.000	1480.000	235.000
1984	11.066	153.200	1200.000	1220.000	272.000
1985	4.692	158.000	1240.000	1260.000	295.000
1986	1.990	163.456	1350.000	1350.000	315.650
1987	0.844	169.101	1450.000	1430.000	337.745
1988	0.358	174.940	1520.000	1500.000	361.387
1989	0.152	180.981	1650.000	1380.000	386.684
1990	0.064	187.231	1710.000	1420.000	413.751
1991	0.027	193.697	1570.000	1230.000	442.714
1992	0.012	200.385	1550.000	1150.000	473.704
1993	0.005	207.305	1520.000	1110.000	506.863
1994	0.002	214.464	1500.000	1090.000	542.343
1995	0.001	221.870	1410.000	1000.000	580.306
1996	0.000	229.532	1290.000	910.000	620.927
1997	0.000	237.458	1330.000	930.000	664.392
1998	0.000	245.658	1340.000	910.000	710.899
1999	0.000	254.141	1350.000	860.000	760.662
2000	0.000	262.917	1370.384	843.918	813.907
2001	0.000	271.996	1391.076	828.136	870.881
2002	0.000	281.389	1412.081	812.650	931.842
2003	0.000	291.106	1433.402	797.453	997.070
2004	0.000	301.158	1455.046	782.541	1066.865
2005	0.000	311.558	1477.016	767.907	1141.545
2006	0.000	322.317	1499.318	753.547	1221.453
2007	0.000	333.447	1521.957	739.456	1306.954
2008	0.000	344.962	1544.938	725.628	1398.440
2009	0.000	356.874	1568.266	712.058	1496.331
2010	0.000	369.198	1591.946	698.743	1601.073

SOURCE: MAP MODEL CASE DOR.5M83
VARIABLES: RPBS RPPS RPRY RPTS RTCSPX

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APPENDIX L

ISER MAP ALASKA ECONOMIC MODEL: INPUT VARIABLES

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L.1. Exogenous and Policy Variables

	ANCSA	BADD	BALDF1	BALGF1	BALPF1	BAL991
1981	325.6	0.	0.	821.	1827.3	2648.3
1982	0.	0.	0.	0.	3212.8	3212.8
1983	0.	0.	0.	0.	0.	0.
1984	0.	0.	0.	0.	0.	0.
1985	0.	0.	0.	0.	0.	0.
1986	0.	0.	0.	0.	0.	0.
1987	0.	0.	0.	0.	0.	0.
1988	0.	0.	0.	0.	0.	0.
1989	0.	0.	0.	0.	0.	0.
1990	0.	0.	0.	0.	0.	0.
1991	0.	0.	0.	0.	0.	0.
1992	0.	0.	0.	0.	0.	0.
1993	0.	0.	0.	0.	0.	0.
1994	0.	0.	0.	0.	0.	0.
1995	0.	0.	0.	0.	0.	0.
1996	0.	0.	0.	0.	0.	0.
1997	0.	0.	0.	0.	0.	0.
1998	0.	0.	0.	0.	0.	0.
1999	0.	0.	0.	0.	0.	0.
2000	0.	0.	0.	0.	0.	0.
2001	0.	0.	0.	0.	0.	0.
2002	0.	0.	0.	0.	0.	0.
2003	0.	0.	0.	0.	0.	0.
2004	0.	0.	0.	0.	0.	0.
2005	0.	0.	0.	0.	0.	0.
2006	0.	0.	0.	0.	0.	0.
2007	0.	0.	0.	0.	0.	0.
2008	0.	0.	0.	0.	0.	0.
2009	0.	0.	0.	0.	0.	0.
2010	0.	0.	0.	0.	0.	0.

SOURCE: Simulation APABASE8.

	BASEMCNX	BASEPOP	BASEXCAP	BASEXGF	BASEXOPS	BASPDRPI
1981	1.	1.	1.	1.	1.	1.
1982	1.	1.	1.	1.	1.	1.
1983	1.	1.	1.	1.	1.	1.
1984	1.	1.	1.	1.	1.	1.
1985	1.	1.	1.	1.	1.	1.
1986	1.	1.	1.	1.	1.	1.
1987	1.	1.	1.	1.	1.	1.
1988	1.	1.	1.	1.	1.	1.
1989	1.	1.	1.	1.	1.	1.
1990	1.	1.	1.	1.	1.	1.
1991	1.	1.	1.	1.	1.	1.
1992	1.	1.	1.	1.	1.	1.
1993	1.	1.	1.	1.	1.	1.
1994	1.	1.	1.	1.	1.	1.
1995	1.	1.	1.	1.	1.	1.
1996	1.	1.	1.	1.	1.	1.
1997	1.	1.	1.	1.	1.	1.
1998	1.	1.	1.	1.	1.	1.
1999	1.	1.	1.	1.	1.	1.
2000	1.	1.	1.	1.	1.	1.
2001	1.	1.	1.	1.	1.	1.
2002	1.	1.	1.	1.	1.	1.
2003	1.	1.	1.	1.	1.	1.
2004	1.	1.	1.	1.	1.	1.
2005	1.	1.	1.	1.	1.	1.
2006	1.	1.	1.	1.	1.	1.
2007	1.	1.	1.	1.	1.	1.
2008	1.	1.	1.	1.	1.	1.
2009	1.	1.	1.	1.	1.	1.
2010	1.	1.	1.	1.	1.	1.

	BIU1	D.80DEC6	D61.66	D61.68	D61.69	D61.70
1981	0.	1.	0.	0.	0.	0.
1982	0.	1.	0.	0.	0.	0.
1983	0.	1.	0.	0.	0.	0.
1984	0.	0.75	0.	0.	0.	0.
1985	0.	0.5	0.	0.	0.	0.
1986	0.	0.25	0.	0.	0.	0.
1987	0.	0.	0.	0.	0.	0.
1988	0.	0.	0.	0.	0.	0.
1989	0.	0.	0.	0.	0.	0.
1990	0.	0.	0.	0.	0.	0.
1991	0.	0.	0.	0.	0.	0.
1992	0.	0.	0.	0.	0.	0.
1993	0.	0.	0.	0.	0.	0.
1994	0.	0.	0.	0.	0.	0.
1995	0.	0.	0.	0.	0.	0.
1996	0.	0.	0.	0.	0.	0.
1997	0.	0.	0.	0.	0.	0.
1998	0.	0.	0.	0.	0.	0.
1999	0.	0.	0.	0.	0.	0.
2000	0.	0.	0.	0.	0.	0.
2001	0.	0.	0.	0.	0.	0.
2002	0.	0.	0.	0.	0.	0.
2003	0.	0.	0.	0.	0.	0.
2004	0.	0.	0.	0.	0.	0.
2005	0.	0.	0.	0.	0.	0.
2006	0.	0.	0.	0.	0.	0.
2007	0.	0.	0.	0.	0.	0.
2008	0.	0.	0.	0.	0.	0.
2009	0.	0.	0.	0.	0.	0.
2010	0.	0.	0.	0.	0.	0.

	D61.72	D61.73	D61.74	D61.75	D61.76	D61.77
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.	0.	0.	0.	0.	0.
1985	0.	0.	0.	0.	0.	0.
1986	0.	0.	0.	0.	0.	0.
1987	0.	0.	0.	0.	0.	0.
1988	0.	0.	0.	0.	0.	0.
1989	0.	0.	0.	0.	0.	0.
1990	0.	0.	0.	0.	0.	0.
1991	0.	0.	0.	0.	0.	0.
1992	0.	0.	0.	0.	0.	0.
1993	0.	0.	0.	0.	0.	0.
1994	0.	0.	0.	0.	0.	0.
1995	0.	0.	0.	0.	0.	0.
1996	0.	0.	0.	0.	0.	0.
1997	0.	0.	0.	0.	0.	0.
1998	0.	0.	0.	0.	0.	0.
1999	0.	0.	0.	0.	0.	0.
2000	0.	0.	0.	0.	0.	0.
2001	0.	0.	0.	0.	0.	0.
2002	0.	0.	0.	0.	0.	0.
2003	0.	0.	0.	0.	0.	0.
2004	0.	0.	0.	0.	0.	0.
2005	0.	0.	0.	0.	0.	0.
2006	0.	0.	0.	0.	0.	0.
2007	0.	0.	0.	0.	0.	0.
2008	0.	0.	0.	0.	0.	0.
2009	0.	0.	0.	0.	0.	0.
2010	0.	0.	0.	0.	0.	0.

	D64.65	D69	D71.00	D71.73	D72	D75
1981	0.	0.	1.	0.	0.	0.
1982	0.	0.	1.	0.	0.	0.
1983	0.	0.	1.	0.	0.	0.
1984	0.	0.	1.	0.	0.	0.
1985	0.	0.	1.	0.	0.	0.
1986	0.	0.	1.	0.	0.	0.
1987	0.	0.	1.	0.	0.	0.
1988	0.	0.	1.	0.	0.	0.
1989	0.	0.	1.	0.	0.	0.
1990	0.	0.	1.	0.	0.	0.
1991	0.	0.	1.	0.	0.	0.
1992	0.	0.	1.	0.	0.	0.
1993	0.	0.	1.	0.	0.	0.
1994	0.	0.	1.	0.	0.	0.
1995	0.	0.	1.	0.	0.	0.
1996	0.	0.	1.	0.	0.	0.
1997	0.	0.	1.	0.	0.	0.
1998	0.	0.	1.	0.	0.	0.
1999	0.	0.	1.	0.	0.	0.
2000	0.	0.	1.	0.	0.	0.
2001	0.	0.	1.	0.	0.	0.
2002	0.	0.	1.	0.	0.	0.
2003	0.	0.	1.	0.	0.	0.
2004	0.	0.	1.	0.	0.	0.
2005	0.	0.	1.	0.	0.	0.
2006	0.	0.	1.	0.	0.	0.
2007	0.	0.	1.	0.	0.	0.
2008	0.	0.	1.	0.	0.	0.
2009	0.	0.	1.	0.	0.	0.
2010	0.	0.	1.	0.	0.	0.

	D77.00	D79	D81.00	EMAGRI	EMCNX1	EMCNX2
1981	1.	0.	1.	0.188	1.433	0.
1982	1.	0.	1.	0.194	2.269	0.125
1983	1.	0.	1.	0.203	3.261	0.29
1984	1.	0.	1.	0.211	2.203	0.726
1985	1.	0.	1.	0.219	2.627	0.863
1986	1.	0.	1.	0.228	2.911	0.85
1987	1.	0.	1.	0.239	3.069	0.613
1988	1.	0.	1.	0.25	3.128	0.401
1989	1.	0.	1.	0.263	3.244	0.875
1990	1.	0.	1.	0.276	4.276	1.025
1991	1.	0.	1.	0.291	1.667	1.125
1992	1.	0.	1.	0.306	6.301	1.075
1993	1.	0.	1.	0.325	5.164	0.563
1994	1.	0.	1.	0.343	2.141	0.1
1995	1.	0.	1.	0.365	1.529	0.
1996	1.	0.	1.	0.389	1.303	0.
1997	1.	0.	1.	0.414	1.303	0.
1998	1.	0.	1.	0.442	1.07	0.
1999	1.	0.	1.	0.474	1.07	0.
2000	1.	0.	1.	0.508	1.07	0.
2001	1.	0.	1.	0.527	1.07	0.
2002	1.	0.	1.	0.546	1.07	0.
2003	1.	0.	1.	0.568	1.07	0.
2004	1.	0.	1.	0.589	1.07	0.
2005	1.	0.	1.	0.611	1.07	0.
2006	1.	0.	1.	0.634	1.07	0.
2007	1.	0.	1.	0.66	1.063	0.
2008	1.	0.	1.	0.686	1.063	0.
2009	1.	0.	1.	0.712	1.056	0.
2010	1.	0.	1.	0.74	1.056	0.

	EMFISH	EMGC	EMGM	EMMX1	EMMX2	EMNATX
1981	6.552	17.6	23.323	0.	10.283	0.17
1982	5.217	17.9	23.323	0.	8.771	0.17
1983	6.421	17.989	23.323	0.	10.433	0.17
1984	6.444	18.079	23.323	0.	10.571	0.17
1985	6.471	18.17	23.323	0.	10.749	0.17
1986	6.499	18.261	23.323	0.	10.929	0.17
1987	6.527	18.352	23.323	0.	11.107	0.17
1988	6.544	18.444	23.323	0.	11.196	0.17
1989	6.579	18.536	23.323	0.	11.24	0.17
1990	6.592	18.629	23.323	0.	11.292	0.17
1991	6.608	18.722	23.323	0.	11.299	0.17
1992	6.629	18.815	23.323	0.	11.315	0.17
1993	6.655	18.909	23.323	0.	11.335	0.17
1994	6.689	19.004	23.323	0.	11.366	0.17
1995	6.731	19.099	23.323	0.	11.413	0.17
1996	6.784	19.194	23.323	0.	11.478	0.17
1997	6.851	19.29	23.323	0.	11.571	0.17
1998	6.935	19.387	23.323	0.	11.704	0.17
1999	7.041	19.484	23.323	0.	11.887	0.17
2000	7.096	19.581	23.323	0.	12.122	0.17
2001	7.096	19.679	23.323	0.	12.018	0.17
2002	7.096	19.777	23.323	0.	11.807	0.17
2003	7.096	19.876	23.323	0.	11.776	0.17
2004	7.096	19.976	23.323	0.	11.747	0.17
2005	7.096	20.076	23.323	0.	11.718	0.17
2006	7.096	20.176	23.323	0.	11.641	0.17
2007	7.096	20.277	23.323	0.	11.634	0.17
2008	7.096	20.378	23.323	0.	11.626	0.17
2009	7.096	20.48	23.323	0.	11.623	0.17
2010	7.096	20.583	23.323	0.	11.617	0.17

	EMP9	EMT9X	EXBOND	EXCAP1	EXCPSHY1	EXCPSNH1
1981	7.788	1.5	0.38	688.018	127.192	96.247
1982	8.411	1.5	0.8	944.515	150.115	117.283
1983	9.387	1.552	0.67	750.	150.	100.
1984	9.983	1.631	0.35	0.	0.	0.
1985	11.279	1.949	0.3	0.	0.	0.
1986	12.4	2.157	0.3	0.	0.	0.
1987	13.149	2.471	0.3	0.	0.	0.
1988	14.062	2.804	0.3	0.	0.	0.
1989	14.526	2.44	0.3	0.	0.	0.
1990	14.797	2.752	0.3	0.	0.	0.
1991	15.671	2.063	0.3	0.	0.	0.
1992	16.557	2.753	0.3	0.	0.	0.
1993	16.068	2.348	0.3	0.	0.	0.
1994	16.969	3.147	0.3	0.	0.	0.
1995	17.329	3.055	0.3	0.	0.	0.
1996	17.501	3.291	0.3	0.	0.	0.
1997	17.39	3.351	0.3	0.	0.	0.
1998	16.994	3.423	0.3	0.	0.	0.
1999	16.62	3.423	0.3	0.	0.	0.
2000	16.226	3.423	0.3	0.	0.	0.
2001	15.957	3.423	0.3	0.	0.	0.
2002	15.888	3.423	0.3	0.	0.	0.
2003	16.089	3.423	0.3	0.	0.	0.
2004	16.143	3.423	0.3	0.	0.	0.
2005	16.197	3.423	0.3	0.	0.	0.
2006	16.253	3.423	0.3	0.	0.	0.
2007	16.309	3.351	0.3	0.	0.	0.
2008	16.34	3.351	0.3	0.	0.	0.
2009	16.223	3.279	0.3	0.	0.	0.
2010	16.282	3.279	0.3	0.	0.	0.

	EXDFPCNT	EXDF1	EXDSSX	EXGFCHY1	EXGFCNH1	EXOPS1
1981	0.	0.	97.686	147.779	316.8	1581.6
1982	0.	0.	102.325	140.017	537.1	1960.
1983	0.	0.	136.4	100.	400.	2050.
1984	0.	0.	131.2	0.	0.	0.
1985	0.	0.	125.7	0.	0.	0.
1986	0.	0.	121.6	0.	0.	0.
1987	0.	0.	115.2	0.	0.	0.
1988	0.	0.	110.	0.	0.	0.
1989	0.	0.	99.5	0.	0.	0.
1990	0.	0.	86.2	0.	0.	0.
1991	0.	0.	63.4	0.	0.	0.
1992	0.	0.	38.2	0.	0.	0.
1993	0.	0.	31.7	0.	0.	0.
1994	0.	0.	25.8	0.	0.	0.
1995	0.	0.	23.1	0.	0.	0.
1996	0.	0.	21.5	0.	0.	0.
1997	0.	0.	16.7	0.	0.	0.
1998	0.	0.	14.4	0.	0.	0.
1999	0.	0.	9.	0.	0.	0.
2000	0.	0.	2.6	0.	0.	0.
2001	0.	0.	0.	0.	0.	0.
2002	0.	0.	0.	0.	0.	0.
2003	0.	0.	0.	0.	0.	0.
2004	0.	0.	0.	0.	0.	0.
2005	0.	0.	0.	0.	0.	0.
2006	0.	0.	0.	0.	0.	0.
2007	0.	0.	0.	0.	0.	0.
2008	0.	0.	0.	0.	0.	0.
2009	0.	0.	0.	0.	0.	0.
2010	0.	0.	0.	0.	0.	0.

	EXPFBAK	EXPFCONX	EXPFDIST	EXPF1	EXPRPER	EXSAVX
1981	0.	900.	0.	0.25	1.	0.
1982	0.	800.	1.	0.25	1.	0.
1983	0.5	400.	1.	0.25	1.	0.
1984	0.5	0.	1.	0.25	0.8	0.
1985	0.5	0.	1.	0.25	0.8	0.
1986	0.5	0.	1.	0.25	0.8	0.
1987	0.5	0.	1.	0.25	0.8	0.
1988	0.5	0.	0.	0.25	0.8	0.
1989	0.5	0.	0.	0.25	0.8	0.
1990	0.	0.	0.	0.25	0.8	0.
1991	0.	0.	0.	0.25	0.8	0.
1992	0.	0.	0.	0.25	0.8	0.
1993	0.	0.	0.	0.25	0.8	0.
1994	0.	0.	0.	0.25	0.8	0.
1995	0.	0.	0.	0.25	0.8	0.
1996	0.	0.	0.	0.25	0.8	0.
1997	0.	0.	0.	0.25	0.8	0.
1998	0.	0.	0.	0.25	0.8	0.
1999	0.	0.	0.	0.25	0.8	0.
2000	0.	0.	0.	0.25	0.8	0.
2001	0.	0.	0.	0.25	0.8	0.
2002	0.	0.	0.	0.25	0.8	0.
2003	0.	0.	0.	0.25	0.8	0.
2004	0.	0.	0.	0.25	0.8	0.
2005	0.	0.	0.	0.25	0.8	0.
2006	0.	0.	0.	0.25	0.8	0.
2007	0.	0.	0.	0.25	0.8	0.
2008	0.	0.	0.	0.25	0.8	0.
2009	0.	0.	0.	0.25	0.8	0.
2010	0.	0.	0.	0.25	0.8	0.

	EXSPCAP	EXSPLITX	EXSUBS1	GODTX	GRDIRPU	GREXCAP
1981	48.	0.513	772.	701.	-0.001	-0.297
1982	429.	0.75	634.	842.4	0.001	0.423
1983	0.	0.75	500.	761.2	0.005	0.2
1984	0.	0.75	350.	679.5	0.01	0.15
1985	0.	0.75	300.	597.9	0.015	0.15
1986	0.	0.75	200.	515.	0.015	0.1
1987	0.	0.75	100.	433.	0.015	0.1
1988	0.	0.75	0.	350.6	0.015	0.1
1989	0.	0.75	0.	273.2	0.015	0.1
1990	0.	0.75	0.	203.9	0.015	0.1
1991	0.	0.75	0.	152.7	0.015	0.1
1992	0.	0.75	0.	122.9	0.015	0.1
1993	0.	0.75	0.	97.8	0.015	0.1
1994	0.	0.75	0.	77.2	0.015	0.1
1995	0.	0.75	0.	58.1	0.015	0.1
1996	0.	0.75	0.	39.5	0.015	0.1
1997	0.	0.75	0.	24.6	0.015	0.1
1998	0.	0.75	0.	11.2	0.015	0.1
1999	0.	0.75	0.	2.6	0.015	0.1
2000	0.	0.75	0.	0.	0.015	0.1
2001	0.	0.75	0.	0.	0.015	0.1
2002	0.	0.75	0.	0.	0.015	0.1
2003	0.	0.75	0.	0.	0.015	0.1
2004	0.	0.75	0.	0.	0.015	0.1
2005	0.	0.75	0.	0.	0.015	0.1
2006	0.	0.75	0.	0.	0.015	0.1
2007	0.	0.75	0.	0.	0.015	0.1
2008	0.	0.75	0.	0.	0.015	0.1
2009	0.	0.75	0.	0.	0.015	0.1
2010	0.	0.75	0.	0.	0.015	0.1

	GREXOPS	GRRPCEX	GRRWEUS	GRSSCP	GRUSCPI	LPTRAT
1981	0.311	0.02	-0.016	0.02	0.1	0.2
1982	0.15	0.02	0.013	0.02	0.06	0.2
1983	0.15	0.02	0.01	0.02	0.067	0.2
1984	0.1	0.02	0.01	0.02	0.067	0.2
1985	0.1	0.02	0.01	0.02	0.069	0.2
1986	0.1	0.02	0.01	0.02	0.069	0.2
1987	0.1	0.02	0.01	0.02	0.075	0.2
1988	0.1	0.02	0.01	0.02	0.067	0.2
1989	0.1	0.02	0.01	0.02	0.067	0.2
1990	0.1	0.02	0.01	0.02	0.066	0.2
1991	0.1	0.02	0.01	0.02	0.067	0.2
1992	0.1	0.02	0.01	0.02	0.066	0.2
1993	0.1	0.02	0.01	0.02	0.066	0.2
1994	0.1	0.02	0.01	0.02	0.066	0.2
1995	0.1	0.02	0.01	0.02	0.066	0.2
1996	0.1	0.02	0.01	0.02	0.065	0.2
1997	0.1	0.02	0.01	0.02	0.065	0.2
1998	0.1	0.02	0.01	0.02	0.065	0.2
1999	0.1	0.02	0.01	0.02	0.065	0.2
2000	0.1	0.02	0.01	0.02	0.065	0.2
2001	0.1	0.02	0.01	0.02	0.065	0.2
2002	0.1	0.02	0.01	0.02	0.065	0.2
2003	0.1	0.02	0.01	0.02	0.065	0.2
2004	0.1	0.02	0.01	0.02	0.065	0.2
2005	0.1	0.02	0.01	0.02	0.065	0.2
2006	0.1	0.02	0.01	0.02	0.065	0.2
2007	0.1	0.02	0.01	0.02	0.065	0.2
2008	0.1	0.02	0.01	0.02	0.065	0.2
2009	0.1	0.02	0.01	0.02	0.065	0.2
2010	0.1	0.02	0.01	0.02	0.065	0.2

	NCBP	NCRP	PCNC1	PCNC2	PCNC3	PCOLART
1981	0.	0.	0.15	0.15	0.15	0.25
1982	0.	0.	0.15	0.15	0.15	0.25
1983	0.	0.	0.15	0.15	0.15	0.25
1984	0.	0.	0.15	0.15	0.15	0.25
1985	0.	0.	0.15	0.15	0.15	0.25
1986	0.	0.	0.15	0.15	0.15	0.25
1987	0.	0.	0.15	0.15	0.15	0.25
1988	0.	0.	0.15	0.15	0.15	0.25
1989	0.	0.	0.15	0.15	0.15	0.25
1990	0.	0.	0.15	0.15	0.15	0.25
1991	0.	0.	0.15	0.15	0.15	0.25
1992	0.	0.	0.15	0.15	0.15	0.25
1993	0.	0.	0.15	0.15	0.15	0.25
1994	0.	0.	0.15	0.15	0.15	0.25
1995	0.	0.	0.15	0.15	0.15	0.25
1996	0.	0.	0.15	0.15	0.15	0.25
1997	0.	0.	0.15	0.15	0.15	0.25
1998	0.	0.	0.15	0.15	0.15	0.25
1999	0.	0.	0.15	0.15	0.15	0.25
2000	0.	0.	0.15	0.15	0.15	0.25
2001	0.	0.	0.15	0.15	0.15	0.25
2002	0.	0.	0.15	0.15	0.15	0.25
2003	0.	0.	0.15	0.15	0.15	0.25
2004	0.	0.	0.15	0.15	0.15	0.25
2005	0.	0.	0.15	0.15	0.15	0.25
2006	0.	0.	0.15	0.15	0.15	0.25
2007	0.	0.	0.15	0.15	0.15	0.25
2008	0.	0.	0.15	0.15	0.15	0.25
2009	0.	0.	0.15	0.15	0.15	0.25
2010	0.	0.	0.15	0.15	0.15	0.25

	PDUSCPI1	PIPADJ	PR.DPIU1	P9PTPER	RLPTX	RLTFPX
1981	272.3	1.62	3458.	0.5	0.	0.
1982	0.	1.62	0.	0.5	0.	0.
1983	0.	1.62	0.	0.5	0.	0.
1984	0.	1.62	0.	0.5	0.	0.
1985	0.	1.62	0.	0.5	0.	0.
1986	0.	1.62	0.	0.5	0.	0.
1987	0.	1.62	0.	0.5	0.	0.
1988	0.	1.62	0.	0.5	0.	0.
1989	0.	1.62	0.	0.5	0.	0.
1990	0.	1.62	0.	0.5	0.	0.
1991	0.	1.62	0.	0.5	0.	0.
1992	0.	1.62	0.	0.5	0.	0.
1993	0.	1.62	0.	0.5	0.	0.
1994	0.	1.62	0.	0.5	0.	0.
1995	0.	1.62	0.	0.5	0.	0.
1996	0.	1.62	0.	0.5	0.	0.
1997	0.	1.62	0.	0.5	0.	0.
1998	0.	1.62	0.	0.5	0.	0.
1999	0.	1.62	0.	0.5	0.	0.
2000	0.	1.62	0.	0.5	0.	0.
2001	0.	1.62	0.	0.5	0.	0.
2002	0.	1.62	0.	0.5	0.	0.
2003	0.	1.62	0.	0.5	0.	0.
2004	0.	1.62	0.	0.5	0.	0.
2005	0.	1.62	0.	0.5	0.	0.
2006	0.	1.62	0.	0.5	0.	0.
2007	0.	1.62	0.	0.5	0.	0.
2008	0.	1.62	0.	0.5	0.	0.
2009	0.	1.62	0.	0.5	0.	0.
2010	0.	1.62	0.	0.5	0.	0.

	RLTX	RNATX	RPBS	RPPS	RPRY	RPTS
1981	0.	0.07	10.1	143.	1118.5	1170.2
1982	0.	0.07	6.7	142.7	1530.	1590.
1983	0.	0.07	26.1	148.6	1430.	1480.
1984	0.	0.07	11.066	153.2	1200.	1220.
1985	0.	0.07	4.692	158.	1240.	1260.
1986	0.	0.07	1.99	163.456	1350.	1350.
1987	0.	0.07	0.844	169.101	1450.	1430.
1988	0.	0.07	0.358	174.94	1520.	1500.
1989	0.	0.07	0.152	180.981	1650.	1380.
1990	0.	0.07	0.064	187.231	1710.	1420.
1991	0.	0.07	0.027	193.697	1570.	1230.
1992	0.	0.07	0.012	200.385	1550.	1150.
1993	0.	0.07	0.005	207.305	1520.	1110.
1994	0.	0.07	0.002	214.464	1500.	1090.
1995	0.	0.07	0.001	221.870	1410.	1000.
1996	0.	0.07	0.	229.532	1290.	910.
1997	0.	0.07	0.	237.458	1330.	930.
1998	0.	0.07	0.	245.658	1340.	910.
1999	0.	0.07	0.	254.141	1350.	860.
2000	0.	0.07	0.	262.917	1370.38	843.918
2001	0.	0.07	0.	271.996	1391.08	828.136
2002	0.	0.07	0.	281.389	1412.08	812.65
2003	0.	0.07	0.	291.106	1433.4	797.453
2004	0.	0.07	0.	301.158	1455.05	782.541
2005	0.	0.07	0.	311.558	1477.02	767.907
2006	0.	0.07	0.	322.317	1499.32	753.547
2007	0.	0.07	0.	333.447	1521.96	739.456
2008	0.	0.07	0.	344.962	1544.94	725.628
2009	0.	0.07	0.	356.874	1568.27	712.058
2010	0.	0.07	0.	369.198	1591.95	698.743

	RP9X	RSFDNPX	RSFDNX	RTCSPX	RTCSX	RTISXX
1981	0.	11.3	0.	860.1	0.	80.
1982	0.	21.9	0.	668.9	0.	0.
1983	0.	23.	0.	235.	0.	0.
1984	0.	24.	0.	272.	0.	0.
1985	0.	25.	0.	295.	0.	0.
1986	0.	26.	0.	315.65	0.	0.
1987	0.	27.	0.	337.745	0.	0.
1988	0.	28.	0.	361.387	0.	0.
1989	0.	29.	0.	386.684	0.	0.
1990	0.	30.	0.	413.751	0.	0.
1991	0.	31.	0.	442.714	0.	0.
1992	0.	32.	0.	473.704	0.	0.
1993	0.	33.	0.	506.863	0.	0.
1994	0.	34.	0.	542.343	0.	0.
1995	0.	35.	0.	580.306	0.	0.
1996	0.	36.	0.	620.927	0.	0.
1997	0.	37.	0.	664.392	0.	0.
1998	0.	38.	0.	710.899	0.	0.
1999	0.	39.	0.	760.662	0.	0.
2000	0.	40.	0.	813.907	0.	0.
2001	0.	41.	0.	870.881	0.	0.
2002	0.	42.	0.	931.842	0.	0.
2003	0.	43.	0.	997.07	0.	0.
2004	0.	44.	0.	1066.86	0.	0.
2005	0.	45.	0.	1141.54	0.	0.
2006	0.	46.	0.	1221.45	0.	0.
2007	0.	47.	0.	1306.95	0.	0.
2008	0.	48.	0.	1398.44	0.	0.
2009	0.	49.	0.	1496.33	0.	0.
2010	0.	50.	0.	1601.07	0.	0.

	SANCSA	TCRED	TOURIST	TXBASE	TXCRPC	TXPTXX
1981	315.7	0.	630.	0.	0.	0.
1982	0.	0.	680.	0.	0.	0.
1983	0.	0.	730.	0.	0.	0.
1984	0.	0.	780.	0.	0.	0.
1985	0.	0.	830.	0.	0.	0.
1986	0.	0.	880.	0.	0.	0.
1987	0.	0.	930.	0.	0.	0.
1988	0.	0.	980.	0.	0.	0.
1989	0.	0.	1030.	0.	0.	0.
1990	0.	0.	1080.	0.	0.	0.
1991	0.	0.	1130.	0.	0.	0.
1992	0.	0.	1180.	0.	0.	0.
1993	0.	0.	1230.	0.	0.	0.
1994	0.	0.	1280.	0.	0.	0.
1995	0.	0.	1330.	0.	0.	0.
1996	0.	0.	1380.	0.	0.	0.
1997	0.	0.	1430.	0.	0.	0.
1998	0.	0.	1480.	0.	0.	0.
1999	0.	0.	1530.	0.	0.	0.
2000	0.	0.	1580.	0.	0.	0.
2001	0.	0.	1630.	0.	0.	0.
2002	0.	0.	1680.	0.	0.	0.
2003	0.	0.	1730.	0.	0.	0.
2004	0.	0.	1780.	0.	0.	0.
2005	0.	0.	1830.	0.	0.	0.
2006	0.	0.	1880.	0.	0.	0.
2007	0.	0.	1930.	0.	0.	0.
2008	0.	0.	1980.	0.	0.	0.
2009	0.	0.	2030.	0.	0.	0.
2010	0.	0.	2080.	0.	0.	0.

	TXRT	UUS	VAEX1	WEUS1	XXMX2	YR
1981	0.	0.076	1000.	254.7	0.	1981.
1982	0.	0.097	1000.	0.	0.	1982.
1983	0.	0.107	1000.	0.	0.	1983.
1984	0.	0.092	0.	0.	0.	1984.
1985	0.	0.08	0.	0.	0.	1985.
1986	0.	0.07	0.	0.	0.	1986.
1987	0.	0.065	0.	0.	0.	1987.
1988	0.	0.06	0.	0.	0.	1988.
1989	0.	0.06	0.	0.	0.	1989.
1990	0.	0.06	0.	0.	0.	1990.
1991	0.	0.06	0.	0.	0.	1991.
1992	0.	0.06	0.	0.	0.	1992.
1993	0.	0.06	0.	0.	0.	1993.
1994	0.	0.06	0.	0.	0.	1994.
1995	0.	0.06	0.	0.	0.	1995.
1996	0.	0.06	0.	0.	0.	1996.
1997	0.	0.06	0.	0.	0.	1997.
1998	0.	0.06	0.	0.	0.	1998.
1999	0.	0.06	0.	0.	0.	1999.
2000	0.	0.06	0.	0.	0.	2000.
2001	0.	0.06	0.	0.	0.	2001.
2002	0.	0.06	0.	0.	0.	2002.
2003	0.	0.06	0.	0.	0.	2003.
2004	0.	0.06	0.	0.	0.	2004.
2005	0.	0.06	0.	0.	0.	2005.
2006	0.	0.06	0.	0.	0.	2006.
2007	0.	0.06	0.	0.	0.	2007.
2008	0.	0.06	0.	0.	0.	2008.
2009	0.	0.06	0.	0.	0.	2009.
2010	0.	0.06	0.	0.	0.	2010.

L.2. Startup Values for 1980 and 1981

ADMSD	1980	86.558	86.49
AEX	1980	0.4	NA
AGI	1980	4500.	NA
AHG	1980	1.	NA
ATD	1980	600.	NA
ATI	1980	3500.	NA
ATI.TT	1980	10.	NA
ATT	1980	320.	NA
BALCAP84	1980	0.	0.
BALDF	1980	0.	0.
BALGF	1980	1549.1	821.1
BALGFCP	1980	900.	NA
BALGFP	1980	1549.1	821.1
BALPF	1980	483.2	1827.3
BAL99	1980	2032.3	2648.4
BIU	1980	31.9	34.9
BL	1980	33.	NA
CEA9N	1980	0.034	NA
CECMN	1980	0.012	NA
CECNN	1980	0.072	NA
CED9N	1980	0.12	NA
CEFIN	1980	0.015	NA
CEGAN	1980	0.197	NA
CEGFN	1980	0.207	NA
CEM9N	1980	0.093	NA
CEPUN	1980	0.018	NA
CEP9N	1980	0.021	NA
CES9N	1980	0.152	NA
CET9N	1980	0.06	NA
CNNPF1	1980	2.777	NA
CNNPF10	1980	8.158	NA
CNNPF11	1980	7.036	NA
CNNPF12	1980	5.893	NA
CNNPF13	1980	4.956	NA
CNNPF14	1980	3.112	NA
CNNPF15	1980	4.368	NA
CNNPF2	1980	9.098	NA
CNNPF3	1980	10.982	NA
CNNPF4	1980	11.165	NA
CNNPF5	1980	11.911	NA
CNNPF6	1980	14.403	NA
CNNPF7	1980	16.919	NA
CNNPF8	1980	15.081	NA
CNNPF9	1980	11.626	NA
CNNPM1	1980	2.922	NA
CNNPM10	1980	10.431	NA

CNNPM11	1980	8.546	NA
CNNPM12	1980	7.427	NA
CNNPM13	1980	5.826	NA
CNNPM14	1980	3.742	NA
CNNPM15	1980	4.433	NA
CNNPM2	1980	10.077	NA
CNNPM3	1980	11.548	NA
CNNPM4	1980	12.002	NA
CNNPM5	1980	13.066	NA
CNNPM6	1980	13.719	NA
CNNPM7	1980	18.285	NA
CNNPM8	1980	17.566	NA
CNNPM9	1980	13.534	NA
COLA	1980	70.	NA
DEBTP82	1980	0.	0.
DF.RSVP	1980	0.	0.
DPI	1980	4193.98	NA
DPIRES	1980	54.307	62.532
DPI8	1980	4512.8	NA
ELBD	1980	129.	151.2
ELED	1980	360.8	383.2
ELEDCP	1980	141.7	110.5
ELED1	1980	129.7	111.8
ELNED1	1980	422.4	553.7
ELPERS	1980	383.8	407.5
EL99	1980	912.2	1088.1
EMAFISH	1980	0.221	NA
EMA9	1980	0.885	NA
EMCM	1980	4.383	NA
EMCN	1980	10.708	12.5
EMCNRT	1980	0.	0.
EMCNX	1980	0.	0.
EMCN1	1980	10.708	12.5
EMDR	1980	23.98	26.2
EMDRNT	1980	22.08	NA
EMDTOUR	1980	1.9	NA
EMDW	1980	5.546	6.4
EMD9	1980	29.526	32.7
EMFI	1980	7.751	8.7
EMGA	1980	36.254	39.8
EMGF	1980	41.143	40.923
EMGL	1980	20.884	23.1
EMGS	1980	15.37	16.7
EMMO	1980	2.66	2.7
EMM9	1980	14.205	13.
EMM91	1980	14.205	13.
EMPRO	1980	17.044	17.235
EMPROFIS	1980	7.269	NA
EMPRO1	1980	9.775	NA

EMPU	1980	1.373	NA
EMRATE	1980	0.48	NA
EMRATN1	1980	0.17	0.17
EMSB	1980	5.063	NA
EMSP	1980	84.25	NA
EMSTOUR	1980	2.02	NA
EMSUP	1980	67.073	NA
EMS8NT	1980	21.713	NA
EMS9	1980	29.796	NA
EMS91	1980	28.796	NA
EMTCU	1980	17.177	NA
EMTNT	1980	9.321	NA
EMTOUR	1980	4.92	NA
EMTTOUR	1980	1.	NA
EMT9	1980	11.421	NA
EMT91	1980	10.321	NA
EMX	1980	6.684	8.6
EM96	1980	187.851	200.935
EM97	1980	170.807	183.7
EM98	1980	194.13	207.023
EM99	1980	211.174	224.258
EXANSAV	1980	0.	NA
EXCAP	1980	399.923	688.018
EXCAPFR	1980	0.	0.
EXCDS	1980	68.9	167.
EXCDSNT	1980	23.402	52.587
EXCDS4	1980	68.9	167.
EXCPS	1980	150.658	223.439
EXCPSFED	1980	43.7	107.5
EXCPSHY	1980	87.111	127.192
EXCPSM	1980	0.	0.
EXCPSNH	1980	63.547	96.247
EXDFCON	1980	0.	0.
EXDFWITH	1980	0.	0.
EXDSS	1980	76.209	97.686
EXEDS	1980	474.3	592.
EXEDS4	1980	474.3	592.
EXGF	1980	1414.36	3668.2
EXGFBM	1980	1172.79	4349.57
EXGFCHY	1980	81.703	147.779
EXGFCNH	1980	167.562	316.8
EXGGS	1980	117.	116.2
EXGGS4	1980	117.	116.2
EXHES	1980	89.3	125.6
EXHES4	1980	89.3	125.6
EXINREC	1980	71.996	153.333
EXJUS	1980	87.6	106.3
EXJUS4	1980	87.6	106.3
EXLIM	1980	0.	0.

EXLIMOK	1980	0.	0.
EXNOPS	1980	476.132	1605.7
EXNRS	1980	80.6	103.3
EXNRS4	1980	80.6	103.3
EXOPS	1980	1206.6	1581.6
EXPFCON	1980	344.8	1285.
EXPPS	1980	28.9	33.2
EXPPS4	1980	28.9	33.2
EXPRCDS	1980	7.	10.6
EXPREDS1	1980	13.	14.9
EXPRGGS	1980	53.6	49.3
EXPRHES	1980	26.7	29.9
EXPRJUS	1980	58.4	69.7
EXPRNRS	1980	54.	69.
EXPRPPS	1980	17.7	20.2
EXPRSSS	1980	36.6	42.7
EXPRTRS	1980	67.7	93.2
EXPRUA	1980	113.322	120.392
EXPR99	1980	448.022	519.892
EXSAVS	1980	0.	NA
EXSSS	1980	134.7	167.4
EXSSS4	1980	134.7	167.4
EXSUBS	1980	0.	772.
EXTRNS	1980	0.	0.
EXTRS	1980	125.4	169.8
EXTRS4	1980	125.4	169.8
EXUA	1980	167.	177.
EX99S	1980	1682.73	3187.3
FAGI	1980	4500.	NA
FAGII	1980	3500.	NA
GOBONDL	1980	827.1	1091.02
GODT	1980	631.723	701.178
GR	1980	15000.	NA
GTR	1980	14000.	NA
IM.BAL	1980	0.	NA
IM.BALRV	1980	0.	NA
LPTB	1980	12332.	13626.
LPTB1	1980	12332.	13626.
MIGIN	1980	12.451	NA
MIGOUT	1980	-20.351	NA
MILPCT	1980	1.	1.
NATPF1	1980	0.904	NA
NATPF10	1980	1.393	NA
NATPF11	1980	1.304	NA
NATPF12	1980	1.082	NA
NATPF13	1980	0.865	NA
NATPF14	1980	0.685	NA
NATPF15	1980	1.433	NA
NATPF2	1980	2.764	NA

NATPF3	1980	3.391	NA
NATPF4	1980	3.625	NA
NATPF5	1980	4.066	NA
NATPF6	1980	3.475	NA
NATPF7	1980	2.828	NA
NATPF8	1980	2.208	NA
NATPF9	1980	1.772	NA
NATPM1	1980	0.945	NA
NATPM10	1980	1.44	NA
NATPM11	1980	1.357	NA
NATPM12	1980	1.112	NA
NATPM13	1980	0.948	NA
NATPM14	1980	0.639	NA
NATPM15	1980	1.471	NA
NATPM2	1980	2.965	NA
NATPM3	1980	3.486	NA
NATPM4	1980	3.778	NA
NATPM5	1980	4.226	NA
NATPM6	1980	3.486	NA
NATPM7	1980	2.865	NA
NATPM8	1980	2.223	NA
NATPM9	1980	1.802	NA
NCCAP	1980	278.	350.
NCCI	1980	127.	143.
NCPI	1980	19.	21.
P.DPINN	1980	11417.9	10000.
PDCON	1980	514.127	NA
PDEXOPS	1980	362.064	NA
PDRATIO	1980	1.296	1.266
PDRPI	1980	320.055	344.708
PDUSCPI	1980	247.	272.3
PI	1980	5090.2	NA
PIDIR	1980	541.387	661.376
PIOLI	1980	280.624	306.461
PIPROF	1980	25.	25.
PIPRO1	1980	180.	180.
PIRADJ	1980	318.813	348.493
PISSC	1980	R 267é.581	310.433
PITRAN	1980	417.39	500.245
PITRAN1	1980	417.39	500.245
PI3	1980	5090.2	NA
PI8	1980	5409.02	NA
POP	1980	403.603	NA
POPC	1980	378.7	NA
POPGER	1980	12.	NA
POPM	1980	23.3	23.3
POPMIG	1980	-7.9	NA
POPNE	1980	70.855	NA
POPSKUL	1980	106.642	NA

PR.BALCP	1980	1239.14	1300.
PR.DPINN	1980	3233.7	4400.
PR.DPIUS	1980	3239.68	3235.03
PR.PI	1980	3956.11	NA
PR.PI3	1980	3956.11	NA
R.BALCAP	1980	500.	550.
R.DPI	1980	1310.39	NA
R.DPI8N	1980	1410.01	NA
R.DPI8X	1980	0.	NA
R.WR97	1980	7239.51	NA
RLMC	1980	267.6	331.9
RLOT	1980	46.9	52.3
RLPT1	1980	191.	199.9
RLTCS	1980	0.	NA
RLTCS4	1980	0.	NA
RLTEB	1980	7.512	-85.415
RLTEB4	1980	7.512	-85.415
RLTEF4	1980	162.679	275.301
RLTEO	1980	43.653	62.889
RLTEO4	1980	43.653	62.889
RLTET	1980	15.253	16.622
RLTET4	1980	15.253	16.622
RLTE99	1980	231.1	271.4
RLTE994	1980	231.1	271.4
RLTF	1980	52.5	71.1
RLTMA	1980	11.4	56.5
RLTMA4	1980	11.4	56.5
RLTMS	1980	20.202	50.887
RLTRS	1980	26.9	52.601
RLTRS4	1980	26.9	52.601
RLTT9	1980	18.598	61.812
RLTT94	1980	18.598	61.812
RLTVS4	1980	2.522	1.093
RLT99	1980	296.8	436.7
RMIS	1980	22.1	22.1
RMISRES	1980	18.034	17.942
ROFAS	1980	10.661	NA
ROFERS	1980	20.98	NA
ROFOS	1980	8.138	NA
RSFDN	1980	223.534	200.687
RSFFS	1980	4.93	5.122
RSFS1	1980	11.993	12.015
RSGF	1980	2742.77	3936.83
RSGFBM	1980	2501.2	3718.2
RSIAS	1980	26.116	29.451
RTAS	1980	7.366	8.3
RTBS2	1980	10.	NA
RTCIS	1980	4.283	1.7
RTCS1	1980	17.864	34.8

RTIS	1980	100.479	0.
RTISC	1980	0.	0.
RTISCA1	1980	0.44	NA
RTISCA2	1980	0.44	NA
RTISCP	1980	71.147	49.813
RTISLOS	1980	150.	150.
RTMF	1980	26.175	23.2
RTOTS	1980	16.9	21.7
RTPIF	1980	770.765	893.085
RTSS	1980	2.556	0.
RTVS	1980	12.418	11.8
R99S	1980	2971.69	4001.1
TPTV	1980	260.	NA
VAEX	1980	1000.	1000.
WEALTH	1980	4001.03	NA
WEUS	1980	234.9	254.7
WRA9	1980	18914.1	NA
WRCM	1980	34588.6	NA
WRCN	1980	39907.	NA
WRCNNP	1980	39907.	NA
WRCNP	1980	0.	0.
WRDR	1980	13824.5	NA
WRDW	1980	25669.7	NA
WRD9	1980	16049.4	NA
WRFI	1980	18820.	NA
WRGA	1980	24545.1	NA
WRGC	1980	21270.7	NA
WRGF	1980	17046.7	NA
WRGL	1980	22192.5	NA
WRGM	1980	13819.4	15220.8
WRGS	1980	27741.7	NA
WRM91	1980	21833.1	NA
WRPU	1980	33253.4	NA
WRP9	1980	45591.5	NA
WRSB	1980	18904.2	NA
WRSNB	1980	16464.3	NA
WRS9	1980	16878.9	NA
WRT9	1980	27009.7	NA
WR98	1980	22047.	NA
WSCN	1980	427.324	NA
WSCNP	1980	0.	0.
WSGA	1980	889.859	NA
WSGC	1980	379.045	NA
WSGL	1980	463.469	NA
WSGM	1980	322.31	354.995
WSGS	1980	426.39	NA
WSGSFY	1980	398.858	NA
WS97	1980	3957.67	NA
WS98	1980	4279.98	NA

XXA9	1980	75.1	77.6
XXCM	1980	204.5	NA
XXCN	1980	120.7	141.
XXCN1	1980	120.7	141.
XXCN8	1980	89.338	NA
XXDR	1980	190.5	206.3
XXDRNT	1980	219.932	NA
XXDW	1980	103.6	115.5
XXD9	1980	294.1	321.8
XXFI	1980	354.5	357.1
XXGA	1980	330.	NA
XXGF	1980	500.	NA
XXM91	1980	240.	NA
XXPU	1980	55.1	NA
XXP9	1980	600.	NA
XXSB	1980	53.9	NA
XXS8NT	1980	200.557	NA
XXS9	1980	282.6	NA
XXTNT	1980	183.792	NA
XXT9	1980	225.2	NA
XXVHY	1980	91.595	NA
XXVNHY	1980	69.644	NA
XX98	1980	2500.	NA

SOURCE: dset A83.2.

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APPENDIX M

ISER MAP REGIONALIZATION MODEL: INPUT VARIABLES

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M.1. Exogenous and Policy Variables

1981	2.606	18.657	5.08	0.457	1.846	0.96
1982	2.205	21.361	6.089	0.436	1.528	0.818
1983	2.64	22.376	7.472	0.491	1.838	0.96
1984	2.847	22.73	6.73	0.486	1.838	0.964
1985	3.187	24.16	8.027	0.501	1.851	1.059
1986	3.81	25.242	8.474	0.512	1.862	1.174
1987	4.051	26.035	9.144	0.522	1.87	1.273
1988	4.195	25.991	9.534	0.516	1.869	1.263
1989	4.338	25.941	10.012	0.511	1.868	1.229
1990	3.61	26.723	12.462	0.519	1.877	1.237
1991	3.418	26.792	10.206	0.516	1.875	1.24
1992	7.175	28.368	12.737	0.536	1.895	1.255
1993	7.832	30.35	10.178	0.567	1.914	1.265
1994	5.24	31.68	11.237	0.585	1.925	1.272
1995	5.804	31.715	10.057	0.58	1.925	1.277
1996	6.086	30.712	9.914	0.559	1.912	1.275
1997	6.225	30.024	10.05	0.542	1.904	1.276
1998	6.202	30.3	9.644	0.542	1.905	1.279
1999	6.127	30.486	9.517	0.541	1.904	1.282
2000	5.96	30.728	9.506	0.54	1.904	1.262
2001	5.633	30.971	9.525	0.54	1.904	1.219
2002	5.524	31.265	9.527	0.541	1.906	1.2
2003	5.529	31.635	9.689	0.544	1.909	1.182
2004	5.536	32.04	9.703	0.546	1.912	1.164
2005	5.543	32.483	9.719	0.549	1.916	1.147
2006	5.551	32.955	9.735	0.553	1.92	1.084
2007	5.56	33.454	9.674	0.556	1.925	1.09
2008	5.57	33.984	9.666	0.561	1.93	1.096
2009	5.579	34.514	9.431	0.565	1.935	1.102
2010	5.59	35.091	9.451	0.57	1.941	1.109

	B.09	B.11	B.12	B.14	B.15	B.16
1981	4.907	11.622	3.968	0.152	4.028	0.016
1982	5.62	11.755	3.94	0.158	3.527	0.017
1983	5.781	13.112	4.225	0.169	4.439	0.017
1984	5.791	13.584	4.316	0.277	4.3	0.017
1985	6.128	14.265	4.808	0.32	4.163	0.018
1986	6.393	14.734	4.991	0.38	4.212	0.019
1987	6.627	15.371	4.651	0.329	4.554	0.019
1988	6.631	15.621	4.849	0.604	4.673	0.019
1989	6.634	15.785	5.367	0.602	4.371	0.019
1990	6.871	16.121	5.594	0.606	4.331	0.02
1991	6.911	16.223	5.704	0.605	4.345	0.02
1992	7.37	16.743	5.807	0.615	4.425	0.021

1993	7.955	17.212	5.457	0.627	4.496	0.021
1994	8.345	17.558	5.368	0.635	4.548	0.021
1995	8.352	17.687	5.529	0.633	4.567	0.022
1996	8.077	17.565	5.441	0.625	4.545	0.022
1997	7.894	17.227	5.391	0.618	4.539	0.022
1998	7.991	17.36	5.415	0.618	4.558	0.022
1999	8.06	17.465	5.43	0.617	4.574	0.022
2000	8.156	17.591	5.453	0.617	4.591	0.022
2001	8.251	17.732	5.482	0.617	4.561	0.022
2002	8.361	17.89	5.516	0.618	4.404	0.022
2003	8.493	18.072	5.56	0.619	4.432	0.022
2004	8.636	18.264	5.606	0.62	4.46	0.023
2005	8.79	18.467	5.659	0.622	4.49	0.023
2006	8.953	18.679	5.713	0.623	4.522	0.023
2007	9.126	18.899	5.771	0.625	4.555	0.023
2008	9.308	19.128	5.832	0.627	4.589	0.024
2009	9.493	19.357	5.895	0.629	4.624	0.024
2010	9.69	19.599	5.961	0.632	4.661	0.024

	B.17	B.18	B.21	B.24	B.25	B.26
1981	0.683	0.335	0.285	0.161	0.028	1.123
1982	0.77	0.348	0.297	0.173	0.03	1.281
1983	0.893	0.365	0.318	0.177	0.031	1.252
1984	0.896	0.435	0.32	0.177	0.031	1.295
1985	0.84	0.551	0.335	0.183	0.032	1.355
1986	0.876	0.561	0.348	0.188	0.034	1.411
1987	0.905	0.569	0.357	0.192	0.034	1.465
1988	0.906	0.502	0.359	0.192	0.035	1.507
1989	0.908	0.4	0.363	0.191	0.035	1.549
1990	0.938	0.409	0.373	0.195	0.036	1.603
1991	0.942	0.411	0.374	0.195	0.036	1.646
1992	1.002	0.429	0.396	0.204	0.038	1.712
1993	1.069	0.445	0.415	0.213	0.039	1.783
1994	1.113	0.457	0.428	0.218	0.04	1.845
1995	1.117	0.458	0.431	0.218	0.041	1.887
1996	1.082	0.449	0.421	0.212	0.04	1.915
1997	1.06	0.445	0.416	0.209	0.04	1.946
1998	1.07	0.447	0.418	0.209	0.04	1.992
1999	1.074	0.449	0.42	0.208	0.04	2.036
2000	1.082	0.451	0.423	0.208	0.04	2.081
2001	1.092	0.455	0.426	0.209	0.04	2.127
2002	1.104	0.458	0.429	0.209	0.04	2.173
2003	1.119	0.463	0.434	0.211	0.041	2.221
2004	1.135	0.468	0.44	0.212	0.041	2.269
2005	1.153	0.474	0.446	0.214	0.042	2.318
2006	1.172	0.48	0.452	0.216	0.043	2.368
2007	1.192	0.487	0.46	0.218	0.043	2.417

2008	1.213	0.494	0.467	0.221	0.044	2.467
2009	1.234	0.5	0.474	0.223	0.045	2.517
2010	1.256	0.508	0.482	0.226	0.045	2.568

	B.27	B.29	BETA	B01	B02	B04
1981	0.244	0.916	0.363	2.282	4.033	4.687
1982	0.2	0.86	0.366	1.833	4.328	5.595
1983	0.242	0.89	0.37	2.254	4.826	6.973
1984	0.242	0.888	0.378	2.462	5.227	6.249
1985	0.243	0.877	0.378	2.777	5.537	7.509
1986	0.244	0.887	0.379	3.38	5.747	7.932
1987	0.245	0.897	0.378	3.606	5.794	8.577
1988	0.245	0.894	0.38	3.751	5.839	8.988
1989	0.245	0.891	0.383	3.896	5.885	9.487
1990	0.246	0.899	0.385	3.153	5.935	11.918
1991	0.245	0.899	0.39	2.963	5.99	9.671
1992	0.248	0.918	0.39	6.683	6.047	12.157
1993	0.25	0.946	0.396	7.305	6.106	9.509
1994	0.252	0.963	0.401	4.691	6.21	10.516
1995	0.251	0.96	0.405	5.256	6.308	9.353
1996	0.25	0.942	0.411	5.562	6.399	9.273
1997	0.248	0.929	0.41	5.716	6.495	9.463
1998	0.248	0.931	0.412	5.692	6.6	9.058
1999	0.248	0.931	0.416	5.619	6.724	8.936
2000	0.248	0.932	0.42	5.452	6.83	8.928
2001	0.248	0.934	0.425	5.124	6.877	8.947
2002	0.248	0.937	0.43	5.012	6.924	8.948
2003	0.249	0.94	0.435	5.012	6.971	9.107
2004	0.249	0.944	0.44	5.012	7.021	9.117
2005	0.249	0.949	0.445	5.013	7.07	9.127
2006	0.25	0.954	0.451	5.013	7.119	9.137
2007	0.25	0.959	0.456	5.013	7.168	9.069
2008	0.251	0.965	0.462	5.013	7.219	9.053
2009	0.251	0.971	0.467	5.013	7.269	8.81
2010	0.252	0.977	0.473	5.014	7.322	8.821

	B05	B06	B08	B09	B11	B12
1981	0.282	1.671	0.824	0.349	6.429	2.085
1982	0.225	1.327	0.668	0.35	5.929	1.818
1983	0.275	1.63	0.802	0.359	7.005	2.033
1984	0.275	1.63	0.803	0.369	7.343	2.102
1985	0.275	1.63	0.887	0.378	7.629	2.472
1986	0.275	1.63	0.994	0.387	7.76	2.556
1987	0.275	1.63	1.086	0.398	8.113	2.133
1988	0.275	1.63	1.073	0.41	8.235	2.307

1989	0.276	1.63	1.036	0.423	8.272	2.803
1990	0.276	1.63	1.036	0.437	8.309	2.938
1991	0.276	1.63	1.037	0.452	8.3	3.022
1992	0.276	1.63	1.037	0.47	8.292	2.957
1993	0.276	1.63	1.038	0.489	8.283	2.431
1994	0.276	1.63	1.039	0.508	8.275	2.216
1995	0.276	1.63	1.039	0.53	8.266	2.364
1996	0.276	1.63	1.04	0.554	8.258	2.351
1997	0.276	1.63	1.04	0.58	7.935	2.337
1998	0.276	1.63	1.041	0.609	7.927	2.324
1999	0.276	1.63	1.042	0.64	7.919	2.312
2000	0.276	1.63	1.019	0.677	7.911	2.3
2001	0.276	1.63	0.974	0.696	7.903	2.289
2002	0.276	1.63	0.952	0.716	7.896	2.277
2003	0.276	1.63	0.929	0.736	7.888	2.266
2004	0.276	1.63	0.907	0.759	7.88	2.255
2005	0.276	1.63	0.885	0.781	7.873	2.246
2006	0.276	1.63	0.816	0.805	7.866	2.235
2007	0.276	1.63	0.817	0.83	7.858	2.225
2008	0.276	1.63	0.818	0.857	7.851	2.215
2009	0.277	1.63	0.818	0.886	7.844	2.207
2010	0.277	1.63	0.819	0.914	7.837	2.197

	B14	B15	B16	B17	B18	B21
1981	0.071	3.24	0.008	0.117	0.154	0.089
1982	0.062	2.642	0.008	0.118	0.144	0.075
1983	0.07	3.514	0.008	0.219	0.155	0.087
1984	0.18	3.357	0.008	0.22	0.224	0.087
1985	0.216	3.162	0.008	0.121	0.329	0.087
1986	0.271	3.162	0.008	0.123	0.33	0.087
1987	0.216	3.463	0.008	0.124	0.331	0.087
1988	0.493	3.565	0.008	0.125	0.264	0.088
1989	0.493	3.247	0.009	0.126	0.161	0.09
1990	0.493	3.163	0.009	0.128	0.162	0.09
1991	0.493	3.163	0.009	0.13	0.163	0.09
1992	0.493	3.163	0.009	0.131	0.164	0.09
1993	0.493	3.163	0.009	0.132	0.166	0.09
1994	0.493	3.163	0.009	0.133	0.167	0.091
1995	0.493	3.164	0.009	0.135	0.168	0.091
1996	0.493	3.164	0.009	0.136	0.169	0.091
1997	0.493	3.164	0.009	0.137	0.17	0.091
1998	0.493	3.164	0.009	0.139	0.171	0.091
1999	0.493	3.165	0.009	0.14	0.172	0.093
2000	0.493	3.165	0.009	0.141	0.174	0.093
2001	0.493	3.115	0.009	0.143	0.175	0.093
2002	0.493	2.935	0.009	0.144	0.176	0.093
2003	0.493	2.936	0.009	0.146	0.177	0.094

2004	0.493	2.936	0.009	0.147	0.178	0.094
2005	0.493	2.937	0.009	0.148	0.18	0.094
2006	0.493	2.937	0.009	0.15	0.181	0.094
2007	0.493	2.938	0.009	0.151	0.182	0.095
2008	0.494	2.938	0.009	0.153	0.183	0.096
2009	0.494	2.939	0.01	0.154	0.185	0.096
2010	0.494	2.94	0.01	0.155	0.186	0.096

	B24	B25	B26	B27	B29	G.01
1981	0.079	0.01	0.374	0.226	0.732	3.293
1982	0.079	0.01	0.453	0.179	0.643	3.348
1983	0.079	0.01	0.373	0.22	0.668	3.348
1984	0.079	0.011	0.373	0.22	0.669	3.354
1985	0.079	0.011	0.373	0.22	0.645	3.382
1986	0.079	0.011	0.373	0.22	0.646	3.405
1987	0.079	0.011	0.373	0.22	0.647	3.419
1988	0.079	0.011	0.373	0.22	0.648	3.43
1989	0.079	0.011	0.374	0.22	0.649	3.441
1990	0.079	0.011	0.374	0.22	0.65	3.454
1991	0.079	0.011	0.374	0.22	0.651	3.464
1992	0.079	0.011	0.374	0.22	0.652	3.485
1993	0.079	0.012	0.374	0.22	0.653	3.493
1994	0.079	0.012	0.374	0.22	0.654	3.502
1995	0.079	0.012	0.374	0.22	0.655	3.52
1996	0.079	0.012	0.374	0.22	0.656	3.49
1997	0.079	0.012	0.374	0.22	0.657	3.513
1998	0.079	0.012	0.374	0.22	0.658	3.512
1999	0.079	0.012	0.374	0.22	0.659	3.499
2000	0.079	0.012	0.374	0.22	0.66	3.487
2001	0.079	0.013	0.374	0.22	0.661	3.479
2002	0.079	0.013	0.374	0.22	0.663	3.473
2003	0.079	0.013	0.374	0.22	0.664	3.468
2004	0.079	0.013	0.374	0.22	0.665	3.465
2005	0.079	0.013	0.374	0.22	0.666	3.463
2006	0.079	0.013	0.374	0.22	0.667	3.463
2007	0.079	0.013	0.374	0.22	0.668	3.463
2008	0.079	0.013	0.374	0.22	0.669	3.464
2009	0.079	0.014	0.375	0.22	0.67	3.465
2010	0.079	0.014	0.375	0.22	0.672	3.467

	G.02	G.04	G.05	G.06	G.08	G.09
1981	35.071	1.632	1.444	1.257	0.367	13.25
1982	36.632	1.777	1.556	1.332	0.396	13.841
1983	36.559	1.766	1.549	1.327	0.393	13.805
1984	36.682	1.775	1.556	1.332	0.395	13.846

1985	37.518	1.855	1.618	1.373	0.411	14.169
1986	38.189	1.919	1.667	1.406	0.424	14.427
1987	38.586	1.955	1.695	1.425	0.431	14.576
1988	38.865	1.98	1.714	1.438	0.436	14.678
1989	39.139	2.003	1.733	1.45	0.441	14.779
1990	39.479	2.034	1.757	1.466	0.447	14.905
1991	39.733	2.056	1.774	1.478	0.451	14.998
1992	40.356	2.115	1.82	1.508	0.463	15.236
1993	40.529	2.128	1.831	1.515	0.466	15.297
1994	40.755	2.147	1.846	1.525	0.47	15.378
1995	41.264	2.194	1.883	1.55	0.479	15.572
1996	40.249	2.088	1.805	1.496	0.458	15.162
1997	40.92	2.152	1.854	1.529	0.47	15.419
1998	40.802	2.136	1.843	1.521	0.467	15.364
1999	40.316	2.083	1.805	1.494	0.456	15.163
2000	39.883	2.035	1.77	1.47	0.447	14.983
2001	39.547	1.998	1.743	1.452	0.439	14.842
2002	39.279	1.967	1.721	1.436	0.433	14.727
2003	39.062	1.941	1.703	1.423	0.427	14.633
2004	38.895	1.92	1.689	1.413	0.423	14.558
2005	38.77	1.903	1.677	1.405	0.42	14.5
2006	38.677	1.89	1.669	1.398	0.417	14.455
2007	38.611	1.879	1.662	1.393	0.414	14.42
2008	38.57	1.871	1.657	1.389	0.413	14.395
2009	38.543	1.864	1.653	1.386	0.411	14.376
2010	38.534	1.859	1.651	1.384	0.41	14.363

	G.11	G.12	G.14	G.15	G.16	G.17
1981	11.841	1.612	0.996	2.133	0.463	1.454
1982	12.782	1.762	1.076	2.236	0.499	1.58
1983	12.716	1.75	1.07	2.229	0.496	1.569
1984	12.776	1.758	1.076	2.236	0.499	1.576
1985	13.295	1.843	1.119	2.293	0.518	1.647
1986	13.708	1.909	1.154	2.338	0.534	1.703
1987	13.945	1.947	1.174	2.364	0.543	1.734
1988	14.105	1.972	1.188	2.382	0.549	1.755
1989	14.261	1.996	1.201	2.399	0.555	1.775
1990	14.461	2.028	1.218	2.421	0.562	1.801
1991	14.604	2.05	1.23	2.437	0.568	1.82
1992	14.986	2.111	1.263	2.479	0.582	1.871
1993	15.077	2.125	1.271	2.489	0.585	1.883
1994	15.202	2.144	1.281	2.503	0.59	1.899
1995	15.51	2.194	1.307	2.536	0.602	1.94
1996	14.835	2.08	1.251	2.463	0.576	1.846
1997	15.247	2.147	1.286	2.508	0.592	1.901
1998	15.15	2.129	1.278	2.497	0.588	1.887
1999	14.815	2.072	1.25	2.461	0.575	1.839

2000	14.515	2.021	1.225	2.428	0.564	1.796
2001	14.277	1.98	1.205	2.402	0.554	1.762
2002	14.083	1.946	1.189	2.381	0.547	1.734
2003	13.922	1.918	1.176	2.364	0.541	1.711
2004	13.792	1.895	1.166	2.349	0.536	1.692
2005	13.69	1.877	1.157	2.338	0.532	1.676
2006	13.608	1.861	1.151	2.33	0.529	1.664
2007	13.544	1.849	1.146	2.323	0.526	1.654
2008	13.496	1.84	1.142	2.317	0.524	1.646
2009	13.456	1.831	1.139	2.313	0.523	1.639
2010	13.428	1.825	1.137	2.31	0.521	1.634

	G.18	G.21	G.24	G.25	G.26	G.27
1981	1.054	0.419	1.673	0.323	1.008	0.637
1982	1.142	0.455	1.73	0.351	1.103	0.69
1983	1.136	0.452	1.727	0.348	1.095	0.686
1984	1.141	0.454	1.731	0.35	1.1	0.689
1985	1.191	0.474	1.762	0.365	1.154	0.718
1986	1.23	0.49	1.786	0.377	1.196	0.742
1987	1.252	0.499	1.8	0.384	1.22	0.755
1988	1.267	0.505	1.81	0.389	1.236	0.764
1989	1.281	0.511	1.82	0.393	1.251	0.772
1990	1.3	0.518	1.832	0.399	1.271	0.784
1991	1.314	0.524	1.841	0.403	1.285	0.792
1992	1.35	0.538	1.864	0.414	1.324	0.813
1993	1.358	0.542	1.87	0.417	1.332	0.818
1994	1.37	0.546	1.878	0.42	1.344	0.825
1995	1.399	0.558	1.897	0.429	1.375	0.842
1996	1.334	0.532	1.86	0.409	1.303	0.804
1997	1.373	0.548	1.884	0.421	1.346	0.827
1998	1.364	0.544	1.88	0.418	1.334	0.822
1999	1.332	0.531	1.862	0.408	1.298	0.803
2000	1.303	0.519	1.846	0.399	1.265	0.787
2001	1.28	0.51	1.834	0.391	1.239	0.773
2002	1.261	0.502	1.824	0.385	1.218	0.762
2003	1.245	0.496	1.816	0.38	1.2	0.753
2004	1.233	0.491	1.81	0.376	1.185	0.746
2005	1.223	0.487	1.805	0.373	1.173	0.74
2006	1.215	0.484	1.802	0.37	1.163	0.736
2007	1.208	0.481	1.799	0.368	1.156	0.732
2008	1.203	0.479	1.797	0.367	1.149	0.73
2009	1.199	0.477	1.796	0.365	1.144	0.727
2010	1.196	0.476	1.796	0.364	1.14	0.726

	G.29	G01	G02	G04	G05	G06
1981	1.258	2.866	21.439	0.259	0.417	0.557
1982	1.323	2.878	21.602	0.263	0.424	0.56
1983	1.319	2.881	21.651	0.265	0.426	0.561
1984	1.324	2.885	21.7	0.266	0.428	0.562
1985	1.359	2.888	21.749	0.267	0.43	0.563
1986	1.387	2.892	21.798	0.268	0.432	0.564
1987	1.404	2.895	21.848	0.27	0.434	0.565
1988	1.415	2.899	21.898	0.271	0.436	0.566
1989	1.426	2.903	21.948	0.272	0.438	0.567
1990	1.44	2.906	21.998	0.273	0.441	0.568
1991	1.45	2.91	22.049	0.275	0.443	0.569
1992	1.476	2.914	22.1	0.276	0.445	0.57
1993	1.483	2.917	22.151	0.277	0.447	0.571
1994	1.492	2.921	22.203	0.279	0.449	0.572
1995	1.513	2.925	22.254	0.28	0.451	0.573
1996	1.468	2.928	22.306	0.281	0.454	0.574
1997	1.496	2.932	22.358	0.283	0.456	0.575
1998	1.49	2.936	22.411	0.284	0.458	0.576
1999	1.468	2.94	22.464	0.285	0.46	0.577
2000	1.449	2.944	22.517	0.287	0.462	0.578
2001	1.433	2.947	22.57	0.288	0.465	0.579
2002	1.421	2.951	22.623	0.289	0.467	0.58
2003	1.41	2.955	22.677	0.291	0.469	0.581
2004	1.402	2.959	22.731	0.292	0.471	0.582
2005	1.396	2.963	22.786	0.293	0.474	0.583
2006	1.391	2.967	22.84	0.295	0.476	0.584
2007	1.387	2.971	22.895	0.296	0.478	0.585
2008	1.384	2.975	22.95	0.298	0.481	0.587
2009	1.382	2.979	23.006	0.299	0.483	0.588
2010	1.381	2.983	23.061	0.3	0.485	0.589

	G08	G09	G11	G12	G14	G15
1981	0.089	7.855	3.048	0.158	0.259	1.171
1982	0.089	7.893	3.088	0.16	0.263	1.176
1983	0.09	7.905	3.1	0.16	0.265	1.177
1984	0.09	7.917	3.112	0.161	0.266	1.178
1985	0.09	7.928	3.124	0.161	0.267	1.18
1986	0.09	7.94	3.136	0.162	0.268	1.181
1987	0.09	7.952	3.149	0.162	0.27	1.183
1988	0.091	7.964	3.161	0.163	0.271	1.184
1989	0.091	7.976	3.173	0.163	0.272	1.186
1990	0.091	7.988	3.186	0.164	0.273	1.187
1991	0.091	8.	3.198	0.165	0.275	1.189
1992	0.091	8.012	3.211	0.165	0.276	1.19
1993	0.091	8.024	3.223	0.166	0.277	1.192

1994	0.092	8.036	3.236	0.166	0.279	1.193
1995	0.092	8.048	3.249	0.167	0.28	1.195
1996	0.092	8.061	3.262	0.167	0.281	1.196
1997	0.092	8.073	3.274	0.168	0.283	1.198
1998	0.092	8.086	3.287	0.168	0.284	1.199
1999	0.093	8.098	3.3	0.169	0.285	1.201
2000	0.093	8.111	3.313	0.17	0.287	1.202
2001	0.093	8.123	3.327	0.17	0.288	1.204
2002	0.093	8.136	3.34	0.171	0.289	1.205
2003	0.093	8.149	3.353	0.171	0.291	1.207
2004	0.094	8.162	3.366	0.172	0.292	1.209
2005	0.094	8.175	3.38	0.172	0.293	1.21
2006	0.094	8.188	3.393	0.173	0.295	1.212
2007	0.094	8.201	3.407	0.174	0.296	1.213
2008	0.094	8.214	3.42	0.174	0.298	1.215
2009	0.095	8.227	3.434	0.175	0.299	1.217
2010	0.095	8.24	3.448	0.175	0.3	1.218

	G16	G17	G18	G21	G24	G25
1981	0.129	0.242	0.216	0.081	1.178	0.061
1982	0.131	0.244	0.219	0.082	1.184	0.062
1983	0.131	0.244	0.22	0.082	1.185	0.062
1984	0.131	0.245	0.221	0.083	1.187	0.062
1985	0.132	0.245	0.222	0.083	1.189	0.063
1986	0.132	0.246	0.223	0.083	1.19	0.063
1987	0.133	0.246	0.224	0.084	1.192	0.063
1988	0.133	0.247	0.225	0.084	1.194	0.063
1989	0.133	0.247	0.225	0.084	1.196	0.063
1990	0.134	0.248	0.226	0.085	1.197	0.063
1991	0.134	0.248	0.227	0.085	1.199	0.064
1992	0.135	0.249	0.228	0.085	1.201	0.064
1993	0.135	0.249	0.229	0.086	1.203	0.064
1994	0.135	0.25	0.23	0.086	1.204	0.064
1995	0.136	0.25	0.231	0.087	1.206	0.064
1996	0.136	0.251	0.232	0.087	1.208	0.064
1997	0.137	0.251	0.233	0.087	1.21	0.065
1998	0.137	0.252	0.234	0.088	1.211	0.065
1999	0.137	0.252	0.235	0.088	1.213	0.065
2000	0.138	0.253	0.236	0.088	1.215	0.065
2001	0.138	0.253	0.237	0.089	1.217	0.065
2002	0.139	0.254	0.238	0.089	1.219	0.066
2003	0.139	0.254	0.239	0.09	1.221	0.066
2004	0.14	0.255	0.24	0.09	1.223	0.066
2005	0.14	0.255	0.241	0.09	1.224	0.066
2006	0.14	0.256	0.242	0.091	1.226	0.066
2007	0.141	0.256	0.243	0.091	1.228	0.067

2008	0.141	0.257	0.244	0.091	1.23	0.067
2009	0.142	0.258	0.245	0.092	1.232	0.067
2010	0.142	0.258	0.246	0.092	1.234	0.067

	G26	G27	G29	HH	POP
1981	0.086	0.146	0.666	138.788	419.589
1982	0.087	0.148	0.671	145.453	437.175
1983	0.087	0.149	0.672	153.141	457.836
1984	0.087	0.15	0.673	159.154	473.752
1985	0.087	0.15	0.674	165.301	490.154
1986	0.088	0.151	0.676	171.204	505.917
1987	0.088	0.152	0.677	175.647	517.508
1988	0.088	0.152	0.678	179.336	526.964
1989	0.088	0.153	0.68	183.162	536.859
1990	0.089	0.154	0.681	188.149	550.151
1991	0.089	0.154	0.682	191.007	557.251
1992	0.089	0.155	0.684	199.022	579.38
1993	0.089	0.156	0.685	204.818	594.991
1994	0.089	0.157	0.686	209.452	607.199
1995	0.09	0.157	0.688	213.596	617.971
1996	0.09	0.158	0.689	215.035	620.838
1997	0.09	0.159	0.691	217.518	626.791
1998	0.09	0.159	0.692	219.915	632.498
1999	0.091	0.16	0.693	221.834	636.808
2000	0.091	0.161	0.695	223.854	641.432
2001	0.091	0.162	0.696	225.958	646.314
2002	0.091	0.162	0.698	228.285	651.863
2003	0.092	0.163	0.699	230.976	658.498
2004	0.092	0.164	0.7	233.864	665.723
2005	0.092	0.165	0.702	236.948	673.537
2006	0.092	0.165	0.703	240.217	681.909
2007	0.093	0.166	0.705	243.684	690.874
2008	0.093	0.167	0.706	247.373	700.507
2009	0.093	0.168	0.708	251.154	710.42
2010	0.093	0.168	0.709	255.211	721.159

M.2. Startup Value for 1980 and 1981

M.01	1980	0.	NA
M.02	1980	0.001	NA
M.03	1980	0.	NA
M.04	1980	0.	NA
M.05	1980	0.	NA
M.06	1980	0.	NA
M.07	1980	0.	NA
M.08	1980	0.	NA
M.09	1980	0.	NA
M.10	1980	0.	NA
M.11	1980	0.	NA
M.12	1980	0.	NA
M.13	1980	0.	NA
M.14	1980	0.	NA
M.15	1980	0.	NA
M.16	1980	0.	NA
M.17	1980	0.	NA
M.18	1980	0.	NA
M.19	1980	0.	NA
M.20	1980	0.	NA
M.21	1980	0.	NA
M.22	1980	0.	NA
M.23	1980	0.	NA
M.24	1980	0.	NA
M.25	1980	0.	NA
M.26	1980	0.	NA
M.27	1980	0.	NA
M.28	1980	0.	NA
M.29	1980	0.	NA
PCEN.06	1980	1.	1.

SOURCE: dset A83.CD.

APPENDIX N
ISER MAP MODEL OUTPUT FOR HARZA-EBASCO SUSITNA JOINT VENTURE

Institute of Social
and Economic Research
MAP Documentation
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APPENDIX N
ISER MAP MODEL OUTPUT FOR HARZA-EBASCO SUSITNA JOINT VENTURE

The first six tables in this appendix present selected output from six simulations using the MAP state and regionalization models. The final table presents historical data for the same variables for purposes of comparison. Each table is divided into six parts as follows:

Part	Content
A	State petroleum revenue assumptions
B	Selected state expenditure variables
C	Model output used as input to end use (RED) model: employment
D	Model output used as input to end use (RED) model: population
E	Model output used as input to end use (RED) model: households
F	Model output used as input to end use (RED) model: households

Each simulation uses the same models, parameters, input variables, and economic and fiscal scenarios except as indicated below. The models, parameters, and input variables are presented elsewhere in this technical documentation report. The economic and fiscal scenarios are also described in a separate appendix in the technical documentation report.

The economic scenario is a "most likely" case.

The fiscal scenario assumes that state government will spend according to the guidelines of the constitutionally defined spending limit when revenues and the general fund balance allow it. When the availability of funds precludes this level of spending, cuts occur in the capital and operating budgets, while the capital budget falls from 33 percent to 25 percent of the total. The state subsidy part of the capital budget is eliminated and replaced with regular capital spending. No change occurs in the portion of capital expenditures funded by bonds. Contraction of the state operating budget automatically contracts state-local transfers for education and other programs. If spending permanently falls below the limit, the Permanent Fund Dividend program is eliminated and all of the Fund earnings are transferred to the General Fund. The state personal income tax is reimposed using the schedule in place during the 1970s. All of these fiscal adjustments occur automatically with the exception of three, as follows, and which are determined by the user:

1. Setting the level of state subsidy programs (EXSUBS1).

2. Determining the existence of Permanent Fund Dividend program (EXPFDIST)

3. Determining the existence of reinvestment of Permanent Fund earnings (EXPFBAK)

The values for these variables are chosen by rerunning each simulation while monitoring the general fund balance. When the balance falls near zero, the Permanent Fund distribution program is eliminated, and two years later all Permanent Fund earnings begin to be transferred to the General Fund. If this occurs after 1988, state subsidies are automatically eliminated. If it occurs earlier, the user must override the schedule of subsidy payments set through 1987.

Differences among simulations occur in three components of petroleum revenues--royalties, severance taxes, and corporate income taxes. Royalties and severance taxes in each simulation come from Harza-Ebasco. These series are based upon petroleum price assumptions run through the state of Alaska petroleum revenue impact model to calculate revenues. Corporate income taxes are assumed in each simulation to be the same ratio of a base case as severance taxes. The base case is the level of revenues assumed to be consistent with the state Department of Revenue 50 percent petroleum revenue projections for royalties and severance taxes. Petroleum revenues are extrapolated beyond 1999 using the growth rate over the interval 1996 to 1999. The petroleum revenues are consistent with a 6.5 percent annual inflation rate which, consequently, is used in all six simulations.

In sum, six input variables differ among these simulations as follows:

RPRY	Petroleum royalties
RPTS	Petroleum severance taxes
RTCSPX	Petroleum corporate income taxes
EXSUBS1	Level of state subsidies through 1987
EXPFDIST	Policy switch for Permanent Fund Distribution Program
EXPFBAK	Policy switch to direct Permanent Fund earnings into General Fund

TABLE N.1. SIMULATION CASE: 2% ANNUAL DECLINE IN OIL PRICE
Part A
State Petroleum Revenues
(Million $)

	Royalties	Severance Taxes	Corporate Income Taxes	Property Taxes	TOTAL Including Bonuses and Federal Shared Royalties	Total to General Fund (Net of Permanent Fund Contribution)
1982	1530.000	1590.000	668.900	142.700	3960.200	3570.550
1983	1456.661	1473.507	233.969	148.600	3361.836	2985.396
1984	1508.173	1532.724	341.722	153.200	3570.885	3185.075
1985	1701.177	1705.368	399.272	158.000	3993.510	3560.792
1986	1831.367	1808.988	422.968	163.456	4254.766	3789.927
1987	1973.556	1932.379	456.399	169.101	4559.277	4058.927
1988	2001.545	1949.115	469.589	174.940	4623.543	4116.066
1989	2109.927	1740.979	487.832	180.981	4548.867	4014.098
1990	2176.395	1786.434	520.520	187.231	4700.641	4149.023
1991	2036.216	1610.733	579.751	193.697	4451.422	3934.611
1992	1978.438	1512.403	622.983	200.385	4346.219	3843.606
1993	1971.635	1476.211	674.086	207.305	4362.242	3861.082
1994	1929.960	1414.667	703.884	214.464	4296.977	3805.986
1995	1778.028	1253.217	727.250	221.870	4015.365	3562.108
1996	1659.199	1107.354	755.589	229.532	3787.674	3363.874
1997	1675.236	1125.503	804.059	237.458	3879.256	3451.197
1998	1662.242	1089.805	851.364	245.658	3887.068	3462.008
1999	1636.990	1026.704	908.109	254.141	3864.944	3445.947
2000	1630.442	1001.036	965.438	262.917	3899.833	3482.223
2001	1623.920	976.010	1026.386	271.996	3939.313	3523.083
2002	1617.424	951.610	1091.183	281.389	3983.605	3568.750
2003	1610.954	927.820	1160.069	291.106	4032.949	3619.460
2004	1604.510	904.624	1233.304	301.158	4087.597	3675.469
2005	1598.092	882.008	1311.164	311.558	4147.820	3737.047
2006	1591.700	859.958	1393.938	322.317	4213.910	3804.485
2007	1585.333	838.459	1481.938	333.447	4286.176	3878.093
2008	1578.991	817.498	1575.492	344.962	4364.941	3958.194
2009	1572.675	797.060	1674.953	356.874	4450.563	4045.144
2010	1566.384	777.133	1780.695	369.198	4543.410	4139.313

SOURCE: MAP MODEL OUTPUT FILES HE.8 AND HER.8
VARIABLES: RPRY, RPTS, RTCSPX, RPPS, RP9S, AND RP9SGF

TABLE N.1. SIMULATION CASE: 2% ANNUAL DECLINE IN OIL PRICE
Part B
State Government Expenditures
(Million $)

	Unrestricted General Fund Expenditures	General Fund Balance	Permanent Fund Dividends	State Personal Income Tax	State Subsidy Programs	Percent of Permanent Fund Earnings Reinvested
1982	4601.891	399.200	425.000	0.000	634.000	0.000
1983	3287.977	486.305	152.608	0.000	500.000	0.500
1984	3389.729	741.117	196.738	0.000	350.000	0.500
1985	3700.205	1123.496	224.409	0.000	350.000	0.500
1986	4033.571	1487.867	255.622	0.000	350.000	0.500
1987	4379.844	1861.578	289.844	0.000	350.000	0.500
1988	4736.676	2024.793	327.378	0.000	695.528	0.500
1989	5110.898	1784.977	367.033	0.000	750.555	0.500
1990	5536.277	1296.852	409.869	0.000	0.000	0.500
1991	5534.566	636.348	0.000	0.000	0.000	0.500
1992	5081.215	636.359	0.000	292.164	0.000	0.500
1993	6042.754	636.379	0.000	586.240	0.000	0.000
1994	6095.320	636.398	0.000	634.880	0.000	0.000
1995	5953.105	636.398	0.000	674.155	0.000	0.000
1996	5867.332	636.422	0.000	722.490	0.000	0.000
1997	6078.984	636.445	0.000	778.900	0.000	0.000
1998	6221.434	636.469	0.000	839.393	0.000	0.000
1999	6340.441	636.488	0.000	903.787	0.000	0.000
2000	6521.238	636.508	0.000	974.693	0.000	0.000
2001	6715.750	636.527	0.000	1051.732	0.000	0.000
2002	6923.633	636.551	0.000	1135.767	0.000	0.000
2003	7149.676	636.574	0.000	1229.285	0.000	0.000
2004	7396.832	636.598	0.000	1331.685	0.000	0.000
2005	7660.422	636.625	0.000	1442.191	0.000	0.000
2006	7943.316	636.656	0.000	1561.895	0.000	0.000
2007	8246.219	636.688	0.000	1691.311	0.000	0.000
2008	8570.668	636.723	0.000	1831.145	0.000	0.000
2009	8917.000	636.758	0.000	1980.322	0.000	0.000
2010	9285.110	636.793	0.000	2141.362	0.000	0.000

SOURCE: MAP MODEL OUTPUT FILES HE.8 AND HER.8
VARIABLES: EXGFBM, BALGF, EXTRNS, RTIS, EXSUBS, AND EXPFBAK

TABLE N.1. SIMULATION CASE: 2% ANNUAL DECLINE IN OIL PRICE
Part C
Employment
(Thousands)

	State Non-ag Wage and Salary	State Total	Railbelt Total	Greater Anchorage Total	Greater Fairbanks Total
1982	192.903	231.984	154.033	120.533	33.500
1983	202.237	243.067	159.147	125.221	33.927
1984	205.903	246.984	162.259	127.853	34.406
1985	216.616	258.401	169.200	133.671	35.529
1986	225.533	267.914	174.833	138.336	36.497
1987	230.869	273.619	177.441	140.369	37.072
1988	234.713	277.728	179.468	142.103	37.365
1989	238.423	281.713	182.354	144.621	37.733
1990	247.535	291.431	188.768	149.964	38.803
1991	247.834	291.765	191.015	151.584	39.431
1992	258.320	302.962	195.175	155.613	39.561
1993	257.450	302.060	195.200	155.216	39.983
1994	255.676	300.202	194.554	154.452	40.102
1995	254.940	299.458	194.711	154.665	40.046
1996	255.545	300.154	195.298	155.235	40.062
1997	257.016	301.787	196.820	156.547	40.273
1998	257.977	302.893	198.290	157.779	40.512
1999	259.498	304.617	200.043	159.260	40.783
2000	261.528	306.835	202.130	160.985	41.145
2001	263.653	309.101	204.376	162.824	41.552
2002	266.116	311.729	206.858	164.863	41.995
2003	269.510	315.349	209.729	167.260	42.470
2004	273.227	319.314	212.969	169.935	43.033
2005	277.327	323.689	216.510	172.854	43.657
2006	281.729	328.387	220.341	176.001	44.340
2007	286.434	333.411	224.409	179.332	45.077
2008	291.490	338.810	228.724	182.867	45.857
2009	296.473	344.133	233.157	186.468	46.689
2010	301.986	350.023	237.835	190.297	47.538

SOURCE: MAP MODEL OUTPUT FILES HE.8 AND HER.8
VARIABLES: EM97, EM99, M.IR, M.AG, AND M.FG

TABLE N.1. SIMULATION CASE: 2% ANNUAL DECLINE IN OIL PRICE
Part D
Population
(Thousands)

	State	Railbelt	Greater Anchorage	Greater Fairbanks
1982	437.175	307.105	239.830	67.277
1983	457.836	319.767	251.057	68.711
1984	473.752	330.202	259.679	70.523
1985	490.151	341.616	269.303	72.314
1986	505.904	352.204	278.096	74.108
1987	517.473	359.091	283.363	75.729
1988	526.895	364.643	288.018	76.625
1989	536.735	372.631	294.858	77.774
1990	551.818	385.935	305.669	80.266
1991	559.661	392.000	310.373	81.627
1992	575.511	401.516	319.260	82.256
1993	583.065	404.208	320.779	83.429
1994	586.305	407.908	322.943	84.965
1995	589.214	409.758	324.746	85.012
1996	593.511	412.953	327.499	85.454
1997	598.565	417.538	331.323	86.215
1998	603.148	421.495	334.617	86.879
1999	608.044	425.801	338.208	87.594
2000	613.390	430.535	342.082	88.453
2001	618.775	435.480	346.091	89.390
2002	624.542	440.667	350.329	90.339
2003	631.361	446.405	355.093	91.313
2004	638.750	452.564	360.179	92.386
2005	646.708	459.156	365.615	93.541
2006	655.240	466.250	371.446	94.804
2007	664.376	473.703	377.565	96.139
2008	674.189	481.681	384.109	97.573
2009	684.287	489.845	390.770	99.076
2010	695.204	498.676	397.999	100.678

SOURCE: MAP MODEL OUTPUT FILES HE.8 AND HER.8
VARIABLES: POP, P.IR, P.AG, AND P.FG

TABLE N.1. SIMULATION CASE: 2% ANNUAL DECLINE IN OIL PRICE
Part E
Households
(Thousands)

	State	Railbelt	Greater Anchorage	Greater Fairbanks
1982	145.453	106.572	83.678	22.894
1983	153.141	111.549	88.038	23.511
1984	159.154	115.671	91.425	24.246
1985	165.300	120.141	95.167	24.975
1986	171.199	124.281	98.585	25.696
1987	175.635	127.066	100.720	26.346
1988	179.312	129.436	102.686	26.750
1989	183.119	132.550	105.331	27.219
1990	188.723	137.567	109.392	28.175
1991	191.839	139.948	111.236	28.712
1992	197.699	143.740	114.733	29.007
1993	200.720	145.004	115.513	29.491
1994	202.255	146.603	116.495	30.108
1995	203.668	147.521	117.346	30.174
1996	205.549	148.931	118.545	30.386
1997	207.685	150.845	120.130	30.715
1998	209.658	152.501	121.498	31.002
1999	211.733	154.282	122.974	31.308
2000	213.957	156.215	124.549	31.666
2001	216.190	158.219	126.167	32.053
2002	218.546	160.306	127.864	32.442
2003	221.254	162.588	129.750	32.839
2004	224.151	165.011	131.742	33.269
2005	227.237	167.584	133.855	33.729
2006	230.513	170.332	136.106	34.226
2007	233.991	173.198	138.451	34.748
2008	237.695	176.247	140.943	35.304
2009	241.494	179.354	143.470	35.884
2010	245.569	182.700	146.201	36.499

SOURCE: MAP MODEL OUTPUT FILES HE.8 AND HER.8
VARIABLES: HH, HH.IR, HH.AG, AND HH.FG

TABLE N.1. SIMULATION CASE: 2% ANNUAL DECLINE IN OIL PRICE
Part F
State Households by Age of Head
(Thousands)

	Total	Head Younger Than 25	Head 25-29	Head 30-54	Head Older Than 54
1982	145.453	17.141	23.938	81.706	22.667
1983	153.141	18.110	25.128	86.087	23.816
1984	159.154	18.624	25.919	89.726	24.884
1985	165.300	19.085	26.763	93.488	25.964
1986	171.199	19.448	27.534	97.161	27.056
1987	175.635	19.528	27.909	100.075	28.124
1988	179.312	19.492	28.091	102.530	29.200
1989	183.119	19.511	28.325	104.963	30.320
1990	188.723	19.861	29.042	108.269	31.551
1991	191.839	19.776	29.096	110.241	32.725
1992	197.699	20.192	29.898	113.566	34.043
1993	200.720	20.114	29.940	115.379	35.287
1994	202.255	19.833	29.630	116.288	36.504
1995	203.668	19.595	29.351	116.982	37.740
1996	205.549	19.485	29.256	117.797	39.011
1997	207.685	19.445	29.277	118.660	40.302
1998	209.658	19.394	29.296	119.377	41.592
1999	211.733	19.373	29.378	120.098	42.884
2000	213.957	19.382	29.529	120.868	44.178
2001	216.190	19.394	29.705	121.628	45.464
2002	218.546	19.424	29.931	122.449	46.742
2003	221.254	19.504	30.261	123.468	48.020
2004	224.151	19.602	30.644	124.615	49.290
2005	227.237	19.716	31.073	125.898	50.549
2006	230.513	19.844	31.545	127.324	51.799
2007	233.991	19.988	32.059	128.904	53.039
2008	237.695	20.149	32.618	130.656	54.273
2009	241.494	20.308	33.183	132.509	55.494
2010	245.569	20.491	33.804	134.561	56.714

SOURCE: MAP MODEL OUTPUT FILES HE.8 AND HER.8
VARIABLES: HH, HH24, HH25.29, HH30.54, AND HH55

TABLE N.2. SIMULATION CASE: 1% ANNUAL DECLINE IN OIL PRICE
Part A
State Petroleum Revenues
(Million $)

	Royalties	Severance Taxes	Corporate Income Taxes	Property Taxes	Total Including Bonuses and Federal Shared Royalties	Total to General Fund (Net of Permanent Fund Contribution)
1982	1530.000	1590.000	668.900	142.700	3960.200	3570.550
1983	1456.661	1473.507	233.969	148.600	3361.836	2985.396
1984	1527.914	1552.734	346.183	153.200	3615.097	3224.352
1985	1748.822	1752.615	410.334	158.000	4099.461	3654.833
1986	1908.500	1884.047	440.518	163.456	4424.508	3940.386
1987	2081.990	2037.005	481.110	169.101	4797.047	4269.586
1988	2138.123	2080.186	501.167	174.940	4922.770	4381.148
1989	2282.825	1881.240	527.134	180.981	4901.328	4323.332
1990	2383.280	1953.354	569.156	187.231	5123.082	4519.746
1991	2255.336	1781.427	641.188	193.697	4902.672	4331.078
1992	2209.249	1686.935	694.875	200.385	4823.453	4263.137
1993	2221.211	1661.915	758.885	207.305	4882.316	4318.762
1994	2195.779	1608.338	800.248	214.464	4852.828	4295.383
1995	2039.784	1437.589	834.241	221.870	4568.484	4049.788
1996	1919.686	1281.909	874.694	229.532	4341.820	3852.899
1997	1956.014	1315.485	939.782	237.458	4485.738	3987.485
1998	1957.312	1285.495	1004.238	245.658	4530.699	4031.871
1999	1942.932	1221.899	1080.757	254.141	4538.727	4043.244
2000	1950.703	1202.349	1159.592	262.917	4615.559	4117.883
2001	1958.505	1183.111	1244.177	271.996	4698.789	4198.910
2002	1966.339	1164.181	1334.932	281.389	4788.840	4286.754
2003	1974.203	1145.554	1432.307	291.106	4886.168	4381.867
2004	1982.100	1127.225	1536.784	301.158	4991.266	4484.738
2005	1990.027	1109.189	1648.882	311.558	5104.656	4595.898
2006	1997.987	1091.442	1769.159	322.317	5226.902	4715.902
2007	2005.978	1073.979	1898.209	333.447	5358.613	4845.367
2008	2014.001	1056.796	2036.671	344.962	5500.426	4984.922
2009	2022.056	1039.887	2185.234	356.874	5653.051	5135.285
2010	2030.144	1023.249	2344.634	369.198	5817.223	5297.184

SOURCE: MAP MODEL OUTPUT FILES HE.7 AND HER.7
VARIABLES: RPRY, RPTS, RTCSPX, RPPS, RP9S, AND RP9SGF

TABLE N.2. SIMULATION CASE: 1% ANNUAL DECLINE IN OIL PRICE
Part B
State Government Expenditures
(Million $)

	Unrestricted General Fund Expenditures	General Fund Balance	Permanent Fund Dividends	State Personal Income Tax	State Subsidy Programs	Percent of Permanent Fund Earnings Reinvested
1982	4601.891	399.200	425.000	0.000	634.000	0.000
1983	3287.977	486.305	152.608	0.000	500.000	0.500
1984	3389.729	780.395	196.738	0.000	350.000	0.500
1985	3701.695	1258.922	224.643	0.000	300.000	0.500
1986	4042.114	1778.094	256.433	0.000	200.000	0.500
1987	4403.215	2367.781	291.610	0.000	100.000	0.500
1988	4771.078	2812.434	330.515	0.000	698.100	0.500
1989	5143.027	2924.793	371.941	0.000	752.445	0.500
1990	5558.977	2889.391	417.063	0.000	813.728	0.500
1991	5970.949	2327.652	465.532	0.000	875.152	0.500
1992	6491.305	1193.375	514.795	0.000	0.000	0.500
1993	6511.301	111.223	0.000	0.000	0.000	0.500
1994	5721.824	111.238	0.000	332.896	0.000	0.500
1995	6560.609	111.258	0.000	669.139	0.000	0.000
1996	6495.719	111.281	0.000	734.092	0.000	0.000
1997	6762.500	111.305	0.000	791.315	0.000	0.000
1998	6944.129	111.328	0.000	851.276	0.000	0.000
1999	7097.348	111.352	0.000	915.767	0.000	0.000
2000	7324.008	111.375	0.000	987.045	0.000	0.000
2001	7566.648	111.398	0.000	1064.419	0.000	0.000
2002	7825.238	111.414	0.000	1148.947	0.000	0.000
2003	8104.781	111.434	0.000	1243.115	0.000	0.000
2004	8408.453	111.457	0.000	1346.282	0.000	0.000
2005	8731.746	111.484	0.000	1457.654	0.000	0.000
2006	9077.820	111.512	0.000	1578.339	0.000	0.000
2007	9447.700	111.543	0.000	1708.880	0.000	0.000
2008	9843.290	111.574	0.000	1849.992	0.000	0.000
2009	10265.220	111.609	0.000	2000.555	0.000	0.000
2010	10713.710	111.648	0.000	2163.069	0.000	0.000

SOURCE: MAP MODEL OUTPUT FILES HE.7 AND HER.7
VARIABLES: EXGFBM, BALGF, EXTRNS, RTIS, EXSUBS, AND EXPFBAK

TABLE N.2. SIMULATION CASE: 1% ANNUAL DECLINE IN OIL PRICE
Part C
Employment
(Thousands)

	State Non-Ag Wage and Salary	State Total	Railbelt Total	Greater Anchorage Total	Greater Fairbanks Total
1982	192.903	231.984	154.033	120.533	33.500
1983	202.237	243.067	159.147	125.221	33.927
1984	205.903	246.984	162.259	127.853	34.406
1985	216.850	258.648	169.404	133.832	35.571
1986	226.523	268.967	175.694	139.018	36.676
1987	233.000	275.888	179.283	141.831	37.452
1988	236.541	279.675	181.005	143.331	37.674
1989	239.357	282.707	183.082	145.209	37.873
1990	246.490	290.318	187.470	148.909	38.561
1991	246.567	290.416	189.192	150.089	39.103
1992	265.311	310.417	200.146	159.497	40.649
1993	268.406	313.743	204.195	162.421	41.774
1994	262.866	307.867	200.869	159.636	41.233
1995	262.307	307.313	200.363	159.186	41.177
1996	263.551	308.689	201.195	159.886	41.309
1997	264.260	309.512	202.107	160.700	41.407
1998	264.253	309.585	202.871	161.372	41.499
1999	265.075	310.565	204.117	162.452	41.665
2000	266.762	312.417	205.960	163.986	41.974
2001	268.643	314.423	208.031	165.687	42.344
2002	270.939	316.873	210.397	167.636	42.761
2003	274.223	320.377	213.196	169.977	43.219
2004	277.853	324.251	216.381	172.611	43.770
2005	281.885	328.554	219.881	175.499	44.383
2006	286.239	333.203	223.687	178.628	45.059
2007	290.920	338.202	227.747	181.955	45.792
2008	295.971	343.597	232.069	185.497	46.572
2009	300.951	348.917	236.512	189.109	47.403
2010	306.468	354.812	241.205	192.952	48.253

SOURCE: MAP MODEL OUTPUT FILES HE.7 AND HER.7
VARIABLES: EM97, EM99, M.IR, M.AG, AND M.FG

TABLE N.2. SIMULATION CASE: 1% ANNUAL DECLINE IN OIL PRICE
Part D
Population
(Thousands)

	State	Railbelt	Greater Anchorage	Greater Fairbanks
1982	437.175	307.105	239.830	67.277
1983	457.836	319.767	251.057	68.711
1984	473.752	330.202	259.679	70.523
1985	490.387	341.852	269.490	72.362
1986	507.001	353.254	278.931	74.324
1987	520.062	361.484	285.269	76.216
1988	529.741	367.035	289.935	77.101
1989	538.874	374.203	296.125	78.078
1990	551.884	384.894	304.800	80.094
1991	558.777	389.515	308.323	81.193
1992	582.500	406.078	322.779	83.299
1993	596.580	415.584	329.939	85.646
1994	598.194	418.257	331.482	86.775
1995	601.879	419.075	332.220	86.856
1996	607.461	422.741	335.228	87.513
1997	612.371	427.119	338.860	88.260
1998	616.430	430.720	341.870	88.850
1999	620.907	434.747	345.240	89.507
2000	626.068	439.370	349.031	90.339
2001	631.297	444.218	352.964	91.254
2002	636.942	449.336	357.150	92.186
2003	643.662	455.024	361.879	93.145
2004	650.945	461.126	366.925	94.202
2005	658.790	467.659	372.318	95.341
2006	667.209	474.695	378.109	96.587
2007	676.239	482.093	384.187	97.906
2008	685.950	490.020	390.694	99.326
2009	695.937	498.127	397.316	100.812
2010	706.745	506.906	404.508	102.398

SOURCE: MAP MODEL OUTPUT FILES HE.7 AND HER.7
VARIABLES: POP, P.IR, P.AG, AND P.FG

TABLE N.2. SIMULATION CASE: 1% ANNUAL DECLINE IN OIL PRICE
Part E
Households
(Thousands)

	State	Railbelt	Greater Anchorage	Greater Fairbanks
1982	145.453	106.572	83.678	22.894
1983	153.141	111.549	88.038	23.511
1984	159.154	115.671	91.425	24.246
1985	165.382	120.223	95.231	24.992
1986	171.578	124.649	98.876	25.773
1987	176.530	127.907	101.387	26.520
1988	180.300	130.285	103.364	26.921
1989	183.867	133.118	105.788	27.330
1990	188.759	137.238	109.117	28.121
1991	191.547	139.127	110.559	28.568
1992	200.112	145.392	116.001	29.391
1993	205.388	149.033	118.746	30.287
1994	206.389	150.276	119.521	30.755
1995	208.085	150.884	120.036	30.848
1996	210.424	152.487	121.343	31.144
1997	212.532	154.344	122.873	31.471
1998	214.347	155.887	124.152	31.735
1999	216.298	157.583	125.561	32.022
2000	218.479	159.490	127.117	32.373
2001	220.679	161.474	128.719	32.755
2002	223.014	163.551	130.411	33.141
2003	225.709	165.831	132.296	33.535
2004	228.591	168.249	134.286	33.963
2005	231.660	170.816	136.397	34.419
2006	234.919	173.558	138.645	34.914
2007	238.380	176.419	140.987	35.432
2008	242.069	179.464	143.478	35.986
2009	245.849	182.565	146.002	36.563
2010	249.905	185.906	148.730	37.175

SOURCE: MAP MODEL OUTPUT FILES HE.7 AND HER.7
VARIABLES: HH, HH.IR, HH.AG, AND HH.FG

TABLE N.2. SIMULATION CASE: 1% ANNUAL DECLINE IN OIL PRICE
Part F
State Households by Age of Head
(Thousands)

	Total	Head Younger than 25	Head 25-29	Head 30-54	Head Older Than 54
1982	145.453	17.141	23.938	81.706	22.667
1983	153.141	18.110	25.128	86.087	23.816
1984	159.154	18.624	25.919	89.726	24.884
1985	165.382	19.100	26.785	93.531	25.967
1986	171.578	19.513	27.631	97.363	27.071
1987	176.530	19.675	28.132	100.564	28.160
1988	180.300	19.638	28.323	103.097	29.242
1989	183.867	19.601	28.478	105.431	30.357
1990	188.759	19.824	29.000	108.371	31.565
1991	191.547	19.695	28.972	110.151	32.729
1992	200.112	20.576	30.489	114.889	34.158
1993	205.388	20.828	31.081	117.981	35.498
1994	206.389	20.381	30.553	118.747	36.709
1995	208.085	20.139	30.283	119.686	37.976
1996	210.424	20.060	30.245	120.827	39.291
1997	212.532	19.974	30.195	121.750	40.613
1998	214.347	19.868	30.116	122.432	41.932
1999	216.298	19.807	30.120	123.112	43.259
2000	218.479	19.797	30.225	123.864	44.594
2001	220.679	19.795	30.364	124.598	45.922
2002	223.014	19.815	30.563	125.391	47.246
2003	225.709	19.887	30.873	126.379	48.570
2004	228.591	19.978	31.239	127.488	49.887
2005	231.660	20.085	31.654	128.728	51.193
2006	234.919	20.206	32.114	130.109	52.490
2007	238.380	20.343	32.618	131.644	53.776
2008	242.069	20.497	33.168	133.350	55.054
2009	245.849	20.648	33.726	135.156	56.319
2010	249.905	20.825	34.339	137.161	57.580

SOURCE: MAP MODEL OUTPUT FILES HE.7 AND HER.7
VARIABLES: HH, HH24, HH25.29, HH30.54, AND HH55

TABLE N.3. SIMULATION CASE: CONSTANT OIL PRICE
Part A
State Petroleum Revenues
(Million $)

	Royalties	Severance Taxes	Corporate Income Taxes	Property Taxes	Total Including Bonuses and Federal Shared Royalties	Total to General Fund (Net of Permanent Fund Contribution)
1982	1530.000	1590.000	668.900	142.700	3960.200	3570.550
1983	1456.661	1473.507	233.969	148.600	3361.836	2985.396
1984	1547.655	1572.744	350.644	153.200	3659.309	3263.628
1985	1796.466	1799.862	421.396	158.000	4205.414	3748.875
1986	1986.423	1959.875	458.248	163.456	4595.988	4092.385
1987	2193.616	2144.705	506.547	169.101	5041.809	4486.441
1988	2280.051	2216.392	533.983	174.940	5233.719	4656.613
1989	2464.136	2028.323	568.347	180.981	5270.934	4647.609
1990	2602.119	2129.917	620.602	187.231	5569.930	4911.883
1991	2487.494	1962.288	706.286	193.697	5380.789	4751.156
1992	2458.237	1875.202	772.426	200.385	5338.254	4715.691
1993	2492.431	1863.728	851.039	207.305	5447.504	4816.145
1994	2488.079	1821.292	906.205	214.464	5464.039	4833.516
1995	2329.815	1641.873	952.789	221.870	5181.348	4590.141
1996	2212.082	1477.841	1008.386	229.532	4963.840	4401.816
1997	2273.584	1530.371	1093.296	237.458	5171.707	4594.059
1998	2294.437	1509.082	1178.906	245.658	5266.082	4682.973
1999	2295.842	1447.056	1279.906	254.141	5315.945	4732.234
2000	2324.539	1436.927	1385.827	262.917	5450.207	4859.070
2001	2353.595	1426.868	1500.515	271.996	5593.973	4995.320
2002	2383.015	1416.880	1624.693	281.389	5747.973	5141.719
2003	2412.802	1406.961	1759.149	291.106	5913.016	5299.063
2004	2442.961	1397.112	1904.730	301.158	6089.957	5468.215
2005	2473.498	1387.333	2062.361	311.558	6279.746	5650.121
2006	2504.416	1377.621	2233.037	322.317	6483.387	5845.781
2007	2535.721	1367.978	2417.837	333.447	6701.980	6056.297
2008	2567.417	1358.402	2617.931	344.962	6936.707	6282.852
2009	2599.509	1348.893	2834.584	356.874	7188.855	6526.727
2010	2632.002	1339.450	3069.166	369.198	7459.813	6789.309

SOURCE: MAP MODEL OUTPUT FILES HE.6 AND HER.6
VARIABLES: RPRY, RPTS, RTCSPX, RPPS, RP9S, AND RP9SGF

TABLE N.3. SIMULATION CASE: CONSTANT OIL PRICE
Part B
State Government Expenditures
(Million $)

	Unrestricted General Fund Expenditures	General Fund Balance	Permanent Fund Dividends	State Personal Income Tax	State Subsidy Programs	Percent of Permanent Fund Earnings Reinvested
1982	4601.891	399.200	425.000	0.000	634.000	0.500
1983	3287.977	486.305	152.608	0.000	500.000	0.500
1984	3389.729	819.676	196.738	0.000	350.000	0.500
1985	3700.677	1396.813	224.877	0.000	350.000	0.500
1986	4035.211	2086.863	257.244	0.000	350.000	0.500
1987	4383.441	2938.980	293.385	0.000	350.000	0.500
1988	4743.129	3734.266	333.700	0.000	695.550	0.500
1989	5121.121	4273.090	376.963	0.000	750.604	0.500
1990	5539.363	4770.816	424.476	0.000	811.880	0.500
1991	5954.242	4815.613	475.896	0.000	873.306	0.500
1992	6464.086	4385.613	528.408	0.000	950.450	0.500
1993	7019.668	3572.234	583.079	0.000	0.000	0.500
1994	7606.453	2206.754	640.765	0.000	0.000	0.500
1995	7541.895	636.641	0.000	0.000	0.000	0.500
1996	6122.703	636.652	0.000	390.049	0.000	0.500
1997	7630.305	636.668	0.000	788.411	0.000	0.000
1998	7880.047	636.691	0.000	868.410	0.000	0.000
1999	8081.688	636.715	0.000	933.966	0.000	0.000
2000	8367.254	636.734	0.000	1004.314	0.000	0.000
2001	8673.625	636.750	0.000	1081.762	0.000	0.000
2002	9000.560	636.773	0.000	1166.823	0.000	0.000
2003	9352.800	636.797	0.000	1261.456	0.000	0.000
2004	9734.010	636.820	0.000	1365.280	0.000	0.000
2005	10140.160	636.848	0.000	1477.538	0.000	0.000
2006	10574.820	636.879	0.000	1599.287	0.000	0.000
2007	11039.400	636.910	0.000	1731.013	0.000	0.000
2008	11536.360	636.945	0.000	1873.440	0.000	0.000
2009	12066.980	636.980	0.000	2025.513	0.000	0.000
2010	12632.210	637.020	0.000	2189.766	0.000	0.000

SOURCE: MAP MODEL OUTPUT FILES HE.6 AND HER.6
VARIABLES: EXGFBM, BALGF, EXTRNS, RTIS, EXSUBS, AND EXPFBAK

TABLE N.3. SIMULATION CASE: CONSTANT OIL PRICE
Part C
Employment
(Thousands)

	State Non-Ag Wage and Salary	State Total	Railbelt Total	Greater Anchorage Total	Greater Fairbanks Total
1982	192.903	231.984	154.033	120.533	33.500
1983	202.237	243.067	159.147	125.221	33.927
1984	205.903	246.984	162.259	127.853	34.406
1985	216.620	258.404	169.203	133.673	35.529
1986	225.545	267.927	174.844	138.344	36.499
1987	230.898	273.650	177.466	140.389	37.077
1988	234.771	277.790	179.516	142.141	37.374
1989	238.522	281.818	182.436	144.688	37.748
1990	245.841	289.626	186.982	148.519	38.463
1991	246.073	289.889	188.828	149.800	39.028
1992	263.196	308.161	198.029	157.787	40.242
1993	268.383	313.719	203.845	162.129	41.715
1994	272.866	318.534	208.577	165.704	42.874
1995	276.687	322.653	211.840	168.320	43.520
1996	272.778	318.532	209.147	166.393	42.753
1997	273.648	319.526	209.268	166.418	42.850
1998	274.322	320.326	210.300	167.229	43.070
1999	274.073	320.164	210.715	167.639	43.076
2000	274.573	320.751	211.686	168.481	43.205
2001	275.662	321.912	213.174	169.719	43.455
2002	277.559	323.937	215.256	171.445	43.811
2003	280.542	327.121	217.838	173.615	44.224
2004	283.966	330.776	220.879	176.136	44.743
2005	287.865	334.939	224.292	178.956	45.336
2006	292.116	339.479	228.030	182.034	45.997
2007	296.713	344.389	232.041	185.324	46.717
2008	301.699	349.716	236.327	188.840	47.487
2009	306.647	355.004	240.758	192.444	48.314
2010	312.153	360.890	245.456	196.294	49.162

SOURCE: MAP MODEL OUTPUT FILES HE.6 AND HER.6
VARIABLES: EM97, EM99, M.IR, M.AG, AND M.FG

TABLE N.3. SIMULATION CASE: CONSTANT OIL PRICE
Part D
Population
(Thousands)

	State	Railbelt	Greater Anchorage	Greater Fairbanks
1982	437.175	307.105	239.830	67.277
1983	457.836	319.767	251.057	68.711
1984	473.752	330.202	259.679	70.523
1985	490.154	341.619	269.306	72.314
1986	505.917	352.216	278.106	74.110
1987	517.508	359.121	283.387	75.734
1988	526.964	364.702	288.067	76.636
1989	536.859	372.735	294.944	77.792
1990	550.151	383.665	303.819	79.846
1991	557.251	388.448	307.476	80.973
1992	579.380	402.759	320.096	82.663
1993	594.991	413.770	328.480	85.290
1994	607.199	425.280	336.991	88.289
1995	617.971	432.178	342.692	89.487
1996	620.838	434.399	344.854	89.545
1997	626.791	437.694	347.334	90.360
1998	632.498	441.996	350.765	91.231
1999	636.808	445.820	353.951	91.869
2000	641.432	450.069	357.444	92.626
2001	646.314	454.679	361.185	93.495
2002	651.863	459.752	365.340	94.413
2003	658.498	465.391	370.032	95.360
2004	665.723	471.472	375.065	96.408
2005	673.537	478.003	380.461	97.542
2006	681.909	485.027	386.246	98.782
2007	690.874	492.404	392.314	100.091
2008	700.507	500.301	398.803	101.499
2009	710.420	508.379	405.405	102.974
2010	721.159	517.133	412.583	104.551

SOURCE: MAP MODEL OUTPUT FILES HE.6 AND HER.6
VARIABLES: POP, P.IR, P.AG, AND P.FG

TABLE N.3. SIMULATION CASE: CONSTANT OIL PRICE
Part E
Households
(Thousands)

	State	Railbelt	Greater Anchorage	Greater Fairbanks
1982	145.453	106.572	83.678	22.894
1983	153.141	111.549	88.038	23.511
1984	159.154	115.671	91.425	24.246
1985	165.301	120.142	95.167	24.975
1986	171.204	124.285	98.588	25.697
1987	175.647	127.076	100.729	26.348
1988	179.336	129.457	102.703	26.753
1989	183.162	132.587	105.361	27.226
1990	188.149	136.790	108.760	28.030
1991	191.007	138.734	110.248	28.486
1992	199.022	144.227	115.063	29.165
1993	204.818	148.390	118.231	30.159
1994	209.452	152.747	121.449	31.298
1995	213.596	155.506	123.716	31.790
1996	215.035	156.599	124.733	31.865
1997	217.518	158.133	125.900	32.233
1998	219.915	159.951	127.347	32.604
1999	221.834	161.592	128.704	32.889
2000	223.854	163.382	130.166	33.216
2001	225.958	165.297	131.714	33.583
2002	228.285	167.375	133.407	33.968
2003	230.976	169.654	135.293	34.361
2004	233.864	172.083	137.293	34.790
2005	236.948	174.668	139.419	35.248
2006	240.217	177.425	141.681	35.744
2007	243.684	180.298	144.035	36.263
2008	247.373	183.352	146.535	36.817
2009	251.154	186.461	149.068	37.393
2010	255.211	189.812	151.806	38.006

SOURCE: MAP MODEL OUTPUT FILES HE.6 AND HER.6
VARIABLES: HH, HH.IR, HH.AG, AND HH.FG

TABLE N.3. SIMULATION CASE: CONSTANT OIL PRICE
Part F
State Households by Age of Head
(Thousands)

	Total	Head Younger Than 25	Head 25-29	Head 30-54	Head Older Than 54
1982	145.453	17.141	23.938	81.706	22.667
1983	153.141	18.110	25.128	86.087	23.816
1984	159.154	18.624	25.919	89.726	24.884
1985	165.301	19.086	26.764	93.488	25.964
1986	171.204	19.449	27.535	97.163	27.056
1987	175.647	19.530	27.912	100.081	28.124
1988	179.336	19.496	28.097	102.543	29.201
1989	183.162	19.517	28.335	104.987	30.322
1990	188.149	19.762	28.891	107.967	31.529
1991	191.007	19.647	28.889	109.780	32.691
1992	199.022	20.436	30.266	114.227	34.093
1993	204.818	20.784	31.008	117.579	35.447
1994	209.452	20.931	31.431	120.295	36.795
1995	213.596	21.015	31.737	122.686	38.159
1996	215.035	20.685	31.354	123.546	39.449
1997	217.518	20.596	31.317	124.802	40.802
1998	219.915	20.529	31.307	125.910	42.169
1999	221.834	20.412	31.218	126.675	43.528
2000	223.854	20.340	31.207	127.413	44.894
2001	225.958	20.298	31.262	128.136	46.263
2002	228.285	20.301	31.410	128.940	47.634
2003	230.976	20.360	31.681	129.926	49.009
2004	233.864	20.442	32.017	131.025	50.380
2005	236.948	20.543	32.411	132.251	51.743
2006	240.217	20.658	32.853	133.608	53.098
2007	243.684	20.788	33.342	135.110	54.443
2008	247.373	20.935	33.880	136.777	55.781
2009	251.154	21.079	34.427	138.542	57.105
2010	255.211	21.249	35.032	140.506	58.425

SOURCE: MAP MODEL OUTPUT FILES HE.6 AND HER.6
VARIABLES: HH, HH24, HH25.29, HH30.54, AND HH55

TABLE N.4. SIMULATION CASE: 2% ANNUAL INCREASE IN OIL PRICE
Part A
State Petroleum Revenues
(Million $)

	Royalties	Severance Taxes	Corporate Income Taxes	Property Taxes	Total Including Bonuses and Federal Shared Royalties	Total to General Fund (Net of Permanent Fund Contribution)
1982	1530.000	1590.000	668.900	142.700	3960.200	3570.550
1983	1456.661	1473.507	233.969	148.600	3361.836	2985.396
1984	1587.146	1612.763	359.566	153.200	3747.741	3342.188
1985	1894.108	1896.679	444.063	158.000	4422.539	3941.589
1986	2147.052	2116.177	494.793	163.456	4949.465	4405.703
1987	2425.629	2368.573	559.422	169.101	5550.566	4937.195
1988	2579.915	2504.169	603.315	174.940	5890.691	5238.621
1989	2852.770	2343.591	656.687	180.981	6063.176	5342.695
1990	3079.382	2514.983	732.801	187.231	6544.453	5767.090
1991	3000.070	2361.607	850.013	193.697	6436.410	5678.633
1992	3015.941	2296.923	946.139	200.385	6491.395	5729.406
1993	3109.054	2322.544	1060.550	207.305	6732.453	5946.938
1994	3162.103	2312.373	1150.549	214.464	6873.488	6074.461
1995	3008.396	2119.852	1230.163	221.870	6615.277	5854.426
1996	2904.606	1941.895	1325.028	229.532	6437.059	5701.906
1997	3036.613	2046.663	1462.135	237.458	6819.867	6051.461
1998	3116.226	2054.096	1604.674	245.658	7058.648	6270.090
1999	3168.862	2004.037	1772.551	254.141	7238.590	6436.621
2000	3260.760	2024.078	1952.100	262.917	7539.852	6714.660
2001	3355.323	2044.319	2149.835	271.996	7862.469	7013.387
2002	3452.628	2064.763	2367.602	281.389	8208.379	7334.719
2003	3552.755	2085.411	2607.426	291.106	8579.695	7680.754
2004	3655.786	2106.265	2871.543	301.158	8978.750	8053.801
2005	3761.805	2127.328	3162.413	311.558	9408.100	8456.395
2006	3870.898	2148.602	3482.748	322.317	9870.560	8891.336
2007	3983.154	2170.088	3835.532	333.447	10369.210	9361.680
2008	4098.664	2191.790	4224.047	344.962	10907.460	9870.790
2009	4217.523	2213.708	4651.918	356.874	11489.020	10422.390
2010	4339.832	2235.845	5123.133	369.198	12118.000	11020.540

SOURCE: MAP MODEL OUTPUT FILES HE.4 AND HER.4
VARIABLES: RPRY, RPTS, RTCSPX, RPPS, RP9S, AND RP9SGF

TABLE N.4. SIMULATION CASE: 2% ANNUAL INCREASE IN OIL PRICE
Part B
State Government Expenditures
(Million $)

	Unrestricted General Fund Expenditures	General Fund Balance	Permanent Fund Dividends	State Personal Income Tax	State Subsidy Programs	Percent of Permanent Fund Earnings Reinvested
1982	4601.891	399.200	425.000	0.000	634.000	0.000
1983	3287.977	486.305	152.608	0.000	500.000	0.500
1984	3389.729	898.230	196.738	0.000	350.000	0.500
1985	3701.146	1674.754	225.346	0.000	350.000	0.500
1986	4036.879	2701.742	258.895	0.000	350.000	0.500
1987	4387.133	4056.852	297.021	0.000	350.000	0.500
1988	4749.832	5529.086	340.265	0.000	695.573	0.500
1989	5131.844	6915.379	387.400	0.000	750.650	0.500
1990	5555.461	8492.555	440.024	0.000	811.970	0.500
1991	5977.328	9780.330	497.850	0.000	873.491	0.500
1992	6494.707	10784.920	557.492	0.000	950.701	0.500
1993	7044.500	11658.910	620.167	0.000	1029.354	0.500
1994	7584.113	12281.360	686.937	0.000	1105.293	0.500
1995	8184.426	12227.780	757.520	0.000	1189.849	0.500
1996	8843.730	11458.130	829.643	0.000	1283.385	0.500
1997	9561.760	10363.960	903.970	0.000	0.000	0.500
1998	10380.540	8703.914	983.408	0.000	0.000	0.500
1999	11248.540	6333.844	1067.576	0.000	0.000	0.500
2000	12178.230	3241.766	1156.379	0.000	0.000	0.500
2001	9260.960	3241.781	1250.503	0.000	0.000	0.500
2002	9708.750	3241.793	1350.233	0.000	0.000	0.500
2003	10192.130	3241.801	0.000	0.000	0.000	0.500
2004	14677.310	41.734	0.000	759.029	0.000	0.500
2005	14269.330	41.762	0.000	1527.563	0.000	0.000
2006	15006.750	41.793	0.000	1678.949	0.000	0.000
2007	15754.660	41.824	0.000	1809.837	0.000	0.000
2008	16563.450	41.863	0.000	1952.014	0.000	0.000
2009	17441.480	41.902	0.000	2106.625	0.000	0.000
2010	18384.040	41.945	0.000	2273.823	0.000	0.000

SOURCE: MAP MODEL OUTPUT FILES HE.4 AND HER.4
VARIABLES: EXGFBM, BALGF, EXTRNS, RTIS, EXSUBS, AND EXPFBAK

TABLE N.4. SIMULATION CASE: 2% ANNUAL INCREASE IN OIL PRICE
Part C
Employment
(Thousands)

	State Non-Ag Wage and Salary	State Total	Railbelt Total	Greater Anchorage Total	Greater Fairbanks Total
1982	192.903	231.984	154.033	120.533	33.500
1983	202.237	243.067	159.147	125.221	33.927
1984	205.903	246.984	162.259	127.853	34.406
1985	216.622	258.407	169.205	133.675	35.530
1986	225.557	267.939	174.854	138.352	36.501
1987	230.928	273.682	177.491	140.410	37.082
1988	234.830	277.853	179.565	142.181	37.383
1989	238.625	281.927	182.520	144.756	37.764
1990	246.003	289.800	187.116	148.628	38.488
1991	246.315	290.147	189.025	149.960	39.065
1992	263.530	308.517	198.300	158.008	40.292
1993	267.011	312.255	202.293	160.872	41.421
1994	269.457	314.897	204.926	162.730	42.196
1995	274.952	320.801	209.620	166.496	43.124
1996	281.686	328.039	214.693	170.584	44.109
1997	289.380	336.319	221.540	176.170	45.370
1998	296.386	343.884	228.173	181.547	46.626
1999	302.670	350.701	233.611	185.968	47.643
2000	308.867	357.377	238.937	190.276	48.661
2001	304.579	352.793	237.340	189.402	47.939
2002	305.188	353.444	237.826	189.790	48.035
2003	308.315	356.786	239.679	191.200	48.479
2004	315.847	364.839	245.102	195.323	49.780
2005	315.169	364.115	245.595	195.942	49.653
2006	317.479	366.584	247.142	197.140	50.002
2007	319.340	368.575	248.958	198.665	50.293
2008	322.811	372.287	252.127	201.294	50.833
2009	326.371	376.095	255.510	204.058	51.452
2010	331.099	381.154	259.656	207.472	52.183

SOURCE: MAP MODEL OUTPUT FILES HE.4 AND HER.4
VARIABLES: EM97, EM99, M.IR, M.AG, AND M.FG

TABLE N.4. SIMULATION CASE: 2% ANNUAL INCREASE IN OIL PRICE
Part D
Population
(Thousands)

	State	Railbelt	Greater Anchorage	Greater Fairbanks
1982	437.175	307.105	239.830	67.277
1983	457.836	319.767	251.057	68.711
1984	473.752	330.202	259.679	70.523
1985	490.157	341.622	269.308	72.315
1986	505.930	352.227	278.116	74.112
1987	517.542	359.151	283.412	75.739
1988	527.035	364.762	288.117	76.646
1989	536.986	372.841	295.031	77.811
1990	550.359	383.836	303.960	79.876
1991	557.565	388.704	307.686	81.018
1992	579.826	403.120	320.393	82.727
1993	593.775	411.797	326.872	84.926
1994	603.272	420.188	332.818	87.371
1995	614.826	428.017	339.287	88.731
1996	628.404	437.664	347.090	90.575
1997	643.491	450.723	357.727	92.997
1998	658.760	463.546	368.142	95.404
1999	673.393	474.944	377.392	97.553
2000	687.750	486.242	386.503	99.739
2001	691.353	491.611	391.467	100.145
2002	697.792	495.973	394.937	101.036
2003	706.604	501.503	399.206	102.298
2004	720.166	510.824	406.267	104.557
2005	726.125	517.048	411.635	105.414
2006	734.053	522.247	415.713	106.534
2007	741.348	528.141	420.564	107.578
2008	750.130	535.477	426.608	108.869
2009	759.075	542.871	432.655	110.216
2010	769.233	551.279	439.569	111.711

SOURCE: MAP MODEL OUTPUT FILES HE.4 AND HER.4
VARIABLES: POP, P.IR, P.AG, AND P.FG

TABLE N.4. SIMULATION CASE: 2% ANNUAL INCREASE IN OIL PRICE
Part E
Households
(Thousands)

	State	Railbelt	Greater Anchorage	Greater Fairbanks
1982	145.453	106.572	83.678	22.894
1983	153.141	111.549	88.038	23.511
1984	159.154	115.671	91.425	24.246
1985	165.302	120.143	95.168	24.975
1986	171.208	124.289	98.592	25.698
1987	175.658	127.087	100.737	26.350
1988	179.361	129.478	102.721	26.757
1989	183.206	132.625	105.393	27.232
1990	188.221	136.851	108.810	28.040
1991	191.115	138.825	110.323	28.502
1992	199.176	144.356	115.168	29.188
1993	204.402	147.719	117.685	30.034
1994	208.104	150.998	120.018	30.980
1995	212.509	154.072	122.545	31.527
1996	217.611	157.814	125.561	32.253
1997	223.239	162.746	129.565	33.181
1998	228.940	167.571	133.472	34.099
1999	234.434	171.932	136.999	34.933
2000	239.844	176.267	140.485	35.783
2001	241.594	178.463	142.488	35.976
2002	244.295	180.373	144.005	36.368
2003	247.799	182.704	145.807	36.897
2004	252.919	186.363	148.577	37.786
2005	255.467	188.880	150.731	38.149
2006	258.673	191.089	152.463	38.625
2007	261.660	193.507	154.443	39.063
2008	265.145	196.423	156.836	39.587
2009	268.681	199.351	159.221	40.130
2010	272.625	202.640	161.915	40.725

SOURCE: MAP MODEL OUTPUT FILES HE.4 AND HER.4
VARIABLES: HH, HH.IR, HH.AG, AND HH.FG

TABLE N.4. SIMULATION CASE: 2% ANNUAL INCREASE IN OIL PRICE
Part F
State Households by Age of Head
(Thousands)

	Total	Head Younger Than 25	Head 25-29	Head 30-54	Head Older Than 54
1982	145.453	17.141	23.938	81.706	22.667
1983	153.141	18.110	25.128	86.087	23.816
1984	159.154	18.624	25.919	89.726	24.884
1985	165.302	19.086	26.764	93.489	25.964
1986	171.208	19.450	27.536	97.165	27.056
1987	175.658	19.532	27.914	100.088	28.125
1988	179.361	19.500	28.103	102.557	29.202
1989	183.206	19.524	28.346	105.012	30.324
1990	188.221	19.773	28.909	108.008	31.532
1991	191.115	19.662	28.914	109.843	32.696
1992	199.176	20.458	30.302	114.317	34.100
1993	204.402	20.710	30.892	117.368	35.432
1994	208.104	20.713	31.080	119.568	36.743
1995	212.509	20.866	31.479	122.050	38.115
1996	217.611	21.142	32.075	124.849	39.545
1997	223.239	21.496	32.811	127.907	41.025
1998	228.940	21.844	33.559	131.001	42.535
1999	234.434	22.143	34.246	133.983	44.062
2000	239.844	22.419	34.907	136.909	45.610
2001	241.594	22.120	34.603	137.836	47.035
2002	244.295	22.035	34.617	139.132	48.511
2003	247.799	22.103	34.890	140.779	50.028
2004	252.919	22.420	35.616	143.270	51.612
2005	255.467	22.323	35.657	144.390	53.098
2006	258.673	22.349	35.910	145.807	54.608
2007	261.660	22.348	36.128	147.080	56.104
2008	265.145	22.428	36.501	148.605	57.612
2009	268.681	22.509	36.898	150.164	59.111
2010	272.625	22.642	37.409	151.960	60.615

SOURCE: MAP MODEL OUTPUT FILES HE.4 AND HER.4
VARIABLES: HH, HH24, HH25.29, HH30.54, AND HH55

TABLE N.5. SIMULATION CASE: SHERMAN CLARK ASSOCIATES NO SUPPLY DISRUPTION CASE
Part A
State Petroleum Revenues
(Million $)

	Royalties	Severance Taxes	Corporate Income Taxes	Property Taxes	Total Including Bonuses and Federal Shared Royalties	Total to General Fund (Net of Permanent Fund Contribution)
1982	1530.000	1590.000	668.899	142.700	3960.199	3570.549
1983	1456.661	1473.507	233.969	148.600	3361.836	2985.396
1984	1450.305	1474.080	328.647	153.200	3441.298	3069.956
1985	1555.117	1560.529	365.362	158.000	3668.700	3272.498
1986	1724.811	1705.298	398.724	163.456	4020.278	3582.078
1987	1896.215	1857.760	438.776	169.101	4389.691	3908.677
1988	1997.731	1647.607	396.949	174.940	4245.582	3739.060
1989	2251.456	1855.795	520.004	180.981	4837.387	4267.234
1990	2480.380	2031.695	591.983	187.231	5321.348	4693.734
1991	2352.500	1857.126	668.435	193.697	5102.781	4506.898
1992	2530.291	1929.692	794.871	200.385	5487.250	4846.672
1993	2657.006	1986.190	906.959	207.305	5790.461	5117.957
1994	2742.898	2006.949	998.581	214.464	5996.891	5302.664
1995	2651.116	1868.193	1084.124	221.870	5860.301	5188.770
1996	2599.817	1737.659	1185.670	229.532	5788.676	5129.719
1997	2755.836	1856.672	1326.406	237.458	6213.367	5515.156
1998	2865.556	1887.844	1474.798	245.658	6511.852	5785.961
1999	2950.992	1865.044	1649.613	254.141	6758.785	6011.285
2000	3077.885	1909.805	1841.891	262.917	7132.496	6353.023
2001	3210.235	1955.641	2056.580	271.996	7535.449	6722.641
2002	3348.276	2002.576	2296.294	281.389	7970.531	7122.961
2003	3492.252	2050.638	2563.949	291.106	8440.941	7557.125
2004	3642.420	2099.854	2862.802	301.158	8950.230	8028.625
2005	3799.044	2150.251	3196.489	311.558	9502.340	8541.328
2006	3962.404	2201.857	3569.072	322.317	10101.640	9099.540
2007	4132.781	2254.702	3985.082	333.447	10753.010	9708.060
2008	4310.492	2308.815	4449.578	344.962	11461.840	10372.220
2009	4495.844	2364.227	4968.219	356.874	12234.160	11097.950
2010	4689.164	2420.969	5547.316	369.198	13076.640	11891.850

SOURCE: MAP MODEL OUTPUT FILES HE.12 AND HER.12
VARIABLES: RPRY, RPTS, RTCSPX, RPPS, RP9S, AND RP9SGF

TABLE N.5. SIMULATION CASE: SHERMAN CLARK ASSOCIATES NO SUPPLY DISRUPTION CASE
Part B
State Government Expenditures
(Million $)

	Unrestricted General Fund Expenditures	General Fund Balance	Permanent Fund Dividends	State Personal Income Tax	State Subsidy Programs	Percent of Permanent Fund Earnings Reinvested
1982	4601.891	399.200	425.000	0.000	634.000	0.000
1983	3287.977	478.004	152.608	0.000	500.000	0.500
1984	3389.729	616.992	196.738	0.000	350.000	0.500
1985	3699.507	700.539	223.721	0.000	350.000	0.500
1986	4031.094	821.113	253.168	0.000	350.000	0.500
1987	4375.941	987.922	286.008	0.000	350.000	0.500
1988	4731.574	699.973	322.441	0.000	695.501	0.500
1989	5118.008	588.465	361.817	0.000	0.000	0.500
1990	5576.836	506.125	406.085	0.000	0.000	0.500
1991	5386.480	506.141	455.185	0.000	0.000	0.500
1992	5786.504	506.152	505.111	0.000	0.000	0.500
1993	6528.020	139.531	0.000	0.000	0.000	0.500
1994	6729.594	139.543	0.000	338.049	0.000	0.500
1995	7729.250	139.563	0.000	680.847	0.000	0.000
1996	7822.879	139.586	0.000	748.723	0.000	0.000
1997	8361.188	139.609	0.000	809.145	0.000	0.000
1998	8794.711	139.633	0.000	873.359	0.000	0.000
1999	9190.000	139.652	0.000	941.928	0.000	0.000
2000	9713.740	139.668	0.000	1017.188	0.000	0.000
2001	10278.270	139.691	0.000	1098.944	0.000	0.000
2002	10886.180	139.711	0.000	1188.241	0.000	0.000
2003	11545.180	139.734	0.000	1287.516	0.000	0.000
2004	12261.640	139.766	0.000	1396.169	0.000	0.000
2005	13034.660	139.789	0.000	1513.479	0.000	0.000
2006	13871.350	139.820	0.000	1640.603	0.000	0.000
2007	14777.160	139.852	0.000	1778.121	0.000	0.000
2008	15758.890	139.891	0.000	1926.802	0.000	0.000
2009	16822.770	139.934	0.000	2085.652	0.000	0.000
2010	17975.270	139.980	0.000	2257.400	0.000	0.000

SOURCE: MAP MODEL OUTPUT FILES HE.12 AND HER.12
VARIABLES: EXGFBM, BALGF, EXTRNS, RTIS, EXSUBS, AND EXPFBAK

TABLE N.5. SIMULATION CASE: SHERMAN CLARK
ASSOCIATES NO SUPPLY DISRUPTION CASE
Part C
Employment
(Thousands)

	State Non-Ag Wage and Salary	State Total	Railbelt Total	Greater Anchorage Total	Greater Fairbanks Total
1982	192.903	231.984	154.033	120.533	33.500
1983	202.237	243.067	159.147	125.221	33.927
1984	205.903	246.984	162.259	127.853	34.406
1985	216.612	258.396	169.197	133.668	35.528
1986	225.515	267.895	174.818	138.324	36.494
1987	230.833	273.581	177.412	140.345	37.067
1988	234.657	277.669	179.422	142.065	37.357
1989	240.213	283.619	184.211	146.124	38.088
1990	249.654	293.689	190.883	151.685	39.198
1991	247.908	291.844	191.360	151.958	39.402
1992	264.012	309.031	199.404	158.995	40.409
1993	266.941	312.180	202.842	161.351	41.492
1994	267.220	312.511	203.630	161.669	41.961
1995	268.534	313.954	204.668	162.466	42.202
1996	270.783	316.404	206.258	163.772	42.486
1997	272.935	318.765	208.212	165.401	42.811
1998	274.346	320.353	210.041	166.916	43.125
1999	276.144	322.374	212.025	168.580	43.445
2000	278.729	325.186	214.541	170.645	43.897
2001	281.498	328.141	217.283	172.875	44.408
2002	284.643	331.499	220.293	175.333	44.960
2003	288.727	335.859	223.703	178.156	45.546
2004	293.137	340.569	227.487	181.265	46.222
2005	297.941	345.701	231.584	184.625	46.959
2006	303.062	351.172	235.985	188.226	47.759
2007	308.504	356.989	240.639	192.025	48.614
2008	314.317	363.203	245.561	196.044	49.517
2009	320.082	369.368	250.621	200.146	50.475
2010	326.440	376.169	255.974	204.512	51.462

SOURCE: MAP MODEL OUTPUT FILES HE.12 AND HER.12
VARIABLES: EM97, EM99, M.IR, M.AG, AND M.FG

TABLE N.5. SIMULATION CASE: SHERMAN CLARK ASSOCIATES NO SUPPLY DISRUPTION CASE
PART D
Population
(Thousands)

	State	Railbelt	Greater Anchorage	Greater Fairbanks
1982	437.175	307.105	239.830	67.277
1983	457.836	319.767	251.057	68.711
1984	473.752	330.202	259.679	70.523
1985	490.146	341.613	269.300	72.313
1986	505.884	352.187	278.082	74.105
1987	517.431	359.054	283.333	75.723
1988	526.823	364.583	287.969	76.615
1989	538.532	375.007	296.794	78.213
1990	554.634	389.026	308.196	80.831
1991	560.786	393.296	311.585	81.712
1992	581.846	405.991	322.865	83.127
1993	594.848	413.788	328.521	85.268
1994	602.027	420.130	332.694	87.436
1995	608.810	423.460	335.464	87.997
1996	616.422	428.574	339.629	88.945
1997	623.782	434.617	344.561	90.057
1998	630.352	440.001	348.981	91.021
1999	636.928	445.519	353.531	91.988
2000	644.111	451.561	358.441	93.120
2001	651.362	457.835	363.501	94.335
2002	658.994	464.362	368.801	95.561
2003	667.660	471.437	374.626	96.811
2004	676.878	478.925	380.769	98.156
2005	686.663	486.851	387.267	99.584
2006	697.022	495.287	394.168	101.119
2007	707.990	504.091	401.364	102.727
2008	719.644	513.431	408.995	104.436
2009	731.592	522.970	416.755	106.216
2010	744.418	533.218	425.115	108.104

SOURCE: MAP MODEL OUTPUT FILES HE.12 AND HER.12
VARIABLES: POP, P.IR, P.AG, AND P.FG

TABLE N.5. SIMULATION CASE: SHERMAN CLARK
ASSOCIATES NO SUPPLY DISRUPTION CASE
PART E
Households
(Thousands)

	State	Railbelt	Greater Anchorage	Greater Fairbanks
1982	145.453	106.572	83.678	22.894
1983	153.141	111.549	88.038	23.511
1984	159.154	115.671	91.425	24.246
1985	165.299	120.140	95.165	24.974
1986	171.192	124.275	98.580	25.695
1987	175.620	127.053	100.709	26.344
1988	179.287	129.415	102.669	26.746
1989	183.738	133.365	105.994	27.371
1990	189.696	138.640	110.267	28.373
1991	192.234	140.401	111.662	28.739
1992	199.886	145.348	116.024	29.324
1993	204.788	148.405	118.253	30.152
1994	207.695	150.964	119.963	31.002
1995	210.461	152.463	121.197	31.267
1996	213.508	154.590	122.921	31.669
1997	216.470	157.052	124.921	32.131
1998	219.161	159.242	126.710	32.532
1999	221.854	161.483	128.549	32.934
2000	224.751	163.913	130.515	33.398
2001	227.670	166.423	132.532	33.891
2002	230.716	169.023	134.636	34.388
2003	234.112	171.820	136.928	34.892
2004	237.695	174.758	139.329	35.429
2005	241.468	177.849	141.853	35.996
2006	245.436	181.121	144.520	36.601
2007	249.609	184.516	147.285	37.231
2008	254.014	188.100	150.203	37.896
2009	258.519	191.748	153.162	38.586
2010	263.323	195.652	156.336	39.316

SOURCE: MAP MODEL OUTPUT FILES HE.12 AND HER.12
VARIABLES: HH, HH.IR, HH.AG, AND HH.FG

TABLE N.5. SIMULATION CASE: SHERMAN CLARK
ASSOCIATES NO SUPPLY DISRUPTION CASE
Part F
State Households by Age of Head
(Thousands)

	Total	Head Younger Than 25	Head 25-29	Head 30-54	Head Older Than 54
1982	145.453	17.141	23.938	81.706	22.667
1983	153.141	18.110	25.128	86.087	23.816
1984	159.154	18.624	25.919	89.726	24.884
1985	165.299	19.085	26.763	93.487	25.964
1986	171.192	19.447	27.532	97.157	27.056
1987	175.620	19.526	27.905	100.067	28.123
1988	179.287	19.488	28.085	102.516	29.199
1989	183.738	19.617	28.486	105.290	30.345
1990	189.696	20.014	29.285	108.807	31.591
1991	192.234	19.816	29.171	110.503	32.744
1992	199.886	20.529	30.434	114.787	34.137
1993	204.788	20.725	30.930	117.672	35.462
1994	207.695	20.603	30.909	119.437	36.746
1995	210.461	20.508	30.893	121.002	38.058
1996	213.508	20.500	30.996	122.606	39.407
1997	216.470	20.504	31.114	124.079	40.772
1998	219.161	20.485	31.199	125.334	42.143
1999	221.854	20.485	31.321	126.523	43.523
2000	224.751	20.530	31.532	127.771	44.917
2001	227.670	20.583	31.773	129.000	46.313
2002	230.716	20.656	32.069	130.279	47.712
2003	234.112	20.780	32.472	131.742	49.119
2004	237.695	20.920	32.929	133.319	50.526
2005	241.468	21.077	33.435	135.024	51.932
2006	245.436	21.247	33.987	136.866	53.336
2007	249.609	21.432	34.583	138.856	54.738
2008	254.014	21.634	35.226	141.014	56.139
2009	258.519	21.833	35.878	143.272	57.536
2010	263.323	22.058	36.592	145.736	58.937

SOURCE: MAP MODEL OUTPUT FILES HE.12 AND HER.12
VARIABLES: HH, HH24, HH25.29, HH30.54, AND HH55

TABLE N.6. SIMULATION CASE: SHERMAN CLARK ASSOCIATES BASE CASE
Part A
State Petroleum Revenues
(Million $)

	Royalties	Severance Taxes	Corporate Income Taxes	Property Taxes	Total Including Bonuses and Federal Shared Royalties	Total to General Fund (Net of Permanent Fund Contribution)
1982	1530.000	1590.000	668.900	142.700	3960.200	3570.550
1983	1456.661	1473.507	233.969	148.600	3361.836	2985.396
1984	1450.305	1474.080	328.647	153.200	3441.298	3069.956
1985	1555.117	1560.529	365.362	158.000	3668.700	3272.498
1986	1724.811	1705.298	398.723	163.456	4020.277	3582.077
1987	1896.215	1857.760	438.775	169.101	4389.691	3908.677
1988	1997.731	1647.607	396.949	174.940	4245.582	3739.060
1989	3724.894	3051.093	854.933	180.981	7841.047	6902.535
1990	3918.895	3192.306	930.155	187.231	8258.645	7271.402
1991	3842.630	3017.983	1086.262	193.697	8171.598	7203.184
1992	3892.345	2959.623	1219.116	200.385	8303.473	7322.383
1993	4038.582	3014.198	1376.381	207.305	8669.465	7651.566
1994	4143.422	3027.331	1506.285	214.464	8925.492	7881.137
1995	3971.011	2797.890	1623.633	221.870	8649.398	7647.895
1996	3869.246	2588.296	1766.092	229.532	8489.160	7512.848
1997	4080.758	2753.181	1966.871	237.458	9075.270	8045.824
1998	4223.734	2788.598	2178.473	245.658	9474.460	8409.027
1999	4330.508	2745.177	2428.082	254.141	9796.900	8704.523
2000	4495.066	2800.082	2700.508	262.917	10298.570	9164.800
2001	4665.879	2856.084	3003.500	271.996	10838.450	9661.730
2002	4843.180	2913.207	3340.488	281.389	11420.260	10198.960
2003	5027.219	2971.473	3715.285	291.106	12048.080	10780.520
2004	5218.254	3030.903	4132.133	301.158	12726.450	11410.880
2005	5416.547	3091.523	4595.750	311.558	13460.370	12094.980
2006	5622.375	3153.354	5111.387	322.317	14255.430	12838.340
2007	5836.023	3216.423	5684.879	333.447	15117.770	13647.010
2008	6057.793	3280.753	6322.711	344.962	16054.210	14527.770
2009	6287.988	3346.369	7032.109	356.874	17072.340	15488.090
2010	6526.930	3413.298	7821.105	369.198	18180.530	16536.290

SOURCE: MAP MODEL OUTPUT FILES HE.11 AND HER.11
VARIABLES: RPRY, RPTS, RTCSPX, RPPS, RP9S, AND RP9SGF

TABLE N.6. SIMULATION CASE: SHERMAN CLARK ASSOCIATES BASE CASE
Part B
State Government Expenditures
(Million $)

	Unrestricted General Fund Expenditures	General Fund Balance	Permanent Fund Dividends	State Personal Income Tax	State Subsidy Programs	Percent of Permanent Fund Earnings Reinvested
1982	4601.891	399.200	425.000	0.000	634.000	0.000
1983	3287.977	478.004	152.608	0.000	500.000	0.500
1984	3389.729	616.992	196.738	0.000	350.000	0.500
1985	3699.507	700.539	223.721	0.000	350.000	0.500
1986	4031.094	821.113	253.168	0.000	350.000	0.500
1987	4375.941	987.922	286.008	0.000	350.000	0.500
1988	4731.574	699.973	322.441	0.000	695.501	0.500
1989	5118.008	3223.754	361.817	0.000	0.000	0.500
1990	5573.352	5963.813	423.582	0.000	813.366	0.500
1991	5984.609	8552.969	490.596	0.000	871.614	0.500
1992	6504.379	11037.870	559.899	0.000	947.635	0.500
1993	7054.742	13639.220	633.095	0.000	1024.663	0.500
1994	7596.676	16246.970	711.518	0.000	1099.088	0.500
1995	8200.223	18343.450	794.921	0.000	1182.099	0.500
1996	8863.949	19932.590	880.251	0.000	1274.257	0.500
1997	9568.500	21608.150	968.438	0.000	1372.886	0.500
1998	10320.270	23168.750	1063.337	0.000	1477.449	0.500
1999	11127.700	24487.140	1164.454	0.000	1590.320	0.500
2000	11994.410	25658.150	1271.653	0.000	1711.744	0.500
2001	12924.230	26652.990	1385.910	0.000	1841.364	0.500
2002	13926.490	27433.730	1507.635	0.000	1980.824	0.500
2003	15012.480	27954.660	1637.259	0.000	2132.305	0.500
2004	16168.650	28187.950	1775.238	0.000	2295.271	0.500
2005	17406.510	28093.130	1922.051	0.000	2470.945	0.500
2006	18744.470	27615.590	2078.203	0.000	2660.411	0.500
2007	20239.340	26645.790	2244.230	0.000	0.000	0.500
2008	21964.710	25020.710	2420.691	0.000	0.000	0.500
2009	23797.580	22676.660	2608.180	0.000	0.000	0.500
2010	25753.130	19514.110	2807.320	0.000	0.000	0.500

SOURCE: MAP MODEL OUTPUT FILES HE.11 AND HER.11
VARIABLES: EXGFBM, BALGF, EXTRNS, RTIS, EXSUBS, AND EXPFBAK

TABLE N.6. SIMULATION CASE: SHERMAN CLARK ASSOCIATES BASE CASE
Part C
Employment
(Thousands)

	State Non-Ag Wage and Salary	State Total	Railbelt Total	Greater Anchorage Total	Greater Fairbanks Total
1982	192.903	231.984	154.033	120.533	33.500
1983	202.237	243.067	159.147	125.221	33.927
1984	205.903	246.984	162.259	127.853	34.406
1985	216.612	258.396	169.197	133.668	35.528
1986	225.515	267.895	174.818	138.324	36.494
1987	230.833	273.581	177.412	140.345	37.067
1988	234.657	277.669	179.422	142.065	37.357
1989	240.213	283.619	184.211	146.124	38.088
1990	246.856	290.708	188.428	149.748	38.680
1991	244.564	288.281	188.054	149.279	38.775
1992	261.156	305.986	196.836	156.929	39.908
1993	264.320	309.385	200.596	159.606	40.990
1994	266.370	311.604	202.942	161.237	41.705
1995	271.525	317.144	207.397	164.816	42.580
1996	278.133	324.247	212.393	168.848	43.545
1997	284.071	330.651	217.352	172.900	44.451
1998	288.968	335.960	221.805	176.496	45.309
1999	294.282	341.739	226.449	180.270	46.179
2000	299.695	347.575	231.155	184.080	47.075
2001	304.900	353.137	235.799	187.828	47.971
2002	310.287	358.895	240.574	191.695	48.879
2003	316.501	365.539	245.672	195.873	49.800
2004	322.914	372.397	251.061	200.269	50.792
2005	329.623	379.574	256.698	204.868	51.830
2006	336.597	387.038	262.607	209.682	52.926
2007	346.810	397.972	271.385	216.757	54.628
2008	358.232	410.206	281.136	224.639	56.498
2009	367.562	420.204	289.157	231.140	58.018
2010	377.130	430.461	297.158	237.647	59.512

SOURCE: MAP MODEL OUTPUT FILES HE.11 AND HER.11
VARIABLES: EM97, EM99, M.IR, M.AG, AND M.FG

TABLE N.6. SIMULATION CASE: SHERMAN CLARK ASSOCIATES BASE CASE
Part D
Population
(Thousands)

	State	Railbelt	Greater Anchorage	Greater Fairbanks
1982	437.175	307.105	239.830	67.277
1983	457.836	319.767	251.057	68.711
1984	473.752	330.202	259.679	70.523
1985	490.146	341.613	269.300	72.313
1986	505.884	352.187	278.082	74.105
1987	517.431	359.054	283.333	75.723
1988	526.823	364.583	287.969	76.615
1989	538.532	375.007	296.794	78.213
1990	551.784	386.200	305.972	80.228
1991	556.419	388.493	307.673	80.820
1992	577.402	401.938	319.599	82.339
1993	590.290	409.878	325.490	84.389
1994	598.856	417.640	330.934	86.706
1995	609.599	424.922	336.976	87.947
1996	622.606	434.203	344.497	89.707
1997	635.485	444.501	352.883	91.619
1998	647.624	453.869	360.467	93.402
1999	660.064	463.593	368.358	95.236
2000	672.663	473.591	376.424	97.167
2001	685.043	483.618	384.480	99.138
2002	697.642	493.792	392.695	101.098
2003	711.175	504.462	401.398	103.064
2004	725.159	515.493	410.381	105.112
2005	739.617	526.909	419.680	107.229
2006	754.593	538.804	429.358	109.446
2007	773.149	554.087	441.697	112.390
2008	793.962	571.134	455.494	115.640
2009	813.514	586.543	468.008	118.535
2010	833.488	602.250	480.775	121.475

SOURCE: MAP MODEL OUTPUT FILES HE.11 AND HER.11
VARIABLES: POP, P.IR, P.AG, AND P.FG

TABLE N.6. SIMULATION CASE: SHERMAN CLARK ASSOCIATES BASE CASE
Part E
Households
(Thousands)

	State	Railbelt	Greater Anchorage	Greater Fairbanks
1982	145.453	106.572	83.678	22.894
1983	153.141	111.549	88.038	23.511
1984	159.154	115.671	91.425	24.246
1985	165.299	120.140	95.165	24.974
1986	171.192	124.275	98.580	25.695
1987	175.620	127.053	100.709	26.344
1988	179.287	129.415	102.669	26.746
1989	183.738	133.365	105.994	27.371
1990	188.714	137.654	109.495	28.159
1991	190.726	138.734	110.308	28.426
1992	198.345	143.918	114.875	29.043
1993	203.202	147.016	117.181	29.835
1994	206.579	150.066	119.332	30.734
1995	210.698	152.940	121.703	31.236
1996	215.598	156.545	124.615	31.930
1997	220.461	160.521	127.841	32.680
1998	225.079	164.142	130.763	33.379
1999	229.805	167.898	133.801	34.098
2000	234.591	171.756	136.904	34.853
2001	239.308	175.628	140.005	35.623
2002	244.105	179.558	143.167	36.391
2003	249.225	183.670	146.510	37.160
2004	254.504	187.910	149.952	37.959
2005	259.952	192.291	153.508	38.783
2006	265.581	196.846	157.202	39.644
2007	272.433	202.577	161.814	40.763
2008	280.065	208.937	166.946	41.991
2009	287.289	214.744	171.647	43.096
2010	294.669	220.672	176.452	44.221

SOURCE: MAP MODEL OUTPUT FILES HE.11 AND HER.11
VARIABLES: HH, HH.IR, HH.AG, AND HH.FG

TABLE N.6. SIMULATION CASE: SHERMAN CLARK ASSOCIATES BASE CASE
Part F
State Households by Age of Head
(Thousands)

	Total	Head Younger Than 25	Head 25-29	Head 30-54	Head Older Than 54
1982	145.453	17.141	23.938	81.706	22.667
1983	153.141	18.110	25.128	86.087	23.816
1984	159.154	18.624	25.919	89.726	24.884
1985	165.299	19.085	26.763	93.487	25.964
1986	171.192	19.447	27.532	97.157	27.056
1987	175.620	19.526	27.905	100.067	28.123
1988	179.287	19.488	28.085	102.516	29.199
1989	183.738	19.617	28.486	105.290	30.345
1990	188.714	19.848	29.029	108.285	31.552
1991	190.726	19.581	28.797	109.666	32.682
1992	198.345	20.314	30.077	113.884	34.070
1993	203.202	20.523	30.587	116.705	35.386
1994	206.579	20.495	30.713	118.690	36.681
1995	210.698	20.624	31.064	120.975	38.036
1996	215.598	20.890	31.636	123.621	39.451
1997	220.461	21.143	32.203	126.226	40.889
1998	225.079	21.350	32.709	128.679	42.341
1999	229.805	21.572	33.251	131.164	43.818
2000	234.591	21.799	33.814	133.663	45.316
2001	239.308	22.008	34.362	136.112	46.827
2002	244.105	22.225	34.935	138.590	48.355
2003	249.225	22.483	35.596	141.239	49.907
2004	254.504	22.751	36.295	143.981	51.477
2005	259.952	23.030	37.030	146.828	53.064
2006	265.581	23.318	37.803	149.792	54.668
2007	272.433	23.768	38.886	153.449	56.330
2008	280.065	24.292	40.140	157.598	58.035
2009	287.289	24.711	41.239	161.601	59.738
2010	294.669	25.122	42.342	165.740	61.466

SOURCE: MAP MODEL OUTPUT FILES HE.11 AND HER.11
VARIABLES: HH, HH24, HH25.29, HH30.54, AND HH55

TABLE N.7. SIMULATION CASE: DEPARTMENT OF REVENUE AVERAGE
Part A
State Petroleum Revenues
(Million $)

	Royalties	Severance Taxes	Corporate Income Taxes	Property Taxes	Total Including Bonuses and Federal Shared Royalties	Total to General Fund (Net of Permanent Fund Contri- bution)
1982	1530.000	1590.000	668.900	142.700	3960.200	3570.550
1983	1456.660	1473.510	233.970	148.600	3361.839	2985.399
1984	1185.480	1205.680	268.807	153.200	2848.233	2543.097
1985	1233.320	1241.430	290.652	158.000	2953.094	2637.341
1986	1342.340	1333.120	311.703	163.456	3178.609	2836.027
1987	1444.950	1422.340	335.936	169.101	3400.170	3031.971
1988	1554.410	1520.010	366.208	174.940	3643.925	3248.233
1989	1709.830	1416.400	396.883	180.981	3733.246	3298.500
1990	1844.030	1518.280	442.387	187.231	4021.992	3553.469
1991	1806.010	1431.390	515.200	193.697	3977.323	3518.064
1992	1833.740	1402.980	577.910	200.385	4047.026	3580.589
1993	1906.680	1427.870	652.012	207.305	4226.871	3741.950
1994	1943.950	1424.860	708.956	214.464	4326.230	3831.743
1995	1863.280	1313.270	762.098	221.870	4195.516	3720.946
1996	1809.710	1208.220	824.414	229.532	4107.875	3646.448
1997	1901.360	1278.510	913.367	237.458	4367.691	3883.102
1998	1961.900	1288.600	1006.664	245.658	4540.820	4040.845
1999	2008.140	1263.500	1117.553	254.141	4682.332	4170.547
2000	2079.028	1282.453	1236.847	262.917	4901.242	4371.484
2001	2152.418	1301.690	1368.875	271.996	5135.977	4587.621
2002	2228.398	1321.216	1514.999	281.389	5388.000	4820.398
2003	2307.061	1341.034	1676.718	291.106	5658.918	5071.402
2004	2388.501	1361.150	1855.701	301.158	5950.508	5342.379
2005	2472.815	1381.568	2053.791	311.558	6264.727	5635.270
2006	2560.106	1402.292	2273.026	322.317	6603.734	5952.207
2007	2650.479	1423.326	2515.663	333.447	6969.910	6295.539
2008	2744.041	1444.677	2784.202	344.962	7365.875	6667.863
2009	2840.906	1466.347	3081.404	356.874	7794.527	7072.051
2010	2941.191	1488.343	3410.333	369.198	8259.063	7511.262

SOURCE: MAP MODEL OUTPUT FILES HE.3 AND HER.3
VARIABLES: RPRY, RPTS, RTCSPX, RPPS, RP9S, AND RP9SGF

TABLE N.7. SIMULATION CASE: DEPARTMENT OF REVENUE AVERAGE
Part B
State Government Expenditures
(Million $)

	Unre-Stricted General Fund Expendi-tures	General Fund Balance	Permanent Fund Dividends	State Personal Income Tax	State Subsidy Programs	Percent of Permanent Fund Earnings Reinvested
1982	4601.891	399.200	425.000	0.000	634.000	0.000
1983	3287.977	486.309	152.608	0.000	500.000	0.500
1984	3389.729	99.148	196.738	0.000	350.000	0.500
1985	3100.347	99.145	220.577	0.000	300.000	0.500
1986	3343.141	99.137	246.052	0.000	200.000	0.500
1987	3585.042	99.133	274.012	0.000	100.000	0.500
1988	3850.296	99.129	0.000	0.000	460.528	0.500
1989	4163.891	99.129	0.000	213.268	0.000	0.500
1990	5079.809	99.145	0.000	437.520	0.000	0.000
1991	5168.512	99.160	0.000	483.550	0.000	0.000
1992	5339.059	99.180	0.000	535.147	0.000	0.000
1993	5650.840	99.199	0.000	589.865	0.000	0.000
1994	5839.738	99.215	0.000	626.804	0.000	0.000
1995	5834.137	99.238	0.000	668.031	0.000	0.000
1996	5879.117	99.262	0.000	719.155	0.000	0.000
1997	6248.059	99.285	0.000	778.038	0.000	0.000
1998	6547.063	99.309	0.000	841.006	0.000	0.000
1999	6823.195	99.328	0.000	907.964	0.000	0.000
2000	7181.582	99.348	0.000	981.398	0.000	0.000
2001	7566.125	99.371	0.000	1061.018	0.000	0.000
2002	7977.875	99.391	0.000	1147.708	0.000	0.000
2003	8423.039	99.414	0.000	1243.982	0.000	0.000
2004	8906.191	99.438	0.000	1349.248	0.000	0.000
2005	9424.380	99.465	0.000	1462.763	0.000	0.000
2006	9982.400	99.496	0.000	1585.600	0.000	0.000
2007	10583.060	99.531	0.000	1718.290	0.000	0.000
2008	11230.350	99.566	0.000	1861.615	0.000	0.000
2009	11927.300	99.602	0.000	2014.553	0.000	0.000
2010	12676.770	99.641	0.000	2179.743	0.000	0.000

SOURCE: MAP MODEL OUTPUT FILES HE.3 AND HER.3
VARIABLES: EXGFBM, BALGF, EXTRNS, RTIS, EXSUBS, AND EXPFBAK

TABLE N.7. SIMULATION CASE: DEPARTMENT OF REVENUE AVERAGE
Part C
Employment
(thousands)

	State Non-Ag Wage and Salary	State Total	Railbelt Total	Greater Anchorage Total	Greater Fairbanks Total
1982	192.903	231.984	154.033	120.533	33.500
1983	202.237	243.067	159.147	125.221	33.927
1984	205.903	246.984	162.259	127.853	34.406
1985	212.775	254.316	166.559	131.672	34.887
1986	220.143	262.178	170.661	135.074	35.587
1987	224.439	266.776	172.495	136.489	36.006
1988	228.001	270.583	173.982	137.706	36.275
1989	230.011	272.756	175.767	139.328	36.439
1990	236.562	279.744	179.872	142.771	37.101
1991	235.002	278.098	180.410	143.021	37.389
1992	248.643	292.647	187.012	148.933	38.079
1993	249.295	293.368	188.874	150.122	38.752
1994	248.681	292.746	189.270	150.232	39.038
1995	250.204	294.410	191.122	151.794	39.328
1996	252.864	297.296	193.207	153.543	39.664
1997	256.099	300.809	196.014	155.865	40.149
1998	258.402	303.346	198.461	157.863	40.598
1999	261.027	306.248	201.027	159.984	41.043
2000	264.019	309.491	203.818	162.262	41.557
2001	266.993	312.664	206.690	164.592	42.098
2002	270.227	316.113	209.740	167.078	42.663
2003	274.320	320.480	213.130	169.881	43.249
2004	278.681	325.135	216.850	172.934	43.916
2005	283.380	330.150	220.840	176.206	44.635
2006	288.329	335.434	225.084	179.678	45.406
2007	293.545	341.005	229.540	183.316	46.225
2008	299.088	346.926	234.227	187.144	47.083
2009	304.541	352.753	239.020	191.029	47.990
2010	310.531	359.155	244.062	195.145	48.917

SOURCE: MAP MODEL OUTPUT FILES HE.3 AND HER.3
VARIABLES: EM97, EM99, M.IR, M.AG, AND M.FG

TABLE N.7. SIMULATION CASE: DEPARTMENT OF REVENUE AVERAGE
Part D
Population
(thousands)

	State	Railbelt	Greater Anchorage	Greater Fairbanks
1982	437.175	307.105	239.830	67.277
1983	457.836	319.767	251.057	68.711
1984	473.752	330.202	259.679	70.523
1985	486.247	339.161	267.509	71.653
1986	499.139	346.968	274.012	72.956
1987	508.393	352.211	277.965	74.246
1988	516.386	356.157	281.192	74.965
1989	523.703	362.726	286.856	75.871
1990	535.300	372.777	294.962	77.815
1991	539.628	375.651	297.106	78.546
1992	556.930	386.495	306.965	79.530
1993	565.539	391.334	310.414	80.921
1994	569.694	396.034	313.463	82.571
1995	574.869	399.548	316.596	82.953
1996	581.568	404.406	320.652	83.754
1997	589.003	410.623	325.755	84.868
1998	595.751	416.065	330.211	85.854
1999	602.662	421.770	334.902	86.869
2000	609.944	427.836	339.822	88.015
2001	617.193	434.069	344.842	89.227
2002	624.765	440.506	350.063	90.443
2003	633.332	447.462	355.785	91.678
2004	642.431	454.815	361.811	93.004
2005	652.063	462.582	368.173	94.409
2006	662.219	470.822	374.911	95.912
2007	672.932	479.393	381.913	97.480
2008	684.279	488.460	389.318	99.142
2009	695.865	497.685	396.820	100.865
2010	708.243	507.558	404.874	102.685

SOURCE: MAP MODEL OUTPUT FILES HE.3 AND HER.3
VARIABLES: POP, P.IR, P.AG, AND P.FG

TABLE N.7. SIMULATION CASE: DEPARTMENT OF REVENUE AVERAGE
Part E
Households
(thousands)

	State	Railbelt	Greater Anchorage	Greater Fairbanks
1982	145.453	106.572	83.678	22.894
1983	153.141	111.549	88.038	23.511
1984	159.154	115.671	91.425	24.246
1985	163.950	119.247	94.516	24.731
1986	168.855	122.412	97.134	25.279
1987	172.483	124.601	98.794	25.807
1988	175.656	126.407	100.257	26.150
1989	178.581	128.991	102.464	26.527
1990	182.967	132.857	105.569	27.288
1991	184.851	134.103	106.505	27.598
1992	191.181	138.340	110.323	28.017
1993	194.539	140.310	111.744	28.567
1994	196.363	142.239	113.020	29.219
1995	198.528	143.731	114.328	29.402
1996	201.210	145.719	115.978	29.741
1997	204.142	148.201	118.006	30.195
1998	206.839	150.374	119.777	30.597
1999	209.590	152.643	121.635	31.008
2000	212.464	155.042	123.573	31.469
2001	215.326	157.497	125.544	31.953
2002	218.294	160.024	127.587	32.438
2003	221.599	162.738	129.810	32.928
2004	225.084	165.587	132.136	33.451
2005	228.748	168.580	134.580	34.000
2006	232.591	171.742	137.156	34.586
2007	236.623	175.015	139.821	35.194
2008	240.870	178.463	142.629	35.834
2009	245.202	181.963	145.466	36.497
2010	249.802	185.697	148.503	37.194

SOURCE: MAP MODEL OUTPUT FILES HE.3 AND HER.3
VARIABLES: HH, HH.IR, HH.AG, AND HH.FG

TABLE N.7. SIMULATION CASE: DEPARTMENT OF REVENUE AVERAGE
Part F
State Households by Age of Head
(thousands)

	Total	Head Younger Than 25	Head 25-29	Head 30-54	Head Older Than 54
1982	145.453	17.141	23.938	81.706	22.667
1983	153.141	18.110	25.128	86.087	23.816
1984	159.154	18.624	25.919	89.726	24.884
1985	163.950	18.848	26.414	92.778	25.911
1986	168.855	19.066	26.951	95.877	26.961
1987	172.483	19.048	27.157	98.288	27.990
1988	175.656	18.974	27.262	100.385	29.035
1989	178.581	18.890	27.325	102.262	30.104
1990	182.967	19.088	27.794	104.821	31.264
1991	184.851	18.863	27.612	106.018	32.358
1992	191.181	19.431	28.633	109.460	33.657
1993	194.539	19.456	28.843	111.372	34.868
1994	196.363	19.251	28.671	112.396	36.045
1995	198.528	19.152	28.635	113.485	37.257
1996	201.210	19.168	28.774	114.765	38.503
1997	204.142	19.238	29.006	116.128	39.770
1998	206.839	19.274	29.198	117.333	41.034
1999	209.590	19.325	29.425	118.536	42.304
2000	212.464	19.399	29.702	119.785	43.578
2001	215.326	19.469	29.989	121.018	44.850
2002	218.294	19.554	30.316	122.305	46.120
2003	221.599	19.685	30.737	123.779	47.398
2004	225.084	19.833	31.205	125.372	48.674
2005	228.748	19.995	31.714	127.090	49.949
2006	232.591	20.169	32.261	128.937	51.223
2007	236.623	20.356	32.846	130.924	52.497
2008	240.870	20.559	33.473	133.067	53.772
2009	245.202	20.756	34.103	135.297	55.045
2010	249.802	20.978	34.787	137.712	56.325

SOURCE: MAP MODEL OUTPUT FILES HE.3 AND HER.3
VARIABLES: HH, HH24, HH25.29, HH30.54, AND HH55

TABLE N.8. SIMULATION CASE: DEPARTMENT OF REVENUE 50%
Part A
State Petroleum Revenues
(Million $)

	Royalties	Severance Taxes	Corporate Income Taxes	Property Taxes	Total Including Bonuses and Federal Shared Royalties	Total to General Fund (Net of Permanent Fund Contribution)
1982	1530.000	1590.000	668.900	142.700	3960.200	3570.550
1983	1427.140	1477.040	234.530	148.600	3336.409	2967.349
1984	1195.200	1215.120	270.912	153.200	2869.498	2561.932
1985	1231.320	1251.180	292.935	158.000	2963.127	2647.874
1986	1333.800	1333.800	311.862	163.456	3170.907	2830.460
1987	1419.550	1399.970	330.652	169.101	3347.116	2985.268
1988	1486.560	1467.000	353.436	174.940	3510.293	3131.564
1989	1610.400	1346.880	377.403	180.981	3544.816	3134.928
1990	1667.250	1384.500	403.407	187.231	3672.453	3248.124
1991	1527.610	1196.790	430.760	193.697	3379.884	2990.225
1992	1506.600	1117.800	460.440	200.385	3317.236	2932.583
1993	1475.920	1077.810	492.163	207.305	3286.203	2908.972
1994	1455.000	1057.300	526.072	214.464	3286.838	2914.587
1995	1366.290	969.000	562.317	221.870	3154.477	2804.154
1996	1250.010	881.790	601.678	229.532	2999.010	2677.507
1997	1288.770	901.170	643.796	237.458	3108.193	2776.751
1998	1298.460	881.790	688.861	245.658	3152.769	2818.654
1999	1308.150	833.340	737.081	254.141	3171.712	2834.925
2000	1327.902	817.756	788.676	262.917	3237.252	2895.277
2001	1347.953	802.464	843.883	271.996	3307.296	2960.058
2002	1368.306	787.458	902.955	281.389	3382.107	3029.531
2003	1388.967	772.732	966.161	291.106	3461.966	3103.974
2004	1409.939	758.282	1033.792	301.158	3547.171	3183.687
2005	1431.229	744.102	1106.157	311.558	3638.046	3268.989
2006	1452.839	730.187	1183.587	322.317	3734.931	3360.221
2007	1474.776	716.532	1266.438	333.447	3838.194	3457.750
2008	1497.045	703.133	1355.088	344.962	3948.228	3561.967
2009	1519.649	689.984	1449.944	356.874	4065.452	3673.290
2010	1542.595	677.082	1551.440	369.198	4190.313	3792.164

SOURCE: MAP MODEL OUTPUT FILES HE.9 AND HER.9
VARIABLES: RPRY, RPTS, RTCSPX, RPPS, RP9S, AND RP9SGF

TABLE N.8. SIMULATION CASE: DEPARTMENT OF REVENUE 50%
Part B
State Government Expenditures
(Million $)

	Unre-Stricted General Fund Expendi-tures	General Fund Balance	Permanent Fund Dividends	State Personal Income Tax	State Subsidy Programs	Percent of Permanent Fund Earnings Reinvested
1982	4601.891	399.200	425.000	0.000	634.000	0.000
1983	3287.977	468.262	152.608	0.000	500.000	0.500
1984	3389.373	98.406	196.387	0.000	350.000	0.500
1985	3110.568	98.402	220.325	0.000	300.000	0.500
1986	3337.280	98.398	245.765	0.000	200.000	0.500
1987	3537.842	98.391	273.609	0.000	100.000	0.500
1988	3732.573	98.387	0.000	0.000	0.000	0.500
1989	4001.927	98.391	0.000	213.199	0.000	0.500
1990	4769.551	98.406	0.000	435.587	0.000	0.000
1991	4623.320	98.410	0.000	478.524	0.000	0.000
1992	4662.992	98.426	0.000	527.755	0.000	0.000
1993	4777.902	98.445	0.000	580.122	0.000	0.000
1994	4868.406	98.457	0.000	614.701	0.000	0.000
1995	4848.777	98.477	0.000	654.437	0.000	0.000
1996	4828.109	98.496	0.000	704.480	0.000	0.000
1997	5044.152	98.516	0.000	761.752	0.000	0.000
1998	5209.805	98.539	0.000	822.762	0.000	0.000
1999	5353.863	98.555	0.000	887.839	0.000	0.000
2000	5552.078	98.570	0.000	959.271	0.000	0.000
2001	5764.133	98.594	0.000	1036.618	0.000	0.000
2002	5989.840	98.617	0.000	1120.812	0.000	0.000
2003	6234.121	98.641	0.000	1214.389	0.000	0.000
2004	6499.957	98.664	0.000	1316.726	0.000	0.000
2005	6782.723	98.688	0.000	1427.049	0.000	0.000
2006	7085.309	98.719	0.000	1546.408	0.000	0.000
2007	7408.457	98.750	0.000	1675.305	0.000	0.000
2008	7753.820	98.781	0.000	1814.485	0.000	0.000
2009	8121.906	98.816	0.000	1962.965	0.000	0.000
2010	8512.801	98.852	0.000	2123.280	0.000	0.000

SOURCE: MAP MODEL OUTPUT FILES HE.9 AND HER.9
VARIABLES: EXGFBM, BALGF, EXTRNS, RTIS, EXSUBS, AND EXPFBAK

TABLE N.8. SIMULATION CASE: DEPARTMENT OF REVENUE 50%
Part C
Employment
(thousands)

	State Non-Ag Wage and Salary	State Total	Railbelt Total	Greater Anchorage Total	Greater Fairbanks Total
1982	192.903	231.984	154.033	120.533	33.500
1983	202.237	243.067	159.147	125.221	33.927
1984	205.900	246.981	162.257	127.851	34.406
1985	212.854	254.400	166.610	131.710	34.900
1986	220.129	262.164	170.658	135.073	35.585
1987	224.095	266.411	172.271	136.322	35.949
1988	227.965	270.545	174.417	138.108	36.309
1989	229.526	272.241	175.882	139.489	36.392
1990	234.580	277.633	178.556	141.785	36.771
1991	231.427	274.292	177.974	141.171	36.804
1992	243.917	287.612	183.719	146.411	37.308
1993	243.246	286.923	184.637	146.865	37.772
1994	241.702	285.312	184.321	146.407	37.915
1995	242.914	286.643	185.903	147.742	38.161
1996	245.319	289.256	187.797	149.338	38.459
1997	248.113	292.298	190.293	151.420	38.874
1998	250.089	294.486	192.486	153.216	39.270
1999	252.485	297.142	194.868	155.189	39.679
2000	255.219	300.109	197.460	157.309	40.151
2001	257.921	302.989	200.117	159.469	40.648
2002	260.886	306.151	202.956	161.786	41.169
2003	264.715	310.234	206.135	164.422	41.713
2004	268.805	314.596	209.637	167.301	42.336
2005	273.226	319.313	213.403	170.393	43.010
2006	277.890	324.290	217.417	173.681	43.735
2007	282.812	329.544	221.634	177.128	44.506
2008	288.049	335.136	226.072	180.757	45.315
2009	293.206	340.642	230.618	184.444	46.174
2010	298.868	346.691	235.394	188.347	47.048

SOURCE: MAP MODEL OUTPUT FILES HE.9 AND HER.9
VARIABLES: EM97, EM99, M.IR, M.AG, AND M.FG

TABLE N.8. SIMULATION CASE: DEPARTMENT OF REVENUE 50%
Part D
Population
(thousands)

	State	Railbelt	Greater Anchorage	Greater Fairbanks
1982	437.175	307.105	239.830	67.277
1983	457.836	319.767	251.057	68.711
1984	473.750	330.199	259.677	70.523
1985	486.327	339.204	267.539	71.666
1986	499.149	346.988	274.031	72.957
1987	508.054	352.021	277.833	74.190
1988	516.259	356.992	281.952	75.041
1989	523.255	363.345	287.469	75.877
1990	533.184	371.539	294.078	77.461
1991	535.306	372.958	295.108	77.850
1992	550.842	382.528	303.978	78.551
1993	557.199	385.835	306.233	79.602
1994	559.519	389.212	308.219	80.994
1995	563.529	391.838	310.628	81.210
1996	569.216	395.991	314.124	81.868
1997	575.498	401.438	318.628	82.810
1998	581.204	406.133	322.491	83.642
1999	587.213	411.184	326.660	84.524
2000	593.612	416.622	331.082	85.540
2001	599.998	422.232	335.608	86.625
2002	606.741	428.069	340.351	87.718
2003	614.511	434.441	345.608	88.834
2004	622.832	441.222	351.177	90.045
2005	631.699	448.422	357.087	91.336
2006	641.101	456.103	363.376	92.727
2007	651.071	464.117	369.933	94.184
2008	661.676	472.628	376.894	95.735
2009	672.544	481.306	383.955	97.352
2010	684.180	490.620	391.560	99.060

SOURCE: MAP MODEL OUTPUT FILES HE.9 AND HER.9
VARIABLES: POP, P.IR, P.AG, AND P.FG

TABLE N.8. SIMULATION CASE: DEPARTMENT OF REVENUE 50%
Part E
Households
(thousands)

	State	Railbelt	Greater Anchorage	Greater Fairbanks
1982	145.453	106.572	83.678	22.894
1983	153.141	111.549	88.038	23.511
1984	159.153	115.670	91.424	24.246
1985	163.978	119.262	94.527	24.736
1986	168.859	122.419	97.140	25.279
1987	172.366	124.531	98.745	25.786
1988	175.612	126.675	100.505	26.171
1989	178.426	129.182	102.659	26.522
1990	182.237	132.405	105.248	27.157
1991	183.359	133.124	105.783	27.341
1992	189.075	136.903	109.246	27.657
1993	191.650	138.317	110.236	28.082
1994	192.832	139.766	111.128	28.638
1995	194.582	140.932	112.171	28.761
1996	196.900	142.657	113.612	29.046
1997	199.419	144.852	115.417	29.435
1998	201.739	146.745	116.967	29.778
1999	204.157	148.765	118.627	30.138
2000	206.705	150.923	120.375	30.548
2001	209.245	153.138	122.156	30.983
2002	211.902	155.433	124.013	31.419
2003	214.904	157.918	126.055	31.863
2004	218.091	160.541	128.202	32.339
2005	221.462	163.310	130.467	32.843
2006	225.013	166.249	132.865	33.384
2007	228.756	169.299	135.353	33.946
2008	232.714	172.525	137.983	34.542
2009	236.763	175.804	140.643	35.161
2010	241.074	179.313	143.500	35.813

SOURCE: MAP MODEL OUTPUT FILES HE.9 AND HER.9
VARIABLES: HH, HH.IR, HH.AG, AND HH.FG

TABLE N.8. SIMULATION CASE: DEPARTMENT OF REVENUE 50%
Part F
State Households by Age of Head
(thousands)

	Total	Head Younger Than 25	Head 25-29	Head 30-54	Head Older Than 54
1982	145.453	17.141	23.938	81.706	22.667
1983	153.141	18.110	25.128	86.087	23.816
1984	159.153	18.624	25.919	89.725	24.884
1985	163.978	18.853	26.421	92.792	25.912
1986	168.859	19.066	26.952	95.880	26.961
1987	172.366	19.027	27.127	98.227	27.986
1988	175.612	18.968	27.252	100.358	29.033
1989	178.426	18.866	27.287	102.175	30.098
1990	182.237	18.969	27.610	104.424	31.234
1991	183.359	18.629	27.241	105.191	32.297
1992	189.075	19.121	28.129	108.258	33.566
1993	191.650	19.049	28.170	109.692	34.739
1994	192.832	18.779	27.878	110.297	35.879
1995	194.582	18.655	27.789	111.081	37.057
1996	196.900	18.654	27.890	112.089	38.267
1997	199.419	18.695	28.072	113.161	39.490
1998	201.739	18.708	28.223	114.100	40.708
1999	204.157	18.742	28.421	115.067	41.927
2000	206.705	18.798	28.670	116.092	43.147
2001	209.245	18.849	28.927	117.110	44.359
2002	211.902	18.917	29.225	118.195	45.566
2003	214.904	19.032	29.618	119.479	46.775
2004	218.091	19.164	30.058	120.889	47.981
2005	221.462	19.310	30.538	122.433	49.181
2006	225.013	19.469	31.056	124.111	50.377
2007	228.756	19.641	31.610	125.934	51.570
2008	232.714	19.830	32.206	127.917	52.762
2009	236.763	20.015	32.806	129.993	53.950
2010	241.074	20.223	33.457	132.252	55.143

SOURCE: MAP MODEL OUTPUT FILES HE.9 AND HER.9
VARIABLES: HH, HH24, HH25.29, HH30.54, AND HH55

TABLE N.9. SIMULATION CASE: DEPARTMENT OF REVENUE 30%
Part A
State Petroleum Revenues
(Million $)

	Royalties	Severance Taxes	Corporate Income Taxes	Property Taxes	Total Including Bonuses and Federal Shared Royalties	Total to General Fund (Net of Permanent Fund Contribution)
1982	1530.000	1590.000	668.900	142.700	3960.200	3570.550
1983	1397.200	1437.120	228.191	148.600	3260.211	2898.636
1984	1085.640	1105.560	246.485	153.200	2625.951	2345.775
1985	1092.300	1102.230	258.062	158.000	2640.283	2359.785
1986	1165.840	1165.840	272.590	163.456	2795.716	2497.258
1987	1213.960	1194.380	282.095	169.101	2887.379	2576.928
1988	1261.620	1261.620	303.955	174.940	3030.492	2707.998
1989	1356.640	1112.640	311.768	180.981	2991.180	2644.733
1990	1287.000	1033.500	301.135	187.231	2838.930	2509.664
1991	1167.600	875.700	315.190	193.697	2583.214	2283.557
1992	1127.520	816.480	336.321	200.385	2512.718	2222.835
1993	1068.100	737.960	336.977	207.305	2383.346	2108.070
1994	1008.800	669.300	333.018	214.464	2259.583	1998.883
1995	949.620	639.540	371.129	221.870	2217.159	1971.004
1996	891.480	513.570	350.428	229.532	2021.010	1789.139
1997	891.480	513.570	366.894	237.458	2046.402	1814.281
1998	891.480	513.570	401.205	245.658	2089.912	1857.542
1999	891.480	494.190	437.106	254.141	2115.917	1883.297
2000	891.480	487.765	470.420	262.917	2152.583	1919.712
2001	891.480	481.424	506.272	271.996	2192.173	1959.053
2002	891.480	475.166	544.858	281.389	2234.893	2001.522
2003	891.480	468.988	586.384	291.106	2280.958	2047.338
2004	891.480	462.891	631.075	301.158	2330.605	2096.735
2005	891.480	456.874	679.173	311.558	2384.084	2149.964
2006	891.480	450.934	730.936	322.317	2441.667	2207.297
2007	891.480	445.072	786.644	333.447	2503.643	2269.023
2008	891.480	439.286	846.598	344.962	2570.325	2335.455
2009	891.480	433.575	911.121	356.874	2642.050	2406.930
2010	891.480	427.938	980.562	369.198	2719.178	2483.808

SOURCE: MAP MODEL OUTPUT FILES HE.10 AND HER.10
VARIABLES: RPRY, RPTS, RTCSPX, RPPS, RP9S, AND RP9SGF

TABLE N.9. SIMULATION CASE: DEPARTMENT OF REVENUE 30%
Part B
State Government Expenditures
(Million $)

	Unre-Stricted General Fund Expendi-tures	General Fund Balance	Permanent Fund Dividends	State Personal Income Tax	State Subsidy Programs	Percent of Permanent Fund Earnings Reinvested
1982	4601.891	399.200	425.000	0.000	634.000	0.000
1983	3287.977	399.547	152.608	0.000	500.000	0.500
1984	3389.018	-192.309	196.031	0.000	350.000	0.500
1985	2795.840	-192.313	218.651	0.000	300.000	0.500
1986	2973.724	-192.316	242.361	0.000	200.000	0.500
1987	3095.495	-192.324	268.050	0.000	100.000	0.500
1988	3271.402	-192.332	0.000	0.000	0.000	0.500
1989	3466.574	-192.336	0.000	209.322	0.000	0.500
1990	3961.398	-192.332	0.000	426.534	0.000	0.000
1991	3834.456	-192.332	0.000	467.624	0.000	0.000
1992	3861.400	-192.324	0.000	516.384	0.000	0.000
1993	3874.847	-192.320	0.000	567.874	0.000	0.000
1994	3838.732	-192.316	0.000	600.875	0.000	0.000
1995	3889.546	-192.313	0.000	639.880	0.000	0.000
1996	3803.517	-192.309	0.000	689.648	0.000	0.000
1997	3935.872	-192.301	0.000	745.985	0.000	0.000
1998	4092.233	-192.293	0.000	806.236	0.000	0.000
1999	4235.664	-192.285	0.000	871.032	0.000	0.000
2000	4399.785	-192.266	0.000	942.134	0.000	0.000
2001	4575.453	-192.250	0.000	1018.931	0.000	0.000
2002	4762.574	-192.234	0.000	1102.501	0.000	0.000
2003	4966.098	-192.215	0.000	1195.402	0.000	0.000
2004	5188.883	-192.195	0.000	1296.982	0.000	0.000
2005	5426.211	-192.176	0.000	1406.448	0.000	0.000
2006	5680.887	-192.148	0.000	1524.837	0.000	0.000
2007	5953.543	-192.121	0.000	1652.645	0.000	0.000
2008	6245.758	-192.090	0.000	1790.618	0.000	0.000
2009	6557.922	-192.055	0.000	1937.765	0.000	0.000
2010	6890.051	-192.020	0.000	2096.620	0.000	0.000

SOURCE: MAP MODEL OUTPUT FILES HE.10 AND HER.10
VARIABLES: EXGFBM, BALGF, EXTRNS, RTIS, EXSUBS, AND EXPFBAK

TABLE N.9. SIMULATION CASE: DEPARTMENT OF REVENUE 30%
Part C
Employment
(thousands)

	State Non-Ag Wage and Salary	State Total	Railbelt Total	Greater Anchorage Total	Greater Fairbanks Total
1982	192.903	231.984	154.033	120.533	33.500
1983	202.237	243.067	159.147	125.221	33.927
1984	205.898	246.979	162.255	127.849	34.405
1985	210.382	251.771	165.005	130.511	34.494
1986	216.369	258.164	168.030	133.060	34.970
1987	219.391	261.406	168.946	133.759	35.187
1988	222.773	265.021	170.703	135.228	35.475
1989	223.705	266.045	171.722	136.261	35.462
1990	227.346	269.932	173.452	137.841	35.611
1991	223.998	266.385	172.640	137.023	35.617
1992	236.533	279.749	178.402	142.269	36.133
1993	235.556	278.733	179.120	142.573	36.548
1994	233.547	276.627	178.479	141.864	36.615
1995	235.158	278.384	180.284	143.355	36.929
1996	237.669	281.108	182.274	145.029	37.245
1997	240.468	284.154	184.771	147.112	37.659
1998	242.718	286.632	187.128	149.028	38.100
1999	245.504	289.703	189.769	151.198	38.572
2000	248.530	292.980	192.563	153.473	39.090
2001	251.482	296.126	195.389	155.763	39.626
2002	254.687	299.542	198.389	158.204	40.185
2003	258.737	303.860	201.717	160.953	40.764
2004	263.021	308.428	205.348	163.931	41.418
2005	267.615	313.327	209.228	167.109	42.119
2006	272.425	318.459	213.336	170.469	42.867
2007	277.474	323.846	217.633	173.975	43.658
2008	282.817	329.549	222.135	177.652	44.483
2009	288.060	335.147	226.733	181.376	45.356
2010	293.792	341.269	231.546	185.306	46.241

SOURCE: MAP MODEL OUTPUT FILES HE.10 AND HER.10
VARIABLES: EM97, EM99, M.IR, M.AG, AND M.FG

TABLE N.9. SIMULATION CASE: DEPARTMENT OF REVENUE 30%
Part D
Population
(thousands)

	State	Railbelt	Greater Anchorage	Greater Fairbanks
1982	437.175	307.105	239.830	67.277
1983	457.836	319.767	251.057	68.711
1984	473.747	330.197	259.675	70.522
1985	483.812	337.814	266.557	71.257
1986	494.582	343.998	271.775	72.224
1987	501.725	347.784	274.588	73.197
1988	508.614	351.775	277.917	73.858
1989	514.242	357.214	282.721	74.494
1990	522.041	364.097	288.349	75.748
1991	523.050	364.573	288.595	75.978
1992	537.925	373.654	297.067	76.588
1993	543.329	376.343	298.846	77.497
1994	544.564	379.002	300.274	78.728
1995	548.379	381.365	302.438	78.928
1996	553.758	385.344	305.800	79.545
1997	559.688	390.546	310.111	80.436
1998	565.359	395.149	313.882	81.268
1999	571.535	400.271	318.090	82.181
2000	578.103	405.802	322.577	83.226
2001	584.683	411.520	327.179	84.341
2002	591.664	417.493	332.022	85.471
2003	599.702	424.024	337.396	86.628
2004	608.314	430.982	343.098	87.884
2005	617.487	438.370	349.149	89.221
2006	627.202	446.244	355.586	90.659
2007	637.486	454.454	362.291	92.163
2008	648.399	463.156	369.396	93.760
2009	659.563	472.016	376.596	95.420
2010	671.471	481.497	384.327	97.170

SOURCE: MAP MODEL OUTPUT FILES HE.10 AND HER.10
VARIABLES: POP, P.IR, P.AG, AND P.FG

TABLE N.9. SIMULATION CASE: DEPARTMENT OF REVENUE 30%
Part E
Households
(thousands)

	State	Railbelt	Greater Anchorage	Greater Fairbanks
1982	145.453	106.572	83.678	22.894
1983	153.141	111.549	88.038	23.511
1984	159.152	115.669	91.423	24.246
1985	163.108	118.748	94.165	24.583
1986	167.277	121.333	96.324	25.009
1987	170.170	122.994	97.573	25.421
1988	172.954	124.784	99.048	25.736
1989	175.287	126.955	100.941	26.014
1990	178.353	129.695	103.170	26.525
1991	179.076	130.070	103.420	26.651
1992	184.548	133.664	106.732	26.932
1993	186.777	134.843	107.541	27.302
1994	187.566	136.019	108.222	27.797
1995	189.226	137.079	109.168	27.911
1996	191.415	138.725	110.547	28.178
1997	193.788	140.813	112.269	28.545
1998	196.069	142.657	113.772	28.884
1999	198.519	144.685	115.432	29.254
2000	201.099	146.858	117.188	29.670
2001	203.678	149.093	118.981	30.112
2002	206.391	151.418	120.860	30.558
2003	209.460	153.941	122.928	31.013
2004	212.722	156.610	125.108	31.502
2005	216.174	159.429	127.409	32.020
2006	219.810	162.421	129.847	32.574
2007	223.639	165.525	132.375	33.150
2008	227.684	168.804	135.044	33.760
2009	231.816	172.135	137.743	34.392
2010	236.203	175.691	140.634	35.057

SOURCE: MAP MODEL OUTPUT FILES HE.10 AND HER.10
VARIABLES: HH, HH.IR, HH.AG, AND HH.FG

TABLE N.9. SIMULATION CASE: DEPARTMENT OF REVENUE 30%
Part F
State Households by Age of Head
(thousands)

	Total	Head Younger Than 25	Head 25-29	Head 30-54	Head Older Than 54
1982	145.453	17.141	23.938	81.706	22.667
1983	153.141	18.110	25.128	86.087	23.816
1984	159.152	18.624	25.919	89.725	24.884
1985	163.108	18.700	26.196	92.335	25.878
1986	167.277	18.807	26.558	95.015	26.897
1987	170.170	18.690	26.601	96.985	27.893
1988	172.954	18.587	26.644	98.808	28.915
1989	175.287	18.439	26.597	100.303	29.949
1990	178.353	18.452	26.773	102.088	31.040
1991	179.076	18.089	26.357	102.565	32.066
1992	184.548	18.581	27.239	105.429	33.299
1993	186.777	18.487	27.246	106.618	34.428
1994	187.566	18.186	26.905	106.959	35.517
1995	189.226	18.081	26.847	107.647	36.650
1996	191.415	18.087	26.964	108.553	37.811
1997	193.788	18.128	27.152	109.527	38.981
1998	196.069	18.156	27.334	110.434	40.145
1999	198.519	18.213	27.575	111.420	41.312
2000	201.099	18.287	27.860	112.474	42.477
2001	203.678	18.356	28.151	113.537	43.634
2002	206.391	18.441	28.481	114.683	44.786
2003	209.460	18.573	28.906	116.040	45.941
2004	212.722	18.722	29.374	117.533	47.093
2005	216.174	18.884	29.882	119.165	48.242
2006	219.810	19.059	30.425	120.937	49.389
2007	223.639	19.247	31.003	122.855	50.534
2008	227.684	19.450	31.619	124.933	51.682
2009	231.816	19.649	32.238	127.101	52.828
2010	236.203	19.870	32.904	129.448	53.981

SOURCE: MAP MODEL OUTPUT FILES HE.10 AND HER.10
VARIABLES: HH, HH24, HH25.29, HH30.54, AND HH55

TABLE N.10. SIMULATION CASE: DRI JUNE OIL PRICE
Part A
State Petroleum Revenues
(Million $)

	Royalties	Severance Taxes	Corporate Income Taxes	Property Taxes	Total Including Bonuses and Federal Shared Royalties	Total to General Fund (Net of Permanent Fund Contribution)
1982	1530.000	1590.000	668.900	142.700	3960.200	3570.550
1983	1457.689	1466.341	232.831	148.600	3354.561	2977.864
1984	1274.960	1307.848	291.585	153.200	3062.659	2735.153
1985	1622.790	1624.002	380.222	158.000	3814.706	3401.586
1986	1968.274	1937.369	452.985	163.456	4550.070	4051.005
1987	2351.861	2291.565	541.234	169.101	5381.598	4786.668
1988	2679.573	2195.610	528.976	174.940	5607.453	4930.469
1989	3131.633	2563.191	718.220	180.981	6623.172	5832.973
1990	3568.237	2902.565	845.732	187.231	7533.824	6634.246
1991	3561.764	2791.625	1004.789	193.697	7582.895	6684.695
1992	3675.249	2787.725	1148.309	200.385	7843.676	6916.859
1993	3867.240	2879.209	1314.741	207.305	8301.492	7326.430
1994	4077.600	2971.692	1478.601	214.464	8776.352	7748.449
1995	3915.632	2751.747	1596.855	221.870	8521.102	7533.441
1996	3817.288	2546.900	1737.845	229.532	8367.563	7404.238
1997	4028.878	2711.620	1937.181	237.458	8952.133	7935.660
1998	4172.879	2748.733	2147.331	245.658	9352.590	8299.871
1999	4279.906	2707.357	2394.630	254.141	9675.030	8595.305
2000	4446.820	2764.211	2665.913	262.917	10179.860	9058.150
2001	4620.238	2822.259	2967.929	271.996	10723.420	9558.110
2002	4800.426	2881.526	3304.160	281.389	11309.490	10098.880
2003	4987.637	2942.038	3678.481	291.106	11942.260	10684.600
2004	5182.152	3003.820	4095.210	301.158	12626.330	11319.790
2005	5384.254	3066.900	4559.148	311.558	13366.860	12009.540
2006	5594.234	3131.304	5075.645	322.317	14169.500	12759.440
2007	5812.406	3197.061	5650.656	333.447	15040.570	13575.710
2008	6039.086	3264.199	6290.809	344.962	15987.050	14465.280
2009	6274.605	3332.747	7003.484	356.874	17016.710	15435.800
2010	6519.313	3402.734	7796.898	369.198	18138.140	16495.810

SOURCE: MAP MODEL OUTPUT FILES HE.13 AND HER.13
VARIABLES: RPRY, RPTS, RTCSPX, RPPS, RP9S, AND RP9SGF

TABLE N.10. SIMULATION CASE: DRI JUNE OIL PRICE
Part B
State Government Expenditures
(Million $)

	Unre-Stricted General Fund Expenditures	General Fund Balance	Permanent Fund Dividends	State Personal Income Tax	State Subsidy Programs	Percent of Permanent Fund Earnings Reinvested
1982	4601.891	399.200	425.000	0.000	634.000	0.000
1983	3287.977	478.777	152.608	0.000	500.000	0.500
1984	3389.742	283.035	196.750	0.000	350.000	0.500
1985	3697.424	467.289	221.652	0.000	350.000	0.500
1986	4029.703	1036.957	251.803	0.000	350.000	0.500
1987	4377.344	2100.152	287.469	0.000	350.000	0.500
1988	4738.473	3098.219	329.383	0.000	695.494	0.500
1989	5120.824	4768.766	377.185	0.000	750.519	0.500
1990	5546.852	7031.609	432.636	0.000	811.771	0.500
1991	5973.613	9202.800	495.916	0.000	873.203	0.500
1992	6497.406	11347.520	562.136	0.000	950.386	0.500
1993	7055.133	13650.800	632.861	0.000	1029.020	0.500
1994	7604.488	16118.520	709.238	0.000	1104.981	0.500
1995	8217.195	18071.770	791.751	0.000	1189.619	0.500
1996	8889.809	19502.150	876.273	0.000	1283.305	0.500
1997	9605.000	20992.860	963.654	0.000	1383.801	0.500
1998	10366.800	22343.360	1057.710	0.000	1490.094	0.500
1999	11184.290	23423.120	1157.955	0.000	1604.699	0.500
2000	12061.170	24327.080	1264.245	0.000	1727.870	0.500
2001	13001.340	25024.180	1377.577	0.000	1859.258	0.500
2002	14014.250	25474.170	1498.364	0.000	2000.528	0.500
2003	15111.230	25628.790	1627.040	0.000	2153.868	0.500
2004	16278.860	25457.270	1764.063	0.000	2318.760	0.500
2005	17554.140	24891.040	1909.917	0.000	0.000	0.500
2006	19026.810	23791.370	2065.109	0.000	0.000	0.500
2007	20598.860	22096.210	2230.180	0.000	0.000	0.500
2008	22291.400	19707.560	2405.693	0.000	0.000	0.500
2009	24126.570	16522.480	2592.248	0.000	0.000	0.500
2010	26110.020	12429.930	2790.473	0.000	0.000	0.500

SOURCE: MAP MODEL OUTPUT FILES HE.13 AND HER.13
VARIABLES: EXGFBM, BALGF, EXTRNS, RTIS, EXSUBS, AND EXPFBAK

TABLE N.10. SIMULATION CASE: DRI JUNE OIL PRICE
Part C
Employment
(thousands)

	State Non-Ag Wage and Salary	State Total	Railbelt Total	Greater Anchorage Total	Greater Fairbanks Total
1982	192.903	231.984	154.033	120.533	33.500
1983	202.237	243.067	159.147	125.221	33.927
1984	205.903	246.984	162.259	127.853	34.406
1985	216.599	258.382	169.186	133.660	35.526
1986	225.497	267.875	174.803	138.312	36.492
1987	230.826	273.574	177.407	140.341	37.066
1988	234.683	277.697	179.445	142.084	37.361
1989	238.437	281.728	182.370	144.634	37.736
1990	245.796	289.578	186.951	148.495	38.456
1991	246.117	289.936	188.872	149.836	39.035
1992	263.377	308.354	198.185	157.915	40.270
1993	266.931	312.170	202.238	160.829	41.410
1994	269.483	314.925	204.957	162.757	42.201
1995	275.114	320.974	209.761	166.611	43.149
1996	282.004	328.378	214.959	170.801	44.158
1997	288.122	334.976	220.051	174.958	45.093
1998	293.168	340.446	224.616	178.642	45.974
1999	298.607	346.359	229.354	182.491	46.864
2000	304.117	352.300	234.133	186.358	47.775
2001	309.399	357.945	238.837	190.153	48.684
2002	314.863	363.787	243.671	194.067	49.604
2003	321.155	370.515	248.829	198.292	50.538
2004	327.646	377.460	254.280	202.737	51.543
2005	336.150	386.560	261.894	208.947	52.947
2006	345.390	396.451	270.171	215.700	54.472
2007	353.878	405.542	277.342	221.536	55.807
2008	362.560	414.843	284.617	227.454	57.164
2009	371.197	424.099	292.032	233.452	58.581
2010	380.238	433.793	299.610	239.615	59.996

SOURCE: MAP MODEL OUTPUT FILES HE.13 AND HER.13
VARIABLES: EM97, EM99, M.IR, M.AG, AND M.FG

TABLE N.10. SIMULATION CASE: DRI JUNE OIL PRICE
Part D
Population
(thousands)

	State	Railbelt	Greater Anchorage	Greater Fairbanks
1982	437.175	307.105	239.830	67.277
1983	457.836	319.767	251.057	68.711
1984	473.753	330.202	259.679	70.523
1985	490.133	341.600	269.290	72.311
1986	505.862	352.168	278.066	74.102
1987	517.417	359.044	283.324	75.721
1988	526.842	364.604	287.987	76.618
1989	536.724	372.633	294.861	77.773
1990	550.045	383.595	303.763	79.832
1991	557.236	388.459	307.488	80.972
1992	579.521	402.902	320.218	82.684
1993	593.536	411.639	326.747	84.893
1994	603.152	420.129	332.774	87.355
1995	614.876	428.092	339.354	88.739
1996	628.667	437.907	347.294	90.614
1997	642.228	448.675	356.050	92.625
1998	654.965	458.457	363.963	94.495
1999	667.922	468.542	372.139	96.404
2000	680.962	478.847	380.448	98.399
2001	693.722	489.139	388.714	100.425
2002	706.663	499.553	397.119	102.435
2003	720.513	510.446	405.999	104.448
2004	734.791	521.685	415.146	106.539
2005	751.282	535.855	426.702	109.154
2006	769.276	551.258	439.266	111.992
2007	787.028	565.256	450.661	114.596
2008	805.142	579.507	462.250	117.257
2009	823.611	593.995	473.992	120.004
2010	842.794	609.094	486.263	122.832

SOURCE: MAP MODEL OUTPUT FILES HE.13 AND HER.13
VARIABLES: POP, P.IR, P.AG, AND P.FG

TABLE N.10. SIMULATION CASE: DRI JUNE OIL PRICE
Part E
Households
(thousands)

	State	Railbelt	Greater Anchorage	Greater Fairbanks
1982	145.453	106.572	83.678	22.894
1983	153.141	111.549	88.038	23.511
1984	159.154	115.671	91.425	24.246
1985	165.294	120.136	95.162	24.974
1986	171.184	124.268	98.574	25.694
1987	175.615	127.049	100.706	26.343
1988	179.293	129.422	102.675	26.747
1989	183.115	132.550	105.332	27.219
1990	188.112	136.764	108.740	28.024
1991	191.001	138.737	110.252	28.486
1992	199.069	144.276	115.104	29.172
1993	204.317	147.661	117.639	30.022
1994	208.060	150.974	120.000	30.974
1995	212.522	154.096	122.566	31.529
1996	217.698	157.897	125.631	32.266
1997	222.804	162.046	128.994	33.053
1998	227.636	165.822	132.038	33.784
1999	232.550	169.714	135.183	34.531
2000	237.500	173.690	138.379	35.311
2001	242.360	177.666	141.562	36.104
2002	247.288	181.691	144.799	36.891
2003	252.531	185.893	148.213	37.680
2004	257.927	190.218	151.722	38.496
2005	264.082	195.554	156.059	39.495
2006	270.758	201.332	160.758	40.574
2007	277.366	206.646	165.070	41.576
2008	284.108	212.058	169.457	42.601
2009	290.982	217.557	173.900	43.657
2010	298.108	223.283	178.540	44.744

SOURCE: MAP MODEL OUTPUT FILES HE.13 AND HER.13
VARIABLES: HH, HH.IR, HH.AG, AND HH.FG

TABLE N.10. SIMULATION CASE: DRI JUNE OIL PRICE
Part F
State Households by Age of Head
(thousands)

	Total	Head Younger Than 25	Head 25-29	Head 30-54	Head Older Than 54
1982	145.453	17.141	23.938	81.706	22.667
1983	153.141	18.110	25.128	86.087	23.816
1984	159.154	18.624	25.919	89.726	24.884
1985	165.294	19.084	26.762	93.484	25.964
1986	171.184	19.446	27.530	97.153	27.055
1987	175.615	19.525	27.904	100.064	28.123
1988	179.293	19.489	28.087	102.519	29.199
1989	183.115	19.511	28.325	104.960	30.320
1990	188.112	19.758	28.884	107.943	31.527
1991	191.001	19.648	28.890	109.773	32.690
1992	199.069	20.445	30.282	114.249	34.094
1993	204.317	20.702	30.879	117.311	35.426
1994	208.060	20.712	31.078	119.532	36.737
1995	212.522	20.873	31.492	122.047	38.111
1996	217.698	21.160	32.105	124.889	39.544
1997	222.804	21.428	32.702	127.672	41.002
1998	227.636	21.646	33.230	130.284	42.476
1999	232.550	21.877	33.787	132.910	43.977
2000	237.500	22.109	34.359	135.530	45.501
2001	242.360	22.323	34.913	138.084	47.039
2002	247.288	22.543	35.491	140.656	48.597
2003	252.531	22.805	36.156	143.388	50.182
2004	257.927	23.077	36.858	146.204	51.786
2005	264.082	23.448	37.756	149.445	53.433
2006	270.758	23.868	38.771	153.006	55.112
2007	277.366	24.245	39.740	156.579	56.803
2008	284.108	24.614	40.718	160.263	58.514
2009	290.982	24.979	41.704	164.053	60.246
2010	298.108	25.358	42.733	168.013	62.005

SOURCE: MAP MODEL OUTPUT FILES HE.13 AND HER.13
VARIABLES: HH, HH24, HH25.29, HH30.54, AND HH55

TABLE N.11. SELECTED HISTORICAL DATA SERIES
Part A
State Petroleum Revenues
(Million $)

	Royalties (RPRY)	Severance Taxes (RPTS)	Corporate Income Taxes (RTCSPX)	Property Taxes (RPPS)	Total Incl.[a] Bonuses and Federal Shared Royalties (RP9S)	Total to General Fund (RP9SGF)
1961	.2	0	-	-	4.2	4.2
1962	1	.2	-	-	26	26
1963	1.1	.3	-	-	27.9	27.9
1964	1.2	.3	-	-	14.8	14.8
1965	1.9	.3	-	-	16.3	16.3
1966	2.8	.3	-	-	21.6	21.6
1967	4.6	.1	-	-	21.2	21.2
1968	12.4	1.2	-	-	42.9	42.9
1969	20.2	5.6	-	-	34.4	34.4
1970	22.4	7.9	-	-	938.6	938.6
1971	27	10.5	-	-	46.3	46.3
1972	27.5	11.4	-	-	47	47
1973	26.8	12	-	-	49.3	49.3
1974	32.8	14.8	-	-	79.5	79.5
1975	44.3	26.6	-	6.6	88.3	88.3
1976	47.4	28	-	83.4	387	387
1977	37.7	23.8	-	139.1	473.2	469.2
1978	202.5	107.7	-	173	488	437.5
1979	335.1	173.8	232.6	163.4	910.4	826.5
1980	921.6	506.2	547.5	168.9	2607.1	2262.3
1981	1498.5	1169.9	860.1	143	3692.9	3307.8
1982	1546.5	1581.1	668.9	142.7	3967.8	3567.3

[a]Also includes reserves tax in 1976-1977.

SOURCE: MAP MODEL DATABASE

TABLE N.11. SELECTED HISTORICAL DATA SERIES
Part B
State Government Expenditures
(Million $)

	Unrestricted General Fund Expenditures (EXGFBM)	General Fund Balance (BALGF)	Permanent Fund Dividends (EXTRNS)	State Personal Income Tax (RTIS)	State Subsidy Program (EXSUBS)	Percent of Permanent Fund Earnings Reinvested (EXPFBAK)
1961	-	9.8	0	10.4	0	0
1962	-	24.4		12.2		
1963	-	37.0		13.0		
1964	90.6	20.2		13.9		
1965	82.7	28.4		16.2		
1966	92.3	29.3		19.2		
1967	102.2	23.8		22.7		
1968	119.5	22.6		22.6		
1969	145.7	7.4		25.2		
1970	188.6	790.0		32.4		
1971	270.2	836.5		35.5		
1972	298.7	761.3		39.1		
1973	340.4	644.5		43.4		
1974	408.8	516.9		49.2		
1975	453.3	379.3		86.9		
1976	582.1	504.9		146.2	0	
1977	685.8	668.2		210.4	-	
1978	794.8	651.0		145.7	-	
1979	949.5	684.2		117.2	-	
1980	1172.8	1549.1		100.5	-	
1981	4349.57	821.1		0	772	
1982	-	-	0	0	634	0

SOURCE: MAP MODEL DATABASE

TABLE N.11. SELECTED HISTORICAL DATA SERIES
Part C
Employment
(Thousand)

	State			Non-Ag. Wage and Salary Plus Active Duty Military and Reservists		
	Non-Ag. Wage and Salary (EM97)	Non-Ag. Wage and Salary Plus Military (EM98)	Total (EM99)	Railbelt Total (M.IR)	Greater Anchorage Total (M.AG)	Greater Fairbanks Total (M.FG)
1961	56.9	89.4	94.3	-	-	-
1962	58.7	91.7	97.1	-	-	-
1963	62.1	95.1	100.7	-	-	-
1964	65.4	97.8	103.8	-	-	-
1965	70.5	103.5	110.0	74.1	52.3	21.8
1966	73.2	106.4	113.5	75.3	53.5	21.8
1967	76.8	110.5	119.2	77.4	55.8	21.6
1968	79.8	112.4	121.1	79.3	57.2	22.1
1969	86.6	118.9	127.4	85.3	61.3	24.0
1970	92.5	123.9	133.4	88.5	64.2	24.3
1971	97.6	127.5	137.2	90.8	67.1	23.7
1972	104.2	135.0	145.5	93.4	70.0	23.4
1973	109.8	136.8	147.3	95.2	72.6	22.6
1974	128.2	153.7	165.3	107.5	81.0	26.5
1975	161.3	186.6	197.5	130.4	93.4	37.0
1976	171.2	195.6	207.6	134.0	97.0	37.0
1977	164.1	189.1	203.3	134.9	103.0	31.9
1978	163.3	185.8	201.1	130.9	101.5	29.4
1979	166.4	189.7	206.1	132.0	102.7	29.3
1980	170.8	194.1	211.2	-	-	-
1981	183.7	207.0	224.3	-	-	-
1982	194.4	-	-	-	-	-

SOURCE: MAP MODEL DATABASE

TABLE N.11. SELECTED HISTORICAL DATA SERIES
Part D
Population
(Thousand)

	State (POP)	Railbelt (P.IR)	Greater Anchorage (P.AG)	Greater Fairbanks (P.FG)
1960	226.2	140.486	97.074	43.412
1961	236.7	-	-	-
1962	242.8	-	-	-
1963	249.9	-	-	-
1964	253.2	-	-	-
1965	265.2	-	-	-
1966	271.5	-	-	-
1967	277.9	-	-	-
1968	284.9	-	-	-
1969	294.6	-	-	-
1970	304.7	199.670	149.480	50.190
1971	314.4	-	-	-
1972	325.5	-	-	-
1973	333.5	-	-	-
1974	353.8	-	-	-
1975	390.0	-	-	-
1976	411.3	-	-	-
1977	410.6	-	-	-
1978	402.5	-	-	-
1979	400.6	-	-	-
1980	402.0	275.818	216.065	59.753

SOURCE: MAP MODEL DATABASE

TABLE N.11. SELECTED HISTORICAL DATA SERIES
Part E
Households
(Thousand)

	State (HH)	Railbelt (HH.IR)	Greater Anchorage (HH.AG)	Greater Fairbanks (HH.FG)
1950	31.028			
1960	57.250	37.062	26.006	11.056
1970	79.059	54.057	41.440	12.617
1980[a]	131.068	94.210	74.287	19.923

Note: 1980 Census areas are not exactly equivalent to 1970 Census Divisions.

[a]Taken from Alaska Department of Labor, Alaska Population Overview, 1981.

SOURCE: MAP MODEL DATABASE

TABLE N.11. SELECTED HISTORICAL DATA SERIES
Part F
State Households by Age of Head
(Thousand)

	Total (HH)	Head Younger than 25 (HH24)	Head 25 - 29 (HH25.29)	Head 30 - 54 (HH30.54)	Head Older than 54 (HH55)
1960[1]	57.250	4.356	8.307	35.895	8.692
1970[2]	79.739	9.044	11.909	46.247	12.539
1980[3]	131.463	15.531	23.034	73.130	19.768

[1] 1960 Census of Population, Vol. 1, Part 3, Alaska.

[2] 1970 Census of Population, Detailed Characteristics, Final Report PC(1)-03 Alaska.

[3] 1980 Census of Population Summary Tape File 2B, Table 21 (special ISER tabulation).

APPENDIX O
PREVIOUS ISER STUDIES OF RAILBELT ELECTRICITY REQUIREMENTS

The Institute of Social and Economic Research (ISER) has been involved in two recent studies of railbelt electric power requirements prior to the current study reported upon in this technical documentation report. The purpose of this appendix is to review the role of the Institute in those previous study efforts.

The first study, entitled Electric Power Consumption for the Railbelt: A Projection of Requirements (June 1980), was prepared by ISER for the House Power Alternatives Study Committee of the Alaska State Legislature and the Alaska Power Authority. The study produced the first set of projections of railbelt electricity needs based upon analytical models. Table B (reproduced) summarizes those projections.

The study was based upon a set of nine state economic projections produced by a version of the ISER MAP economic model (including the population module). This model was similar, but not identical, in structure to the model used in subsequent efforts, including the current report. The nine projections were produced using three "economic scenarios" and three "fiscal scenarios." Table C.11 (reproduced) shows the projections of population in these nine cases.

Four additional models and modules were newly constructed and used in the study. These included a household formation module, a regional allocation model, a housing stock model, and an energy end-use model. All except the housing stock model have continued to be used in subsequent studies of railbelt electricity needs.

TABLE B. PROJECTED ELECTRIC UTILITY SALES AND MILITARY PLUS SELF-SUPPLIED INDUSTRIAL NET GENERATION

(10^3 MWh)

Year	Utility Sales: Anchorage	Utility Sales: Fairbanks	Utility Sales: Anchorage+ Fairbanks	Utility Sales: Glennallen-Valdez	Total Utility Sales	Military Net Generation	Self-Supplied Industry Net Generation
1978	1,747	427	2,174	38	2,212	334	414
1980	1,907	446	2,353	37	2,390	334	414
1985							
L	2,249	619	2,868	53	2,921		414
M	2,438	669	3,107	64	3,171	334	571
H	2,676	769	3,445	116	3,561		847
M-E	2,438	669	3,107	64	3,171		571
1990							
L	2,510	666	3,176	60	3,236		414
M	2,782	742	3,524	75	3,599	334	571
H	3,249	914	4,163	119	4,282		981
M-E	2,782	742	3,524	75	3,599		571
1995							
L	3,097	813	3,910	66	3,976		414
M	3,564	949	4,513	88	4,601	334	571
H	4,438	1,227	5,665	124	5,789		981
M-E	3,564	949	4,513	104	4,617		571
2000							
L	3,981	1,040	5,021	80	5,101		414
M	4,451	1,177	5,628	102	5,730	334	571
H	5,519	1,537	7,056	136	7,192		981
M-E	4,973	1,416	6,389	136	6,525		571
2005							
L	4,375	1,154	5,529	88	5,617		414
M	5,226	1,397	6,623	119	6,742	334	571
H	7,013	1,988	9,001	176	9,177		981
M-E	6,220	1,834	8,054	165	8,219		571
2010							
L	4,807	1,277	6,084	95	6,179		414
M	6,141	1,671	7,812	140	7,952	334	571
H	8,927	2,586	11,513	223	11,736		981
M-E	7,624	2,318	9,942	200	10,142		571

L = Minimum economic growth
M = Likely economic growth
H = Maximum economic growth

M-E = Likely economic growth with shift to electric space heat and appliances in residential sector

Reprinted from: Electric Power Consumption for the Railbelt: A Projection of Requirements (June 1980), ISER, p. iii.

TABLE C.11. POPULATION, 1980-2000

(thousands of people)

	LES.GL	LES.GM	LES.GH	MES.GL
1980	421.737	421.737	421.737	421.737
1985	467.154	481.343	489.697	484.463
1990	490.316	511.635	524.638	518.496
1995	528.220	565.281	589.303	575.227
2000	574.216	635.578	680.418	627.156

	MES.GM	MES.GH	HES.GL	HES.GM
1980	421.737	421.737	421.737	421.737
1985	503.942	515.437	512.720	536.670
1990	547.996	566.267	570.790	614.965
1995	625.159	658.257	660.043	733.365
2000	700.076	753.448	731.548	831.024

	HES.GH
1980	421.737
1985	550.334
1990	645.251
1995	786.342
2000	908.437

SCENARIO NAMES:

LES.GL - Low Economic/Low Government
LES.GM - Low Economic/Moderate Government
LES.GH - Low Economic/High Government
MES.GL - Moderate Economic/Low Government
MES.GM - Moderate Economic/Moderate Government
MES.GH - Moderate Economic/High Government
HES.GL - High Economic/Low Government
HES.GM - High Economic/Moderate Government
HES.GH - High Economic/High Government

Note: Values in 1980 adjusted to be the same in all cases; adjusts for minor differences in exogenous series.

Reprinted from: Electric Power Consumption for the Railbelt: A Projection of Requirements (June 1980), ISER, p. C.42.

The current version of the household formation model is similar in structure to the version developed for the 1980 study. The regional allocation model utilized in that study has been completely redesigned as the Regionalization Model. The end-use model has come to be known as the RED model.

The economic projections using the ISER MAP economic model ended in 2000, and values to 2010 were extrapolated. Four electricity requirements projections were made and reported (Table B). State petroleum revenues projections utilized the Alaska Department of Revenue March 1980 forecast. Alternate revenue projections were not utilized since the "fiscal rule" in use was based upon alternative assumptions of the elasticity of state spending to state personal income, and state revenues did not constitute a constraint on spending.

The second study, done under subcontract for Battelle Pacific Northwest Laboratories, is entitled Alaska Economic Projections for Estimating Electricity Requirements for the Railbelt (October 1981). This report was subsequently published in September 1982 as Volume IX of their study entitled Railbelt Electric Power Alternatives Study for the Office of the Governor, Division of Policy Development and Planning and the Governor's Policy Review Committee.

The purpose of this study was to produce updated and refined economic projections of railbelt activity similar in scope to those of the earlier study. It utilized an updated version of the ISER MAP economic model (including the population module), an updated version of the household formation module, and the newly created Regionalization Model. The economic and fiscal scenarios were completely updated and documented.

ISER was not involved in the projection of electricity requirements for this study. Battelle utilized the end-use model previously constructed by ISER, modified and updated it, and named it the RED model.

The report presented the results of three sets of economic projections through the year 2000 involving various combinations of "economic scenarios" and "fiscal rules" similar to those of the earlier report. As before, petroleum revenues were not a constraint on government spending. In addition, a projection was made in which an "industrialization case" was added to the moderate economic scenario, which was composed of industries thought to be responsive to locating in Alaska if electricity prices were favorable. (ISER also generated a projection for Battelle in which the industrialization case was grafted onto the high economic scenario. This was done subsequent to our written report.) The choice of these economic projections was dictated by Battelle. In addition, a "fiscal crisis" projection was presented which involved a projection of petroleum revenues less than the base case. The statewide population projections for four of those cases are shown as Table I.32. An explanation of why these projections are slightly lower than those in the earlier report were explained in the study.

Table I.32. Summary of Four Projections
Population

(thousands)

POP - ENDOGENOUS

	B.LL	B.MM	B.IM	B.HH
1980	400.457	400.457	400.457	400.457
1981	410.809	412.395	412.616	411.271
1982	426.042	428.251	429.36	429.47
1983	437.823	444.492	446.752	448.584
1984	452.251	463.274	467.662	472.623
1985	479.816	498.151	506.492	515.812
1986	509.003	531.933	549.615	568.864
1987	513.303	545.304	566.246	597.499
1988	511.419	547.669	578.904	620.477
1989	513.395	558.208	587.325	640.117
1990	512.694	562.438	597.3	656.496
1991	514.468	572.732	612.719	671.785
1992	516.988	579.364	619.682	693.689
1993	521.771	588.021	632.293	710.077
1994	526.362	598.543	644.51	733.477
1995	532.359	608.963	658.299	757.925
1996	538.019	621.173	673.9	780.644
1997	544.539	634.519	691.374	806.271
1998	550.92	646.899	708.14	830.444
1999	557.536	660.873	727.244	856.578
2000	564.285	674.985	746.848	884.435

B.LL = Low-Low Projection
B.MM = Moderate-Moderate Projection
B.IM = Industrialization Projection
B.HH = High-High Projection

Reprinted from: Alaska Economic Projections for Estimating Electricity Requirements for the Railbelt (October 1981), ISER, p. 43.

APPENDIX P
MAN-IN-THE-ARCTIC PROGRAM
ECONOMETRIC MODELING BIBLIOGRAPHY

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