**STATE UNEMPLOYMENT INSURANCE
BENEFIT FINANCING MODEL**

USER'S MANUAL

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PREFACE

The State Benefit Financing Model (BFM) was first developed in 1977. It has since been modified and expanded by the Division of Actuarial and Fiscal Services in the Office of Workforce Security of the U.S. Department of Labor. It is now maintained by this division for the free use by any State with the desire to use this forecasting program.

The model was developed as a tool to help analysts project the condition of their UI trust funds several years into the future and to quickly assess the financial impact of various economic scenarios and possible law changes. This model was constructed to be extremely comprehensive yet flexible enough to adapt to individual State needs.

Originally designed only for Reserve Ratio States, the Benefit Financing Model now models Reserve Ratio, Benefit Ratio, and Benefit Wage experience rating systems. The B.F.M. consists of fourteen individual programs written in the C computer language. The exact specifications, procedures, and methodology, used in this model are outlined in this manual.

The manual is divided into several sections. The first section is called the User's Guide, this section will provide the general procedure for accessing and logging onto the model, describe the program facilities and explain how these facilities can be accessed. The next sections describe the program methodology, this section will explain how the model works and a derivation of all the variables and equations. The methodology portion is divided into two sections, the first covers all of the methodology of the Projection Program, while the second covers methodology employed in the Financial Forecast Program.

Before getting started it is important to note that the programs were constructed so they can be readily adapted to meet each State's own financing system. However, each State may have several unique provisions that have not been allowed for in these two general programs. Therefore, certain adjustments should be made to the two programs to properly model each specific State. It is believed that, for most of the States, these changes will be few and can be accommodated by minor modifications to the existing programs. The Division of Actuarial Services is available to assist each State in starting the program and in making any program changes that may be required.

This document intends to provide a general overview of both the methodological and the operational aspects of the Benefit Financing Model. It does not, however, intend to cover state specific variations. Therefore, it should be read along with the State Program Specifications Document, if applicable.

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Part 1

OPERATIONAL GUIDE

CHAPTER 1   GETTING STARTED

The Benefit Financing Model (BFM) is an interactive program that is run on a Sun Computer under the Unix Operation System at the US Department of Labor Office of Workforce Security.

The individual State program is set up by the National Office staff and usually takes approximately four weeks to program depending on the complexity of the state laws. Once a State Model has been programmed and loaded onto the system a User ID and Password will be given to the state by the Division of Fiscal and Actuarial Services. State users may then access their model anytime, free of charge

The Model is accessible over the internet through almost any computer. Specific communication software to connect to the model is required[1]. This software, along with instructions, is available from the National Office on request.

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[1] Currently, SSH Secure Shell communication software is used by all participating states.

CHAPTER 2   THE MAIN MENU

A successful login will bring the user to the Benefit Financing Model Welcome Screen and then to the Main Menu.   From the Main Menu (Figure 2.1) the user can edit any data files, run the Benefit Financing Program, seek help, display outputs and conduct other BFM tasks. Following is a brief description of each of the options on the Main Menu.

Figure 2.1   Main Menu

```
eris.uis.doleta.gov [1] [BFM] - QVT/Term                                    _ 8 X
File  Edit  View  Setup  Keymaps  Font  Printer  Launch  Commands  Apps  Help

1*************************************************************************k
*                    DC BENEFIT FINANCING MODEL MAIN MENU                *
*                                                                        *
*                                                                        *
*          DATA      - To update or view data                           *
*                                                                        *
*          RUNBFM    - Runs benefit financing model                      *
*          SHOW      - Displays output at the terminal                   *
*          DROP      - Deletes input or output files                     *
*          PRINT     - Prints input or output files on user's printer    *
*          EMPDST    - Update or create an employer distribution         *
*                                                                        *
*          NEWS      - New features in the model (Feb 01 2002)           *
*          HELP      - How to use the new screen editing system          *
*          Q         - Exits the program                                 *
*                                                                        *
*                                                                        *
*                                                                        *
*       ------------------------------------------------------------     *
*          To select an option: Use the directional arrow keys to        *
*                  highlight an option and press RETURN                   *
*                                                                        *
*                                                                        *
m*************************************************************************j

30x97    (5,45)    Connected     Secure   Printer: Off   Logging: Off         NUM  Ready
```

2.1 DATA EDITING

The BFM is equipped with a full screen editing system, in which the user can examine, update, or modify all the variables for either the Projection Program or Financial Forecast Program. Under the Data Editing option the user will then be asked to choose a specific dataset to view or edit. Within each dataset the variables are grouped together by type, such as historical variables, scenario variables, or State law variables, etc. Once an individual data item is located it can be changed by overwriting the existing value.

The grouped variables are stored in numbered datasets ranging from zero to nine. The

identifying numbers for each dataset is used to call, save, run, or delete each set of variables. Figure 2.2A displays the Data Editing Screen Menu for the Projection Program and Figure 2.2B displays the Data Editing Screen Menu for the Financial Forecast Program.

Figure 2.2A   Main Data Editing Screen
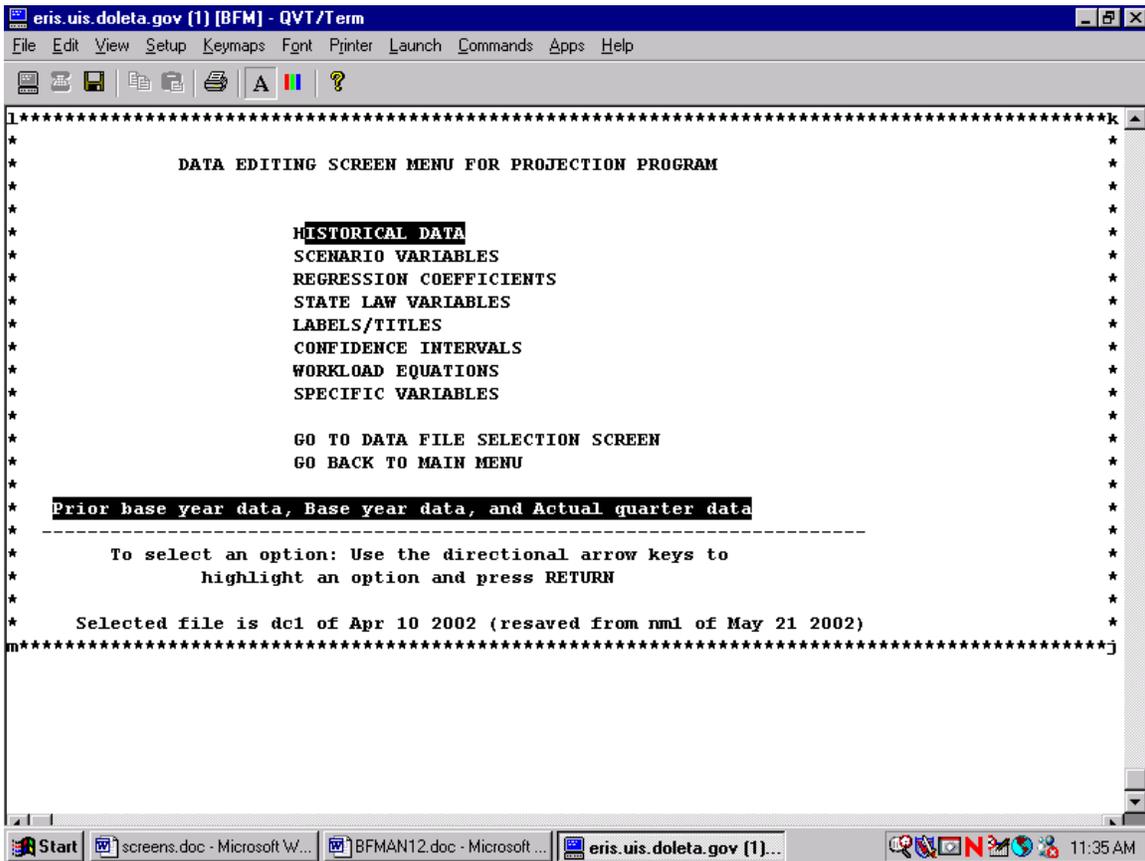
Figure 2.2B Financial Forecast Data Editing Screen

```
eris.uis.doleta.gov (1) [BFM] - QVT/Term                                    _ ô X
File  Edit  View  Setup  Keymaps  Font  Printer  Launch  Commands  Apps  Help

 ▦ ▦ ■ │ ▤ ▥ │ ▤ │ A ▐▐ │ ?

1********************************************************************************k ▲
*                                                                              *
*              DATA EDITING MENU FOR FINANCIAL FORECAST                        *
*                                                                              *
*                                                                              *
*                  BASE YEAR FINANCIAL DATA                                    *
*                  TAX RATES AND TRIGGERS                                      *
*                  SOLVENCY TAXES/SOCIAL TAXES                                 *
*                  DC-SPECIFIC UI DATA                                         *
*                  LOAN OPTIONS                                                *
*                  ADDITIONAL QUARTERLY DATA                                   *
*                  CHANGE IN TAXATION SYSTEM                                   *
*                  SPECIFIC VARIABLES                                          *
*                                                                              *
*                  GO BACK TO DATA SELECTION MENU                              *
*                  GO BACK TO MAIN MENU                                        *
*                                                                              *
*        Selected file is dc0 of Nov 27 2000                                  *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*            NOTE:  GO BACK TO MAIN MENU to complete a file update            *
m********************************************************************************j
◄ │                                                                          ► 
30x97    (6,50)    Connected    Secure   Printer: Off   Logging: Off      NUM Ready
```

2.1 RUN BFM

Since the BFM consists of compiled C programs, it must be run after every change in the data. When this option is chosen a screen will display the available Projection Program data sets, the Financial Forecast Program data sets and the available Employer Distributions. If the user only wants to run a Projection Program, a right arrow button is pushed to select only the Projection Program data sets. However, when running the Financial Forecast Program, a Projection Program data set, a Financial Forecast data set and an Employer Distribution must be selected. Figure 2.3 shows the RUNBFM screen. After each run a new set of outputs will be created.

Figure 2.3 Main RUN Screen
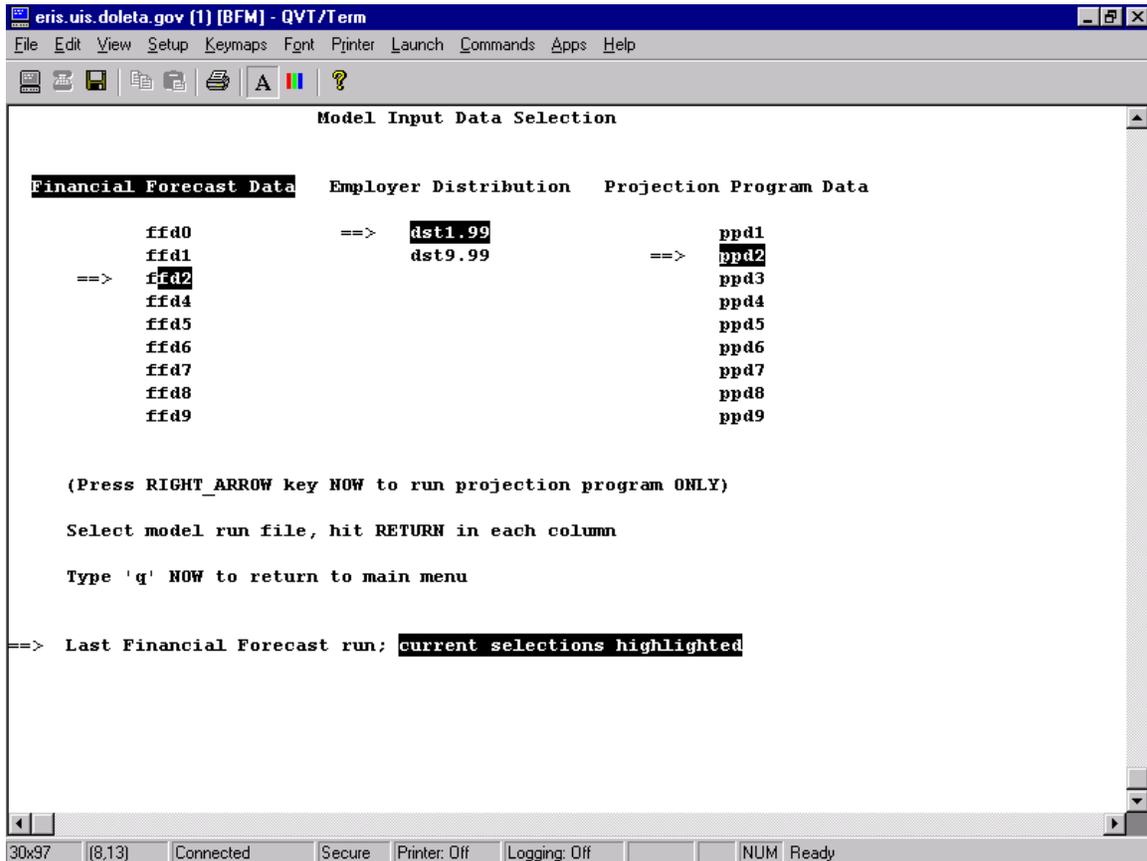
After each run the question will appear "Do you want to see the output (Yes/No)?" Pressing "Y" will let the user see each of the output tables on the screen. Pressing "N" will bring the user back to the Main Menu.

2.3 SHOW

After running either the Projection Program or the Financial Forecast Program, output tables are created. The Projection Program produces two tables, whereas the Financial Forecast Program can generate up to 11 tables. Any one of these tables can be displayed on the screen through the SHOW option.

To view the Projection Program outputs, choose SHOW from the Main Menu and then immediately press the right arrow key which will reveal the list of Projection Programs. Choose the desired Projection Program output file listed under Projection Program Data.

(Note: Each individual input dataset is identified by a number from zero to nine. Once a Projection Program is run, the output dataset carries the same number as the input data.)

Output data sets are labeled under the following naming conventions: The name will start with the two letter abbreviation for that state, followed by the number designation of the input data set used. A single digit after the state code signifies a projection program, while a state abbreviation followed by a three digit number signifies an output produced by a Financial Forecast, employer Distribution, and a Projection Program. For example: ST8 would mean the output created by running Projection Program data set 8 of state ST. ST012 would signify the output created by running Financial Forecast data set 0, with Employer Distribution 1 and Projection Program data set 2 for State ST.

For the Financial Forecast the user will have the option to show all the tables or any one table. Picking an item from the menu works like any other menu in the BFM. Using the arrow keys, move the highlight bar to the table of choice, and press enter. The actual outputs produced are wider then the screen so the user must "scroll" through the columns and rows with the aid of the arrow keys. Movement through the screens is discussed in the next section.

The procedure for showing a Financial Forecast output is similar to that of showing Projection Program outputs. From the SHOW menu choose a numbered output. The Financial Forecast files will be listed with the number of the Financial Forecast, the number of the employer distribution and Projection Program number. The user may see, for example, the same Financial Forecast listed more than once. Each Financial Forecast listed will be combined with either a different Employer Distribution or Projection Program file. The data files that are listed are the input data files used to create the outputs. After the files are chosen the user is given the option to display each of the output tables individually or all together.

2.4 DROP

Through this option the user may delete input data sets and output tables. All of the currently available input data files and output tables will be displayed and the user must choose the files to drop. After all the desired files are deleted the user must select "DONE" to complete the procedure:

Figure 2.4 DROP Screen
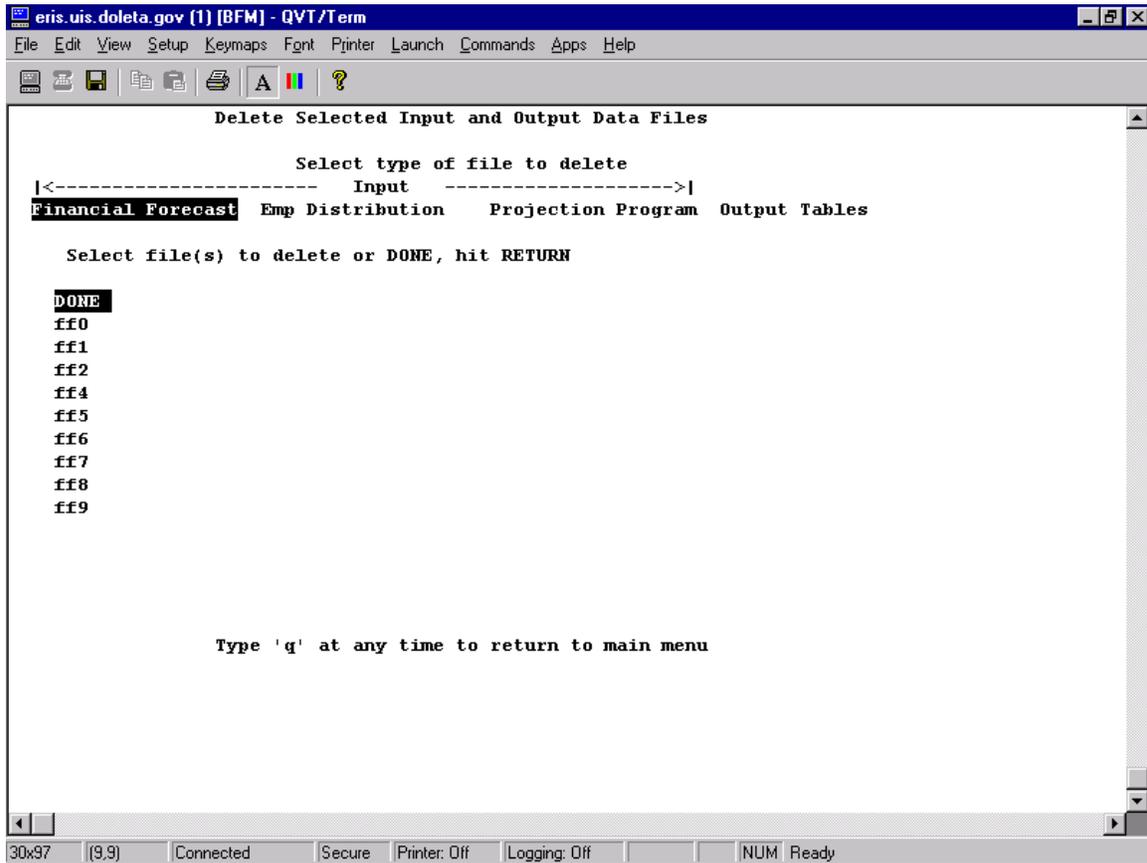
The user can drop as many files as are displayed, but once a data set or output table has been erased or dropped, it will be irretrievable from the DATA EDITING screen. (Some files may be restored from backups in an emergency.)

2.5 PRINT

Any output table can be printed to the user's printer using the PRINT option. This option is structured identically to the SHOW option, only instead of seeing the output displayed on the screen it will be printed out.

Figure 2.5   PRINT Screen

```
eris.uis.doleta.gov (1) [BFM] - QVT/Term                                    _ 8 X
File  Edit  View  Setup  Keymaps  Font  Printer  Launch  Commands  Apps  Help

                             Model Output Data Selection


  Financial Forecast Data    Employer Distribution   Projection Program Data

      ==>    ffd2    run with..==>    dst1        and...     ==>    ppd2







       (Press RIGHT_ARROW key NOW to run projection program ONLY)

       Select model run file combination, hit RETURN

       Type 'q' NOW to return to main menu

  ==>  Last Financial Forecast run; current selections highlighted




30x97    (6,13)    Connected       Secure   Printer: Off   Logging: Off          NUM  Ready
```

The user is asked to choose which type of output to print, Projection Program or
Financial Forecast Program, and then which table(s) to print. A user can print one table
or all of the listed tables.

2.6 HELP

Information and instructions for screen editing and model operation are available through
this option. At times the information in this screen is updated to provide more
information on new options.

Figure 2.6   HELP Screen

```
eris.uis.doleta.gov (1) [BFM] - QVT/Term                                    _ □ ×
File  Edit  View  Setup  Keymaps  Font  Printer  Launch  Commands  Apps  Help

NEW DATA ENTRY SCREEN DESCRIPTION:

The new screen-oriented Data Entry System allows the user to examine and update the many variable
s for which modification is permitted in either the Projection Program or Financial Forecast Prog
ram of the Benefit Financing Model.

DATA ENTRY OVERVIEW:

-Arrow key movements in this system are based upon a rectangular table data
format.  Combinations of vertical and horizontal arrow keys moves are used to gofrom one data ite
m to another.

-To reduce cursor movement between widely separated data items, any arrow key   move that would c
ause the cursor to go outside table boundaries resets the      cursor at the opposite end of the
row or column (rotation). For example, to go  from DATA to Q in the main menu, press the UP-arrow
 key once.

-Any value can be replaced by moving the cursor to highlight that value and      entering the new
value (+RETURN).

-The user can replace individual digits of a number instead of the entire
number.  This is done by moving the cursor with the space bar and typing the newdigit(s).

-When finished editing (or just viewing), the user presses RETURN to bring up   either another da
ta panel or the "Next Step" menu at the bottom of the screen.

-If the "MORE EDITS" option is chosen, then cursor returns to the last editing  position.

30x97    (29,14)    Connected    Secure    Printer: Off    Logging: Off         NUM Ready
```

2.7 QUIT

The QUIT option is used whenever the user desires to exit from the Benefit Financing Model, and disconnect from the SUN System's modem.

CHAPTER 3   SCREEN EDITING

The Benefit Financing Model is equipped with a full screen editing system that allows for great flexibility in inputting and editing many variables at once. The entire keyboard should be usable including the numerical keypad, the mouse, however is not usable for any screens in the BFM.

Within any data screen a user may edit a data item by using the arrow keys to move to the desired position and type the new value. The user can replace the value or "TYPEOVER" individual digits of a value instead of the entire number. This is done by moving the cursor with space bar and typing the new digit(s). The value at the current cursor position and its row and column headings are always highlighted. Column and row headings cannot be edited.

Again, The Main Menu contains a Help selection which also has directions for moving between screen and editing data.

At the bottom of every data screen a new menu called "Next Step" will appear with the options "SAVE", "MORE EDITS", "START OVER" and "CANCEL". Figure 3.1 provides an example. The function of these options is described as follows:

SAVE: Will save the work done on that screen and will return the user to the menu screen.

MORE EDITS: Will allow the user to continue working on that screen. This allows the user to save values and to continue working.

START OVER: Effectively cancels all changes by recalling the original data.

CANCEL: Simply quits the editing session leaving the original data intact.

At the bottom of every data input screen a format line will appear to show the correct size and format of the requested value. The word "**TYPEOVER**" appears in the format field to confirm this mode of editing.

Any verifiable errors by the user will generate short messages that briefly replace the number just typed. For example, if the user enters a value that exceeds the upper limit for that variable, the message "**TOO BIG**" replaces the new value, followed by a second look at the input value and, finally, restoration of the original value.

Figure 3.1 Screen with Options


```
 eris.uis.doleta.gov (1) [BFM] - QVT/Term
 File  Edit  View  Setup  Keymaps  Font  Printer  Launch  Commands  Apps  Help

                          PRIOR BASE YEAR DATA
                          BASE YEAR IS: 2000

              4th QTR        1st QTR        2nd QTR        3rd QTR        4th QTR
               1998           1999           1999           1999           1999
              =======        =======        =======        =======        =======
      IUR     1.70           1.70           1.50           1.60           1.40

      ILF                                                  34912          355463

      UI                                                   7764           6706

      TOT                                                  4059048        4649475




      Next step:       MORE EDITS        SAVE        START OVER        CANCEL
      Change more items



 30x97    (24,18)    Connected      Secure   Printer: Off   Logging: Off           NUM  Ready
```

To reduce cursor movement between widely separated data items, any arrow key move
that would cause the cursor to go off the screen will reset the cursor at the opposite end of
the row or column.

PART 2

PROJECTION PROGRAM

CHAPTER 4   OVERVIEW OF THE PROJECTION PROGRAM

The Benefit Financing Model is comprised of two separate programs. Program one, the Projection Program, projects specific Unemployment Insurance variables twelve years into the future. Section two, the Financial Forecast, forecasts the Unemployment Compensation Fund. Table I indicates, in schematic form, the connection between these two programs and the various steps involved in the development of the entire model.

The Projection Program forecasts twelve Unemployment Insurance variables on a quarterly basis starting from a base year, which is the most recently completed calendar year. All of these variables are forecasted by relying on their historical pattern by itself or with other variables.

The Projection Program does not attempt to forecast any of the economic scenario variables including unemployment rates, total wages, or total labor force. The user inputs all of the economic scenario variables and forecasts are made of the UI variables based on the historical relationship between these variables and the economic scenario variables.

Most all of the relationships established between variables are linear regressions which are run within the Model using the least square methodology. Based on these relationships, a series of standard equations will be developed for each State. Such equations will be measured against defined test standards before being acceptable for the Projection Program. The coefficients of these algebraic relationships will be used to forecast each of the quarterly UI variables.

Since regression analysis is the basis for projecting a number of the Projection Program variables, it must be remembered that this technique presupposes that relationships, which have existed in the past, will continue to exist in the future. However, this may not always be the case, as the degree of the relationships may be changing over time, or may change abruptly if changes occur in the Unemployment Insurance program itself. Therefore, the output from the Projection Program, which forms the input for the Financial Forecast Program, must be examined carefully before it is considered acceptable. Changes to the output can be made to certain variables (currently Average Weekly Benefits and Total Weeks Compensated), based on the subjective opinion of knowledgeable State staff, to allow for emerging trends.

Projection Program Inputs

Inputs for the Projection Program are grouped into seven (7) categories:

> (a) **Historical data**
> (b) **Economic scenario variables**
> (c) **Coefficients from regression analysis**

(d)	**State laws**	
(e)	**Labels/Titles**	
(f)	**Workload Equations**	
(g)	**Specific Variables**	

(a) Historical Data

This part consists of base year data, prior base year data, and actual quarter data. Base year data is data from the most recently completed calendar year. The base year is input by the user and appears as the first four lines of data on the Projection Program output. Prior year data consists of the two quarters prior to the base year. Actual quarter data is data for a maximum of three quarters beyond the base year data. A list of the variables on the historical data screens and their origin is located at the end of this section.

(b) Economic Scenario Variables

There are three economic scenario variables in the Projection Program:

(1)	Rate of Unemployment (Insured or Total),	
(2)	Wage Levels, and	
(3)	Total Labor Force.	

The Projection Program makes no attempt to simulate the economic forces which can give rise to changes in these three scenario variables. The results of economic studies and forecasts made by research groups or state analysts can, however, be converted into input for the program, so the financial effects on the Unemployment Compensation Fund of these forecasts can be assessed. Or the user may use previous recessionary levels of these variables and compare the results.

This approach permits the testing of the responsiveness of the financing system to various possible economic conditions. If the financing system ultimately adopted responds well to the various hypothetical circumstances postulated in the projections, it is reasonable to assume that it will respond well in actual circumstances.

(c) Regression Coefficients

This section contains the historical data and coefficients from the regression equations. There are four variables that are included in this section: Quarterly Insured Unemployment Rate, Average Weekly Benefit, Taxable Wages, Total Weeks Compensated, Additional Optional Yearly Insured Unemployment Rate from the Total Unemployment Rat, and the Waiting Week Adjustment. A regression equation is automatically run for each of these variables each time the historical data is updated to a new base year or revised. The coefficients from that regression are displayed at the bottom of each screen. By default, the user has to use the derived coefficients. If they wish to input their own, the staff at the Division of Actuarial and Fiscal Services should be contacted so that adjustment can be made externally. Once the coefficients are saved they are used to forecast the entire Projection Program. The regression specifications for each variable are described in the next section.

(d) State Laws
There are three types of variables under State Laws:

      (1)   Maximum Weekly Benefit
      (2)   Maximum Taxable Wage Base
      (3)   Dependent Benefits

These variables are used to define current state laws and provide further options for the user to test for differing legislative proposals. The Maximum Weekly Benefit and the Taxable Wage Base can either be input as a percent of previous year's wages or set for each year of the forecast.

(e) Labels/Titles
This screen allows the user to input a title over the top of the output page of the Projection Program and a title of the individual output assumptions.

(f) Workload Equations
Users can also use the Projection Program to forecast the workload variables of Initial Claims, Non-monetary Determinations, and Appeals. Each variable has an input screen, which contains the historical data (for twelve years). The historical data is automatically updated and regression equations re-calculated when the user completes the yearly update screen. The first option is to update the historical workload data. Each variable screen contains the historical values and the calculated regression coefficients. The user can either use the calculated values or replace the coefficients manually.

(g) Specific Variables
This option allows the user to find any variable in the Projection Program by inputting its abbreviation rather than going through each of the screens. The abbreviation of each variable is located in appendix 4.

Figure 4.1 Workload Screen


```
*************************************************************************************k
*                                                                                    *
*                    WORKLOAD EQUATIONS MENU                                         *
*                                                                                    *
*                                                                                    *
*         Update Workload Data                                                       *
*         Initial Claims Equation                                                    *
*         Non-Monetary Determinations Equation                                       *
*         Appeals Equation                                                           *
*                                                                                    *
*         Go back to Data Editing Menu                                               *
*                                                                                    *
*                                                                                    *
*                                                                                    *
*                                                                                    *
*                                                                                    *
*                                                                                    *
*                                                                                    *
*                                                                                    *
*                                                                                    *
*                                                                                    *
*                                                                                    *
*                                                                                    *
m***********************************************************************************j
```

Figure 4.2 Specific Variable Screen


```
SPECIFIC VARIABLES

Modify variables by name as given in the Input Description File (eg TWCR)

Type name, hit RETURN  (name may be found before you finish typing)


    Enter variable name: █                       (RETURN only to exit now)
```
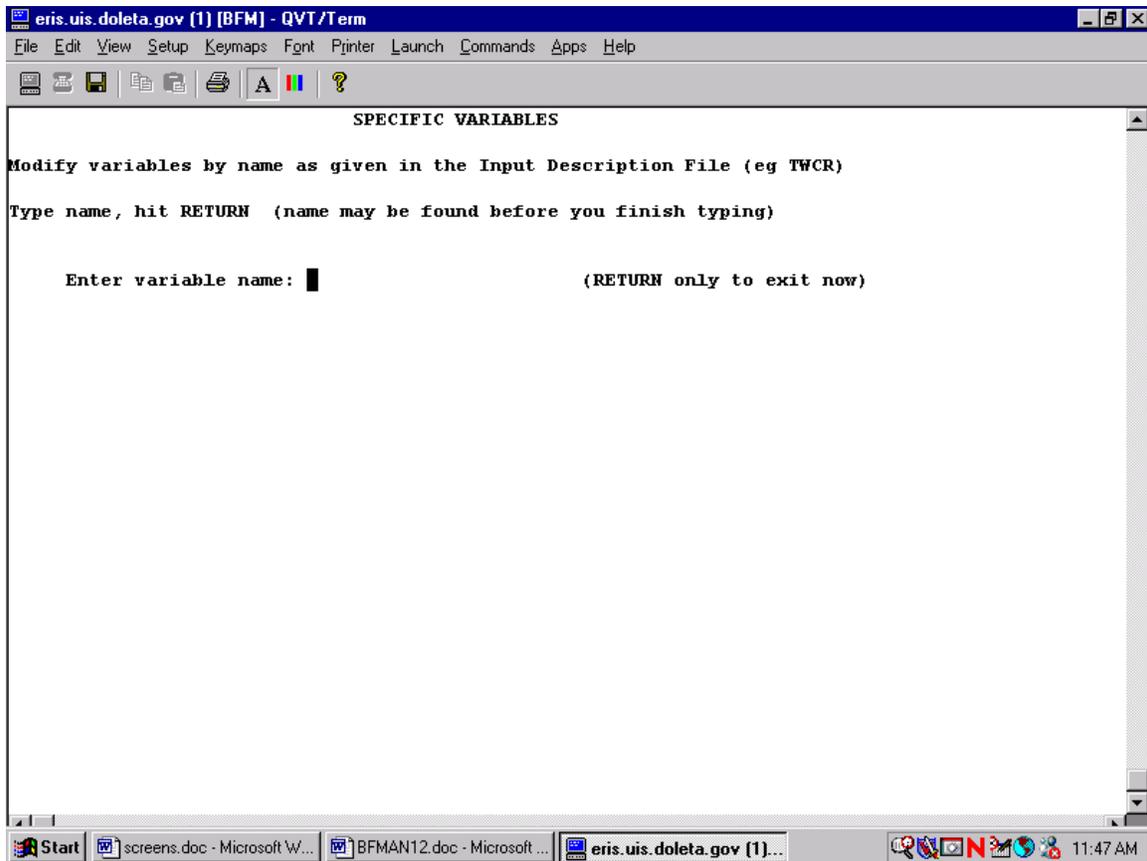
CHAPTER 5   DEFINITION OF VARIABLES

The first step in using the Projection Program and Financial Forecast Program is gathering the necessary data items needed for the input.

The period for which data is normally required is ten to twelve years, and is called the regression period. Some of this data may be readily available, while other data may require some additional work for its preparation in the form required. The period of ten years has been established because it represents a period, which is sufficient in most cases to establish a relationship between variables. A longer regression period may create a bias because of structural changes, which may have occurred over a long period of time. However, if the data remains consistent over a longer period, it may be included.

It is important to note that the variables in the Projection Program exclude reimbursable employment. So the analyst must be careful to use consistent data, which does not include reimbursables for the variables of: total weeks claimed, insured unemployed, covered employment, and regular weeks compensated.

If the State does not maintain separate records for reimbursable weeks compensated, it can obtain a reasonable figure by dividing the dollar amount paid on behalf of reimbursable employers (known as "reimbursable benefits") during a quarter by the statewide average weekly benefit for that quarter. Namely, in absence of actual records, the reimbursable weeks compensated can be estimated in the following fashion:

$$\text{Reimbursable Weeks Compensated} = \frac{\text{Reimbursable Benefits}}{\text{Statewide Average Weekly Benefits}}$$

The following is a description of all the variables that are needed to run the Projection Program. Some variables may not be required unless the State desires to use all of the programs' available options. For instance, data items 1, 3, and 5 are needed only if the State wishes to input total unemployment rates. The data outlined in Items 6 through 24 are required to develop the relationships needed for regression analysis, and must be collected on a quarterly basis. All of these variables are maintained as part of Unemployment Insurance required reports.

PROJECTION PROGRAM DATA ITEMS

1. Total Number Unemployed - UT
The average number of individuals 16 years of age or older who do not have a job but are available for work and are actively seeking work in the week of the 12th for the three months of the quarter. This includes individuals on layoff and waiting to report to a new job within thirty days. This number can also be required for half of a year and is the average of the figures for six months.

2. Total Number Insured Unemployed - TIU
The average number of weeks claimed in the week of the 12th for the three months of the

quarter.

3. Total Labor Force - TLF
The average number of individuals who are either employed or unemployed in the week of the 12th for the three months of the quarter. The Total Labor Force is required on a quarterly basis, which is the average of the figure for the three months.

4. Total Unemployment Rate - QT
Ratio of Total Number Unemployed (Item 1) to Total Labor Force (Item 4). This number can also be required on a six month basis, which is the average of the quarterly figures.

5. Covered Employment - CE
Employment covered by the State Law. This figure includes only workers who are actively at work in the State (place of work basis). It excludes employment at reimbursable establishments. Data is summarized quarterly by taking the average of the three months.

6. Total Weeks Claimed - TWC
Quarterly total of all weeks claimed for total or partial unemployment under the regular Unemployment Insurance program. Such weeks claimed must exclude claims which are directly chargeable to reimbursable employers. The Total Weeks Claimed will also be divided between:
- intrastate claims: claims filed in the State and for which the State is liable.
- agent interstate claims: claims filed in the State and for which another State is liable
- liable interstate claims: claims filed outside the State and for which the State is liable

7. Insured Unemployment - UI
Total weeks claimed during each quarter for which the State is liable (intrastate and liable interstate claims) divided by 13. Claimants from reimbursable employers must be excluded.

8. Insured Labor Force - ILF
Sum (Item 5) and Insured Unemployment (Item 7).

9. Rate of Insured Unemployment - QI
Ratio of Insured Unemployment (Item 7) to Insured Labor Force (Item 8).

10. Regular Weeks Compensated - TWCR
Total weeks paid during each quarter for which regular benefits were paid on account of total or partial unemployment under the State Unemployment Insurance Program. Weeks paid on behalf of reimbursable employers must be excluded. All intrastate claims and liable interstate claims compensated must be included under this item; agent interstate claims must be excluded.

11. Total Amount of Regular Benefits Paid - TRB
Amount paid for regular weeks compensated as defined in Item 11.

12. Average Weekly Benefit (Regular Benefits) - AWB
Amount paid (Item 12) divided by regular weeks compensated (Item 11).

13. First Payments (Regular) - FPR
Number of first payments made to claimants for regular benefits. Only claimants for which the State Unemployment Insurance Program is liable must be included, i.e. claimants from reimbursable employers and agent interstate claimants must be excluded, and intrastate and liable interstate claimants must be included.

14. Final Payments (Regular) - FNR
Number of claimants to whom final payments were made on exhaustion of their regular benefits. Only claimants for which the State Unemployment Insurance Program is liable must be included.

15. Extended Weeks Compensated - TWCE
(Same criteria as for regular weeks compensated).

16. Amount of Extended Benefits Paid (State Share) - TBES
(Same criteria as for regular weeks compensated).

17. Average Weekly Benefit (Extended Benefits) - AWBE
Amount paid (Item 17) divided by weeks compensated (Item 16).

18. Weeks Compensated Dependents - TWCD
(Same criteria as for regular weeks compensated.)

19. Amount of Dependents' Benefits Paid- TBD
(Same criteria as for regular weeks compensated.)

20. Average Weekly Benefit (Dependents) - AWBD
Average weekly benefit paid to each dependent.

21. Total Wages - TOT
Total wages paid during quarter to employees in Covered Employment (also known as Taxable Employment) as defined in Item 6.

22. Taxable Wages - TAX
Wages paid during quarter to employees in covered employment as defined in Item 6 which fall within the taxable wage base as defined by the State Employment Security Law.

23. Average Weekly Wage - AWW
Total Wages (Item 22) divided by Covered Employment (Item 6) divided by 13.

CHAPTER 6   ANALYZING PROJECTION PROGRAM DATA

After gathering all of the necessary data, the next step in the forecasting process is to review each of the data items. It is of prime importance that the historical data be analyzed for any changes which may have occurred during the regression period. The current relationships in the Projection Program depend heavily on the prior years' data, so the analyst must be careful in noticing any major changes in the State UI laws.

Some changes will be sufficiently significant so as to preclude the development of any regression formulas. Other changes may be less significant, and amendments to data may be made to assure its homogeneity. The personal knowledge of the user will have considerable bearing on the decision to proceed or not. Some of the important changes most frequently encountered are summarized under the following headings:

A. Coverage Provisions

Minor changes in the coverage provisions can be overlooked; however, major changes, which affect a large number of employees, must be taken into account. The coverage provisions determine the proportion of the Total Labor Force that is insured under the Unemployment Insurance Program.

B. Benefit Provisions

Minor changes in the benefit formula may not significantly affect the regression formula; this will be tested by examining the residuals of the Average Weekly Benefit regression equations before and after the change. Major changes will prevent the use of a regression formula to obtain the average weekly benefit. The minimum benefit rate usually does not affect adversely the regression formulas.

C. Waiting Period Provisions

The change most frequently encountered is the removal of the waiting period. Such a change will increase the number of regular weeks compensated; this increase can be approximated by adding to the quarterly figures or regular weeks compensated prior to the change, the figure for first payments less final payments in the same quarterly period.

D. Duration of Benefits Provisions

In some States the maximum potential duration of benefits is derived by dividing a total dollar entitlement by a weekly benefit, which has been obtained according to a specified formula. On occasion the weekly benefit formula has been changed without a change in the total dollar benefit entitlement, so the maximum potential duration is changed.

Frequently, this type of change, if minor, will not significantly affect the total weeks claimed or compensated. However, the residuals of the regression formula must be

examined carefully in these circumstances, to determine whether a bias has been introduced.

If the change in the maximum potential duration is significant, an adjustment will have to be made to the Projection Program output of Total Weeks Compensated. This can be done, for example, by estimating the increase in the average duration of benefits from the formula:

$$d = \frac{1 - r^n}{1 - r}$$

where:
d = average duration of benefits
r = average probability that a first payee will remain unemployed to receive at least another week of benefits until he exhausts.
n = the potential duration.

E. Entitlement Requirements and Base Period Provision

Usually these elements have a very small effect on the requested data, unless substantial changes have been made.

F. Disqualification Terms

Voluntary quits and dismissals for misconduct represent, in order of importance, the two major causes of disqualification for non-monetary reasons. A major change in the disqualification rules for these reasons will affect the relationship of insured unemployed or weeks compensated. In this event the data which precedes such change must be excluded to develop the regression formulas. In the case of a minor change all the data can be used, however the residuals must be examined very carefully to ascertain whether the effect of the change is serious or not.

CHAPTER 7   YEARLY DATA UPDATE FOR THE PROJECTION PROGRAM

The Projection program data is structured to make yearly updates to the data. Once a complete calendar year of data has been received this is considered the base year data. This can usually be done six months after the end of the year when the payroll data is received.

The base year data is input in the Base Year Screen under 'Historical Data'. Pressing Historical Data will first reveal a screen to remind you about the entering all of the base year data in one editing session and to fill in all of the variables even if they are the same as last year.

The first variable is the base year this can only be advanced one year at a time in order to ensure that the historical data is updated correctly.

Figure 7.1 Base year data screen

When the user has completed entering all of the necessary items a message will list all of the regressions that will automatically be updated also. The applicable data is then

transferred to the proper regression screen, where the oldest data points are removed and the current data input.

For a complete base year update the user must also go to the previous base year data screen and fill in all of the data items therein. Additionally, the user should also carefully examine the following assumptions in order to determine if any major changes have occurred due to the addition of the new base year data:

- Labor Force
    - Rate of Annual Increase in Labor Force
    - Ratio of Insured to Total Labor Forces (known as ILF-TLF Ratio)
    - Quarterly Split of the Total Labor Force (for both half years)
- Wages
    - Rate of Annual Increase in Total Wages
    - Quarterly Split of Average Weekly Wage

If it is identified that any of the above items for the new base year is significantly different from the assumed value before the update, then this may signal an emerging new trend in labor force and wage pattern. Therefore, the assumptions for the forecasting years may need to reflect the emerging new pattern.

CHAPTER 8   PROJECTION PROGRAM METHODOLOGY

In this chapter, the actual methodology used in the derivation of the forecasts is outlined. Each formula was developed on a quarterly basis to better reflect seasonality and the inherent characteristics of State Unemployment Insurance Systems.

The basic economic scenario variables that go into the Projection Program to arrive at UI variable estimates are:

       1.   A measure of unemployment
       2.   The total labor force
       3.   Average earnings

The Projection Program begins with a value for the total labor force (TLF), which is input by the user with projected values or a constant yearly percentage change. Quarterly values are then derived from the historical relationship of quarterly values to the half year, which is also input. From the TLF a value is found for the quarterly insured labor force (ILF) from a constant percentage value (constant for each year of projection).

Next the program takes the inputted value of yearly insured unemployment rate (QI), a scenario input, and derives a quarterly estimate from the regression equation coefficients. It multiplies the quarterly insured unemployment rates by the insured labor force in order to arrive at the absolute quarterly number of insured unemployed (UI).

If total rates of unemployment are input into the model rather than insured then an equation is built to forecast the insured unemployment rates from the total rates. Once the insured rates are arrived at, the model proceeds as if they were input. An equation estimating insured unemployment rates from the total unemployment rate usually consists of the total unemployment rate (or half year rate) and the gap between insured and total unemployment by quarter, although this can be done simply on a yearly basis.

To derive quarterly covered employment, the program subtracts the quarterly number of insured unemployed from the quarterly insured labor force.

From the insured unemployed (UI) the number of weeks compensated is derived based on a regression equation. The estimated number of weeks compensated for a given quarter is then used to estimate total benefits. (Average weekly benefit multiplied by the total weeks compensated equals total benefits).

The average weekly benefit (AWB) is derived quarterly from a regression equation using primarily the average weekly wage and the maximum weekly benefit as explanatory variables. The product of the average weekly benefit and total weeks compensated gives the outflow of the system, total benefits paid, for each particular quarter, (excluding extended benefits which are dealt with separately).

The revenues flowing into the system are the taxes collected by applying the appropriate tax rate to the taxable payroll. The tax structure and the employer rates are included in the Financial Forecast Program, while taxable wages are produced from the Projection Program.

The starting input used to estimate taxable wages in the Projection Program is the level of Total wages. Total wages are derived from the average weekly wage, input by the user as a yearly percentage increase or decrease, multiplied by covered employment for the quarter.

Taxable wages are then forecasted by a formula that relates the ratio of taxable wages to total wages as a function of the ratio of the maximum taxable wage base to the average annual wage, and as a function of the rate of unemployment. The estimated proportion is then multiplied by total wages for the quarter to get the quarterly estimate of taxable wages.

The quarterly estimates for taxable wages is then passed to the Financial Forecast which combines them with additional taxation variables, such as tax rates, and the percentage of employers at each tax rate to arrive at estimates of the total contributions to the system.

CHAPTER 9   MATHEMATICAL RELATIONSHIPS OF PROJECTED VARIABLES

In this chapter the specific mathematical relationships of the main variables in the Projection Program are outlined. These variables are: *the insured unemployment rate*, *the insured labor force*, *the total weeks compensated*, *the average weekly benefit*, and *the amount of taxable wages*. These are the five variables for which regression analysis may be used for their prediction. This section and the next chapter are included to give any State analyst the proper procedure for arranging the equations and analyzing the resulting outputs.

1. Rate of Insured Unemployment

$$QI_T ----> QI_{t/4}$$

where:

QI_T = Yearly Insured Unemployment Rate
$QI_{t/4}$ = Quarterly Insured Unemployment Rate

This equation is used as an interpolation procedure. The user will input the yearly projected insured unemployment rate for each year of the projection period and this equation is run to calculate each of the quarterly values. The regression formulas relate the level of QI for each quarter of the year to the movement of the annual QI around that quarter. In general, the regression equations are of the form:

$$QI_{t/4} = \beta_0 + \beta_1 QI_{T-1} + \beta_2 QI_T + \beta_2 QI_{T+1}$$

where:

$QI_{t/4}$ =   rate of insured unemployed in quarter t
QI_T =   rate of insured unemployed in year T
QI_{T-1} =   rate of insured unemployed in the previous year
QI_{T+1} =   rate of insured unemployed in the following year

The highest linear correlation coefficient is usually between $QI_{t/4}$ and QI_T.

If we apply a test on the parameters 1 and 2 as described in the section on regression analysis, we find in most cases that the quarterly regression equations can be simplified to:

$$QI_{1/4} = \beta_0 + \beta_1 QI_{T-1} + \beta_2 QI_T$$

$$QI_{2/4} = \beta_0 + \beta_1 QI_{T-1} + \beta_2 QI_T$$

$$QI_{3/4} = \beta_0 + \beta_2 QI_T + \beta_3 QI_{T+1}$$

$$QI_{4/4} = \beta_0 + \beta_2 QI_T + \beta_3 QI_{T+1}$$

In testing the results obtained for $QI_{t/4}$ from different values of QI_{T-1}, QI_T and QI_{T+1} it is important to bear in mind that, in almost all the cases we have studied, the rate of insured unemployment in the first quarter is higher than the rate of insured unemployment in the second quarter. Any results showing the opposite should be subjected to critical analysis.

Finally, it should be noted that the results produced by these regression formulas for each quarter may yield results which, when aggregated, will give an annual rate of insured unemployment that is slightly different from the actual rate used as input. In order to correct for this discrepancy, a pro rata adjustment to each QI is made in the Projection Program.

<div align="center">** Note **</div>

The following relationships are identical irrespective of whether the insured or the total unemployment rate is used as an input, except that the Regression Formula which may be developed in the future for the ratio of the insured labor force cannot be used if rates of insured unemployment have been used directly as input.

2. Ratio of Insured to Total Labor Force

$$TLF_{t/4} \longrightarrow ILF_{t/4}$$

where:

$ILF_{t/4}$ = Insured labor Force in quarter t, excluding reimbursable, and based on place of work.

$TLF_{t/4}$ = Total labor Force in quarter t, including reimbursable, and based on place of residence.

The most common approach to determine the Insured Labor Force is to subjectively determine the level of $(ILF/TLF)_{t/4}$ by reviewing such ratios and the trend in those ratios over the last five years.

In reviewing such ratios one should be aware of the nature of both the numerator and the denominator. Thus the basic historical data should be gathered, keeping these definitions in mind. If the relationship is a changing one the analyst may want to try the following equation instead:

$$(TLF/ILF)_T = \beta_0 + \beta_1 QI_T$$

In other words, it is felt that long periods of high unemployment will definitely have an impact on the ratio considered, and this impact should be inversely proportional to such a measure of unemployment. This option is only available if the total unemployment rate is input into the model.

3. Total Weeks Compensated

$$\text{UI}_{t/4} \longrightarrow \text{TWCR}_{t/4}$$

> where:
> $\text{UI}_{t/4}$ = Quarterly Insured Unemployment
> $\text{TWCR}_{t/4}$ = Quarterly Total Weeks Compensated in Regular State UI Program

The next regression equations that are developed express the Total number of Weeks Compensated, excluding extended and/or dependent benefits, in each quarter as a function of the number of Insured Unemployed for which the State is liable, and its wage replacement rate (the ratio of average weekly benefits to average weekly wage).

Theoretically, it could be argued that the number of weeks of benefits paid for in a quarter will depend not only on the level of unemployment in the current quarter, but also in the previous quarter which will overflow into the period being studied. Thus the regression formula should take the form:

$$\text{TWCR}_{t/4} = \beta_0 + \beta_1 \text{UI}_{t/4} + \beta_2 \text{UI}_{(t-1)/4} + \beta_3 \text{AWWB}_{t/4}$$

> where:
> $\text{TWCR}_{t/4}$ = Total Weeks Compensated in quarter t.
> $\text{UI}_{t/4}$ = Insured Unemployed in quarter t.
> $\text{AWWB}_{t/4}$ = AWB divided by AWW in quarter t.

However, because of the way in which UI is calculated this overflow is reflected in the current quarter. Thus, in fact, the formula is reduced to a straight linear relationship:

$$\text{TWCR}_{t/4} = \beta_0 + \beta_1 \text{UI}_{t/4} + \beta_3 \text{AWWB}_{t/4}$$

$\text{UI}_{t/4}$ is usually arrived at by dividing the Total Weeks Claimed in a quarter by 13. It would then seem reasonable, allowing for fluctuations in the unemployment level throughout the quarter, to expect β_3 to be close to zero, and β_1 to fluctuate around 13.

In actual fact, the parameter β_1 usually varies between 10 and 12, which reflects the treatment of disqualifications and of the waiting weeks, if any, in the computational procedure of $\text{UI}_{t/4}$.

Also, the historically different type of claimants in each quarter of the year, and their impact on the proportion of the disqualified, and on the average claims function, will make it such that generally parameters β_0 and β_1 will change from one quarter to the next.

<center>** Note **</center>

The total weeks compensated for extended and dependent benefits are usually obtained by applying a constant factor to the weeks compensated for regular benefits:

$$TWCE_{t/4} = KX * TWCR_{t/4}$$

$$TWCD_{t/4} = KY * TWCR_{t/4}$$

where:

$TWCE_{t/4}$	= Total Weeks Compensated for Extended Benefits Recipients
$TWCD_{t/4}$	= Total Weeks Compensated for Dependent Benefits Recipients
KY	= Ratio of Weeks Compensated for Dependents
KX	= Ratio of Weeks Compensated for Extended Benefits

Total Weeks Compensated Adjustment

The option of manually adjusting the Total Weeks Compensated output is available following the regression screen. This option is particularly helpful if a law change (such as a new waiting week provision) is expected in the near future. For each projection year the user can adjust the output a specific percentage from what is being forecasted using the regression equation. A value of 0.0% does not change the output, a value of -5.0% reduces the forecast by 5%. A value of 5%, increases the forecasted value by 5%. Figure 8.1 shows a sample screen of the Total Weeks Compensated.

Figure 8.1 Total Weeks Compensated Adjustment Screen

4. Average Weekly Benefit

$$(MWB, AWW, QI)_{t/4} ----> AWB_{t/4}$$

where:

$MWB_{t/4}$ = State maximum weekly benefit, in effect during qtr. t

$AWW_{t/4}$ = average weekly wage, in effect during qtr. t

The regular benefit paid under an unemployment insurance system is usually based on a formula applicable to the wages earned during a qualification period; this formula operates within the limit of a minimum and a maximum benefit payable, the latter affecting a large number of claimants.

Thus the regression formula developed is of the form:

$$AWB_{t/4} = \beta_0 + \beta_1 MWB_{t/4} + \beta_2 AWW_{t/4} + \beta_3 QI_{t/4}$$

or

$$= \beta_0 + \beta_1 (MWB_{t/4} * AWW_{t/4}) + \beta_2 QI_{t/4}$$

or

$$= \beta_0 + \beta_1 \sqrt{\mathrm{MWB}_{t/4} * \mathrm{AWW}_{t/4}} + \beta_2 \mathrm{QI}_{t/4}$$

Some comments concerning this relationship should be made:

a) The correlation matrix resulting from the inclusion of the MWB and AWW as explanatory variables in the same equation may exhibit a high degree of correlation between these two variables. This violates a major assumption inherent within regression analysis, that the explanatory variables be independent of one another. When two or more independent variables are related to each other, they contribute redundant information. This reduces the explanatory power of the coefficients, thus hindering the forecasting ability of the equation. To account for this, two additional variables (i.e., $\mathrm{MWB}_{t/4} * \mathrm{AWW}_{t/4}$ and $\sqrt{\mathrm{MWB}_{t/4} * \mathrm{AWW}_{t/4}}$) have been constructed combining MWB and AWW. Where applicable, these combination variables may be included within the model.

b) A regression formula is developed for each quarter because of the different type of claims in one part of the year as compared to another.

c) The above formula is applicable as long as the basic method of computing the weekly benefit remains unchanged; it is sensitive to changes in the maximum benefit payable but not changes in the minimum benefit. The latter usually has minimal effect on the size of the Average Weekly Benefit.

d) In developing the regression formula, the analyst must be careful in dealing appropriately with the input historical values of MWB in the regression analysis in those quarters in which the maximum weekly benefit has been increased. There are, generally, four cases to be considered, as follows:

(i) Maximum benefit is increased at the beginning of a calendar quarter and the increase is awarded to all claims in course of payment.

(ii) Maximum benefit is increased during a calendar quarter and the increase is awarded to all claims in course of payment.

(iii) Maximum benefit is increased at the beginning of a calendar quarter and the increase is awarded only to new claimants.

(iv) Maximum benefit is increased during a calendar quarter and the increase is awarded only to new claimants.

The approach to each of these four cases is as follows:

(i) The new maximum benefit will be used during the quarter in the

regression analysis.

(ii) The weeks compensated during the quarter will be divided between those before and after the maximum benefit increases; the old maximum will be weighted by the weeks compensated before the change, and the new maximum by the weeks compensated after the change. This weighted maximum will be used as MWB for regression input for the quarter.

(iii) The weeks compensated during the quarter will be divided between those for claimants subject to the old maximum and those subject to the new maximum. A weighted MWB will then be obtained for insertion in the regression analysis.

(iv) The same action will be taken as in (iii) above. However, if the increase was made late in the calendar quarter, some effect of the increase will still be felt in the subsequent quarter, so that a weighted MWB should also be obtained for the quarter following that in which the increase was made. (Theoretically, a weighted MWB for the second quarter in (iii) above might also be required, but this can probably be ignored.)

If the above adjustments to MWB are too onerous or impossible to make, the data for the quarters in question could be omitted from the regression analysis, but care must be taken to ensure that enough observations are retained to give confidence in the results.

For practical purposes in forecasting, it will be necessary to assume that maximum benefit increases will take place at regular intervals in the future, even though this has not been the case in the past. Furthermore, it will be necessary to read into the program a ratio equal to the appropriate weight of weeks compensated at the old and new maximums, which will be used at the times maximum benefit increases are assumed to take place in the future.

** Note **

Whenever the basic provision of computing weekly benefits is changed, the above regression equation, which is derived from historical data and therefore is by and large a reflection of the old benefit entitlement provision, cannot be used to calculate the average weekly benefit under the new law. In those cases, the approach to be used is discussed later. (The data needed then is the historical distribution of total weeks compensated or first payments by level of earnings).

Average Weekly Benefit Adjustment

The option to manually adjust the Average weekly benefit output is available following the regression screen. For each projection year the user can adjust the output a specific percentage from what is being forecasted using the regression equation. A value of 100% does not change the output, a value of 95% reduces the forecast by 5%. A value of

103%, increases the forecasted value by 3%.

Figure 8.2 Average Weekly Benefit Adjustment Screen

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              Yearly Average Weekly Benefit Adjustment

         Starting qtr of FIRST adjustment year:    3
         Ending qtr of LAST adjustment year:       4

              Year                    % Adj

              2006                    2.06
              2007                    1.90
              2008                    1.80
              2009                    1.80
              2010                    1.70
              2011                    1.70
              2012                    1.60
              2013                    1.60
              2014                    3.22
              2015                    4.74
              2016                    4.64




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 Start   2 Micro...   Yahoo! - ...  owsdev0...  owsdev0...  BFMAN   2 Micro...  eris.uis....   10:22 AM
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5. Taxable Wages

To forecast Taxable Wages by quarter, we first calculate the aggregate total wages, from which the taxable wages are computed by the use of regression formulas. Quarterly total wages are the product of the average weekly wage and covered employment.

$$TOT_{t/4} = (AWW_{t/4} * 13)* CE_{t/4}$$

where:

TOT	= Aggregate Total Wages for the Quarter
AWW	= Average Weekly Wage
CE	= Quarterly Covered Employment

The amount of taxable wages is forecasted by finding the ratio of taxable wages to total wages. This ratio is found to be a function of the maximum taxable wage base, the insured unemployment rate and the ratio of the maximum taxable wage base to the average annual wage. There is a different equation for each quarter:

$$(\text{TAX/TOT})_{t/4} = \beta_0 + \beta_1 \ \text{MTWB}_{t/4}/\text{AWW}*52 + \beta_2 \ \text{QI}_{t/4}$$

where:

$\quad$ TAX $\quad$ = Aggregate Taxable Wages for the Quarter
$\quad$ TOT $\quad$ = Aggregate Total Wages for the Quarter
$\quad$ MTWB= Maximum Taxable Wage Base
$\quad$ AWW $\quad$ = Average Weekly Wage
$\quad$ QI $\quad\quad$ = Quarterly Insured Unemployment Rate

The equation basically says that the proportion of total wages that is subject to unemployment tax in a given quarter is linearly related with the ratio of the maximum taxable wage base to the average annual wage in the State, and the rate of insured unemployment.

However, in some States, the maximum taxable wage base has remained at the national level since the early days of the Unemployment Insurance Program, in other States it has increased at various times since then. The average weekly wage, on the other hand, has increased steadily. The historical data points are thus covering a wide range on the (MTWB/AWW) axis. If we plot the data points in the (TAX/TOT) and (MTWB/AWW) plane, we then see that for larger values of (MTWB/AWW*52) the relationship ceases to be linear[*].

Thus, a nonlinear form of the original equation has been incorporated within the model:

$$\ln(1 - \text{tax} / \text{tot})_{t/4} = f(\text{MTWB}_{t/4} / (\text{AWW}_{t/4} * 52), \text{QI}_{t/4}, \text{MTWB}_{t/4})$$

Both equations are tested and analyzed, with the better one being selected for use within the model.

Some other comments relating to this equation should be made:

$\quad$ l. For testing the regression coefficient it is often found that the QI variable is rejected from the equation.

$\quad$ 2. Since the tax rate is applicable to total weekly wages up to the time when the aggregate weekly wages of an employee reaches the Maximum Taxable Wage Base, it follows that the major portion of the revenues are generated in the early part of the year and that the $(\text{TAX/TOT})_{t/4}$ ratio declines rapidly from the first quarter onwards. It also follows that a much more critical analysis of the regression formula should be made for the first quarter than the last, since small

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[*] Mathematically speaking, the ratio TAX/TOT ought to be between 0 and 1. But there is no constraint in the linear regression relationship that guarantees this. In actual fact, the value returned by the standard linear regression relationship sometimes is a small negative number. If this happens, instead of using TAX/TOT directly, one should try alternative nonlinear relationship that uses the natural logarithm of the quantity (1- TAX/TOT) as dependent variable. This alternative, however, may not be an option when the value returned by the standard linear regression relationship is greater than 1 or is a large negative number.

deviation in the (TAX/TOT) first quarter can have a significant impact on the financial stability of the Fund.

3. In some States, the maximum taxable wage base remained at the national level since the early days of the Unemployment Insurance Program, in other States it increased at various times since then. Recently, there have been more frequent changes in some States in this level. The average weekly wage, on the other hand, has increased steadily. The historical data points are thus covering a wide range on the (MTWB/AWW) axis. If we plot the data points in the (TAX/TOT) and (MTWB/AWW) plane, we then see that for larger values of (MTWB/AWW) the relationship ceases to be linear. But since the projected values of (MTWB/AWW) are unlikely to be at the level they were 15 or 20 years ago, you should retain the more recent data points and proceed with the regression analysis over the period where the relationship is linear.

CHAPTER 10   REGRESSION EQUATION OPTIONS

There are several options built into the model which allow the user to have greater flexibility when running the regression equations.

1) Each regression equation can either be run automatically after the yearly update or the individual coefficients can be input manually on the regression equation screen. If the user believes they would like a longer set of data or a different set of data, then the regression coefficients can be derived outside of the model and input. Simply go to the desired regression equation screen and scroll down to the coefficients and enter each one and then answer no the question 'Do you want to re-compute the coefficients?'

2) Each regression can also be run with a reduced number of data points. Data points can be reduced by placing a "0" in the first column of the regression data below the point that you wish to end the data. This will limit all of the four quarter regressions to the desired number of data points.

Figure 10.1 shows an example of this particular instance. (Note: A minimum of 4 observations are required in any of the regressions in the Model.)

3) If it is desired that certain data points be taken out but the total number of historical years be kept intact, then in order for the built-in general least square regression routine continue to run, the user should replace the vacant data points with the arithmetic average of the values of the remaining data points. Mathematically, it can be proved that the result of this approach is identical to that of not having the undesired input data in the regression analysis. For instance, if the Total Weeks Compensated Regular (TWCR) in the 4th quarter of 2001 is deemed as an "outlier", i.e., a dramatic departure from the established historical pattern due to an unusual disturbance that is unlikely to repeat in the future years, then this data point should be removed from the observational data going into the general least square routine. The vacant point (including both the dependent variable and all the explanatory variables) for this particular quarter should be replaced with the arithmetic average of the values of the remaining data points.

Figure 10.2 shows an example in which the TWCR observations in the 4th quarter of 1998, 2001, and 2004 are deemed outliers. To make the regression routine to work, these three data points are replaced with the arithmetic average of the remaining 7 observations (929158 and 88066 for TWCR and UI, respectively.)

Figure 10.1

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WEEKS COMPENSATED (TWCR) HISTORICAL DATA and REGRESSION COEFFICIENTS

Year	1st QTR TWCR	UI	2nd QTR TWCR	UI	3rd QTR TWCR	UI	4th QTR TWCR	UI
2001	132147	11914	127111	11203	116574	10339	137846	12607
2000	132917	11477	113094	9907	95659	8432	95314	8513
1999	146708	13216	135859	11901	106293	9418	96219	8685
1998	137105	12495	137313	12203	116190	10557	112155	9925
1997	142699	14413	126692	13151	105226	9985	97897	9169
1996	144282	13245	133904	11908	113324	10229	107093	9982
1995	137220	12589	124182	11171	102033	9261	97202	8961
1994	0	13093	125774	11600	101754	9416	93934	8895
1993	0	13054	121860	11507	104685	9807	93346	9169
1992	0	15445	143160	13129	122905	11821	105522	10340

	1st QTR	2nd QTR	3rd QTR	4th QTR
INTERCEPT	45440.3	34107.5	−116038.	−72543.8
UI COEF	7.20080	8.05716	9.39674	9.78789
AWB/AWW COEF	0.00000	0.00000	356403.	235545.

Matches input coefs?   No   No   No   No

Recompute coefficients with revised data?   No   Yes

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Figure 10.2

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WEEKS COMPENSATED (TWCR) HISTORICAL DATA and REGRESSION COEFFICIENTS

Year	1st QTR TWCR	UI	2nd QTR TWCR	UI	3rd QTR TWCR	UI	4th QTR TWCR	UI
2006	753384	72900	715960	68649	912606	85228	898784	84231
2005	909849	86241	823690	78990	942014	88709	833711	82325
2004	1086005	102943	1028010	98146	1163904	110701	929158	88066
2003	1153360	108519	1213210	114062	1414366	125104	1183821	111119
2002	1340568	123762	1261450	117654	1417971	130109	1244655	115643
2001	734274	71771	901635	85591	1167078	107761	929158	88066
2000	647219	62588	636604	60637	840279	78445	729033	69624
1999	658812	63369	720167	68116	873974	79349	731750	68552
1998	708622	69738	645480	61739	966159	88630	929158	88066
1997	705769	67047	759669	71614	1013667	93368	743234	70290

Enter 0 for 1st qtr TWCR below last case to limit # of cases

	1st QTR	2nd QTR	3rd QTR	4th QTR
INTERCEPT	−63220.3	−96218.5	−44527.2	−31466.4
UI COEF	11.2419	10.8951	11.3297	10.9776
AWB/AWW COEF	0.00000	185990.	0.00000	0.00000

Next step: MORE EDITS   SAVE   START OVER   CANCEL

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CHAPTER 11   ADDITIONAL PROJECTION PROGRAM FORMULAS

This chapter describes the methods used to determine the various other constants and relationships which are used in the Projection Program.

(a) Ratio of Total Labor Force for quarter to Total Labor Force for current half year: For each quarter the ratio is taken to the corresponding half year (i.e. first quarter with first half etc.) These four constants are determined by examining similar ratios over the last five years or so. Usually, these ratios are fairly constant over that period, and an average ratio can be used. In other cases, when a trend is apparent, the ratios used in each year of the projection period must be modified to accommodate such a trend; these will be based on the personal judgment of the State analyst.

(b) Ratio of Average Weekly Wages by Quarter to Average Weekly Wages for the year: These four constants are determined using similar methodology as for the Total Labor Force constants in (a) above.

(c) Variable for adjustment of covered employment by reimbursable employers, this ratio is used in the calculation of the Insured Unemployment Rate (IUR) variable for the extended benefit trigger (see Chapter 13):

$$XUJ \; = \; \frac{G \times H}{J}$$

where:

$$G = \frac{\text{Intrastate and Liable Interstate Claims}}{\text{Intrastate and Agent Interstate Claims}}$$

$$H = \frac{\text{Nonreimbursable Claims}}{\text{Reimbursable and Nonreimbursable Claims}}$$

$$J = \frac{\text{Covered Employment : Non Reimbursable Employers Only}}{\text{Covered Employment : Reimbursable and Non - Reimbursable}}$$

These ratios are estimated by examining the claims data for a number of previous years. They are usually relatively stable from year to year. Ratio J is obtained by examining the most recent information available on the size of reimbursable employment.

(d) Ratio of Weeks Compensated for Dependents to Regular Weeks Compensated (KY): In the case where specific benefits are paid for each dependent in terms of a dollar amount or a percentage of regular benefits, sometimes up to a maximum

number of dependents, the above ratio must be calculated. The experience of the last five years or so should be examined. It is important to note that this ratio does not represent the number of dependents per claimant, but, strictly, the number of weeks compensated for dependents according to the law of the State as a proportion of the number of regular weeks compensated.

(e) Ratio of Weeks Compensated for Extended Benefits to Weeks Compensated for Regular Benefits (KX) : This ratio is used if there is insufficient past historical data to permit regression analysis of the relationship. If KX is used, it should be determined after examination of the available data over the past five years or so.

(f) Alternative Measure of Average Weekly Benefit: In cases where the benefit formula has been changed recently, for example, from 50% to 55% of earnings, it is not possible to use a regression formula to obtain the average weekly benefit. In such cases, the following function must be developed:

$$(AWB/AWW) \; = \; f(MWB/AWW)$$

This function, which will take the new benefit formula into account, can be incorporated into the Projection Program.

CHAPTER 12 TOTAL VERSUS INSURED UNEMPLOYMENT RATE

The Projection Program can be run using either of two measures of unemployment, i.e., either a rate of insured or a rate of total unemployment. Most users may prefer to use rates of insured unemployment as input, and in some cases it may be the only approach if a relationship between total and insured rates cannot be developed. If a relationship between the total and insured rates can be developed then it may be advantageous to use the total rate, especially if the output is going to be examined by economists or legislators who are familiar with rates of total unemployment.

Input Rates of Insured Unemployment

For some States it will not be feasible to develop a relationship between the total rates of unemployment and the insured rates; in this event, the rates of insured unemployment will be read directly into the program on a yearly basis for all years of the projection period. The quarterly insured rates will be obtained as described in the previous chapters.

Input Rates of Total Unemployment

In looking for a relationship between the total rate of unemployment and the insured rate of unemployment, a regression equation is built using a direct relationship between these two variables.

$$QI_{t/4} = f(\ TUR_{1/2},\ TUR_{2/2},\ TUR_{t-1},\ TUR_{t+1},\ GAP_{t-1}\ )$$

where:

$QI_{t/4}$ =	Insured Unemployment Rate
$TUR_{1/2}$ =	Total Unemployment Rate for first half year
$TUR_{2/2}$ =	Total Unemployment Rate for second half of year
TUR_{t-1} =	Total Unemployment Rate for previous year
TUR_{t+1} =	Total Unemployment Rate for following year
GAP_{t-1} =	Difference between Total and Insured rates for previous year.

Each State may be able to include different factors into this equation in order to make it more reliable and complete. If a stable and reliable equation is found, then the coefficients are placed in the Projection Program data screens. Forecasts can then be made of the insured unemployment rate by inputting the desired total unemployment rate. Analysts are encouraged to test all possible levels of the total unemployment rate when using this regression, so as to best see the viability of this equation.

At times a direct relationship cannot always be found since there are many factors which do not influence the total rate of unemployment in the same way as they affect the insured rate of unemployment. Such factors are the number of exhaustees, and the

proportion of new entrants and re-entrants coming into the labor force.

Inputting Rates of Total Unemployment on a Yearly Basis

Usually, rates of total unemployment are read in by half year; in this case, the user must be careful to respect the seasonal trends in these rates when developing the projection series. In some cases, the user may be able to develop a regression formula, which will relate the half yearly total unemployment to the yearly total unemployment. The regression formula is likely to be as follows:

$$UT_{1/2} = f(UT_{t-1}, \ UT_t)$$

and

$$UT_{2/2} = f(UT_t - UT_{1/2})$$

where:

$UT_{1/2}$ = Total Unemployed for the first half of the year
$UT_{2/2}$ = Total Unemployed for the second half of the year
UT_t = Total Unemployed for the entire year

From experience, we would not expect to obtain a satisfactory regression formula in every State. If a regression formula is developed, the total rate of unemployment is input in the Projection Program for each year of the forecast.

CHAPTER 13   EXTENDED BENEFITS

The Projection Program has been written so that each State has a mandatory extended benefit trigger of five percent Insured Unemployment Rate (IUR) and 120% of the previous two years average IUR during the corresponding quarters. There is also an optional trigger of six percent IUR that can be used by any State as well. It is important to remember that the measure of insured unemployment used in the Projection Program, QI, is different than the one used for the extended benefit trigger, IUR. The difference between the two measures of Insured Unemployment used in the program (QI) and IUR is stated below, the program does compute the corresponding IUR for any given QI value.

Computation of IUR by Quarter

The rate of insured unemployment calculated above (QI) cannot be used directly to simulate the extended benefits trigger because the numerator of the QI ratio excludes claims which are reimbursable, includes liable interstate claims instead of agent interstate claims; and its denominator; excludes employment of reimbursable employers, represents the current quarterly insured labor force instead of the covered employment during the first 4 of the last 6 completed calendar quarters.

Consequently, a new rate of unemployment, known as IUR, will be calculated. The following formula adjusts for the items mentioned above.

$$IUR_{t/4} = \frac{(1 + ILFI_t) \times UI_{t/4}}{CE_{t/4} \times XUJ_t}$$

where:

$ILFI_t$ = the rate of increase in the Insured Labor Force between Year-1 and Year t.

XUJ_t = defined in Chapter 11[*].

IUR   = insured unemployment rate used for EB trigger

Computation of EBC$_{t/4}$

Once $IUR_{t/4}$ has been obtained, the program will set the extended benefit trigger for the quarter t+1, ($EBC_{t/4}$), depending upon the following tests made in quarter t. If the trigger

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[*] This formula should be interpreted as follows: Dividing $UI_{t/4}$ by G adjusts for agent interstate claims. Further dividing the quotient by H adjusts for the impact of reimbursable claims on the calculation of insured unemployment. Dividing CE by $(1 + ILFI_t)$ adjusts for the difference in the current CE and the CE of first 4 of the last 6 completed calendar quarters. Further dividing the quotient by J adjusts for the impact of reimbursable employment on CE. The final result is captured by the adjustment factor $\frac{1 + ILFI_t}{XUJ}$, where

$$XUJ = \frac{G \times H}{J}.$$

is on during the quarter t/4, it will stay on during the following quarter if:

$$IUR_{t/4} \geq 6.0\%$$

or

$$IUR_{t/4} \geq 5.0\% \quad and$$

$$IUR_{t/4} > (\ IUR_{t/4}(t-1) + IUR_{t/4}(t-2))\ *\ 1.2\ /\ 2$$

otherwise it will be taken off.

If the trigger is off during the quarter t/4, it will be set on in the following quarter only if:

$$IUR_{t/4} > 5.9\%\ *$$

or

$$IUR_{t/4} > 4.9\%\ *\quad and$$

$$IUR_{t/4} > ((IUR_{t/4}\ (t-1) + IUR_{t/4}(t-2))\ *\ 1.2)\ /2$$

otherwise it will stay off.

In addition there is an option to manually set the extended benefits trigger on for any period desired by the user. In the first screen of extended benefits the user can enter the beginning and ending quarter for the period of extended benefits desired.

Extended Benefits Measure

The Projection Program will forecast the number of extended weeks compensated by using a simple historical ratio of the total weeks compensated to extended weeks. This proportion is input in the extended weeks compensated screen.

$$Total\ Extended\ Weeks\ Comp_{(t/4)} = Total\ Weeks\ Comp_{(t/4)}\ *\ EB\ proportion$$

Figure 13.1 shows a sample screen of Extended Benefit options.

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* The law requires that the Extended Benefit Trigger be calculated on a running 13 week average. The computer program is only capable of using the 13 weeks during a calendar quarter. The use of 5.9% instead of 6.0% and 4.9% instead of 5% is an allowance for the possibility that the 13 week running average actually exceeds 6% or 5% during the calendar quarter.

Figure 13.1
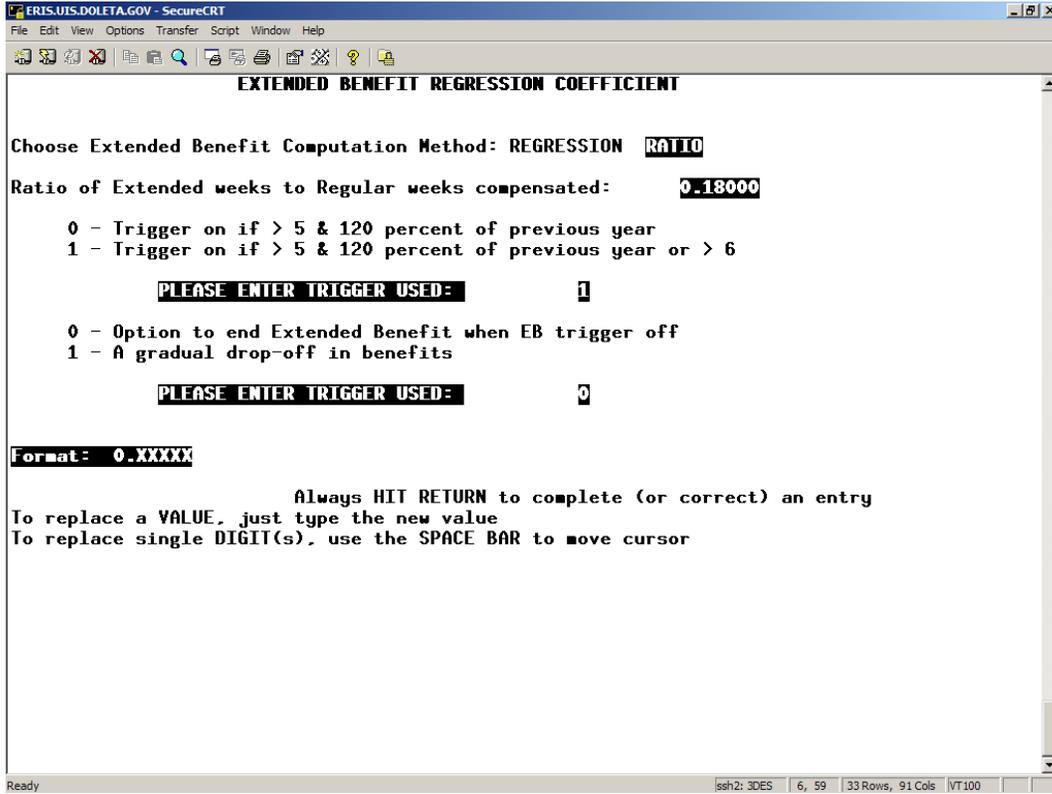
CHAPTER 14   PROJECTION PROGRAM CONFIDENCE INTERVALS

In the Projection Program regression analysis is used in forecasting at least four of the output variables. The estimated coefficients from these equations are used to produce a point estimate (a one integer value) for the dependent variable for the entire projection period. In order to gain a better understanding of the size of the prediction interval for each of the dependant variables, a confidence interval can be calculated for each of the estimated regression equations.

The confidence intervals can be constructed from the variance and covariance of the regression coefficients and the mean squared error of the equation. The size of the confidence intervals depends on the distance between the projected values of the explanatory variables and their historical mean value, not on the time period involved. The confidence interval equation for a two variable equation is as follows:

$$CI = V_{(0)} + V_{(1)}*X1t+1 + V_{(2)}*X2_{t+1} + 2COV_{(01)} + 2COV_{(02)} + 2COV_{(12)}$$

where:

$V_{(0)}$	= Variance of intercept
$V_{(1)}$	= Variance of first independent variable coefficient
$V_{(2)}$	= Variance of second independent variable
$COV_{(01)}$	= Covariance between intercept and first independent variable
$COV_{(02)}$	= Covariance between intercept and second independent variable
$COV_{(12)}$	= Covariance between first and second independent variable

For example, a 95% confidence interval of the average weekly benefit equation can be interpreted as follows: for a given average weekly wage and maximum weekly benefit there are many possible resulting average weekly benefit values that could occur. A mean could then be calculated from those possible values, then if only one prediction is made for the AWB using the stated equation, the probability that the calculated confidence interval around that predicted value will contain the true mean is 95%.

For simplicity, the confidence intervals are calculated in the Projection Program for the first quarter only, the intervals for the remaining quarters are considered to be very similar in size. The inputs for the calculation of the confidence intervals are located on the Confidence Interval screens chosen thru the Projection Program Menu. The required

inputs can be gotten from any standard statistical output when the regression equations are run.

To output the confidence intervals the user simply chooses the 'Show' option in the Benefit Financing Model's Main Menu.

Example:

Confidence Interval Output

Year -Qtr	Taxable Wages (000)	Avg. Weekly Benefit ($)	Insured Unemp. Rate (%)
XXXX -1	9,192,670 +/- 367,700	128.23 +/- 5.26	6.14 +/- .34

In this example, the prediction interval is given for each of the first quarters of data. In the case of the Insured Unemployment Rate (QI) remember that the yearly figure is input by the operator and the quarterly estimates are then derived using regression coefficients, the prediction interval given here is for the first quarter estimate. The estimate of 6.14 percent has a 95 percent confidence interval of plus or minus .34 percent.

CHAPTER 15   WORKLOAD VARIABLE FORECASTING METHODOLOGY

Basic Methodology

Four workload variables are forecasted quarterly in the Projection Program, Weeks Claimed, Initial Claims, Non-Monetary Determinations, and Appeals.

The program first takes the number of insured unemployed (weeks claimed divided by 13) from the Projection Program output and uses that number to derive the number of Initial Claims in a regression equation. The number of Initial Claims is primarily a function of the following quarter and current quarter number of weeks claimed. Then the number of Non-monetary Determinations is forecasted using an equation based on the number of Initial Claims or Weeks Claimed and the lag of non-monetary determinations, whichever variables provide a better relationship. In the same way the number of appeals is forecasted using one of these two variables and the lag of appeals.

> Initial Claims $= f($ Weeks Claimed, Weeks Claimed $_{+1})$
> Non-Monetary Determinations $= f($ Weeks Claimed, Initial Claims, Non-Mons$_{-1})$
> Appeals $= f($ Weeks Claimed, Initial Claims, Non-Mons, Appeals$_{-1})$

Yearly Updates

The Projection Program is structured to store twelve years of historical workload data, which is used in regression analysis to derive the coefficients. Each year the data can be updated in the same fashion as base year data in the Projection Program.

Selecting yearly update and inputting all new data for each of the workload items will automatically send the data to the specific variable regression screen where the oldest data point is dropped and the new one added. The regression procedure is automatically run and new coefficients are produced. If the user wishes to input different coefficients, this can be done on the regression data screen.

In addition the number of initial claims and weeks claimed is divided between the number of intra-state claims and the number of inter-state claims. The percentage of inter-state claims is input by the user on the update screen, with intrastate calculated from this values difference from 100%.

Figure 15.1 is a sample of Workload data update screen.

Figure 15.1

CHAPTER 16   PROJECTION PROGRAM OUTPUTS

The Projection Program produces three different output files. The first one is a permanent file, which is invisible to the user but is used directly as an input file to the Financial Forecast Program. This output is automatically created and stored when the Projection Program is run.

The second output file is a standard Projection Program printout, which summarizes the output results. It can be displayed either through SHOW or PRINT options followed by a number from 0 to 9. A sample of the standard output is shown as Figure 16.1.1.

Figure 16.1.1
Standard Projection Program Output

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                              STATE OF XXXXXXXX           MEASURE OF UNEMPLOYMENT INPUT:    Total
                                                          ANNUAL CHANGE IN WAGES (BEG):      2.00%
                         UI PROJECTION PROGRAM OUTPUT     ..IN TOTAL LABOR FORCE (VARIABLE): 0.68%
                                                          NO. OF ACTUAL QUARTERS: 2
                                                          AWB PERCENT ADJUSTMENT FACTOR:     0.00%


        TOTAL    INSURED  COVERED  INSURED  UNEMP RATES   MAX   AGGREGATE WAGES    AVERAGE       TOTAL WEEKS        AVERAGE MAX
        LABOR    LABOR    EMPLOY.  UNEMP.   TOTAL INS     TAX     (THOUSANDS)      WEEKLY  -----COMPENSATED-------W. BEN WKLY
        FORCE    FORCE                      1/2   1/4     BASE  TAXABLE    TOTAL    WAGE  REGULAR EXTENDED DEPEND  REG.   BEN

2006-1 17789000 12581000 12230891 350109        2.78     7000  64398791 149858025 898.91  4081990    0       0   274.53 450
2006-2 17826000 12792000 12475217 316783        2.48     7000  19245748 141062852 908.02  3671063    0       0   279.16 450
2006-3 17975000 12884000 12619234 264766        2.05     7000  13691475 143344605 909.02  3037588    0       0   281.70 450
2006-4 18017000 12885000 12584153 300847        2.33     7000  11759077 162323685 919.51  3444922    0       0   281.65 450
TOTAL  17901750 12785500 12477374 308126  4.90  2.33          109095092 596589167 919.49 14235563    0       0   278.98

2007-1 18061000 12705000 12291898 413102        3.25     7000  66612988 156876253 928.46  4326123    0       0   283.28 450
2007-2 18123000 12899000 12501029 397971        3.09     7000  19362619 149319965 939.60  3924478    0       0   285.77 450
2007-3 18274370 13266096 12942365 323731        2.44     7000  14370461 159219841 946.32  3718677    0       0   293.76 450
2007-4 18292653 13279369 12926293 353076        2.66     7000  11209361 159652529 950.08  4053446    0       0   295.07 450
TOTAL  18187756 13037366 12665396 371970  5.40  2.86          111555430 625068588 937.88 16022724    0       0   289.31

2008-1 18289222 13276878 12830393 446485        3.36     7000  65161153 153962757 923.07  5192033    0       0   296.22 450
2008-2 18285565 13274223 12895575 378648        2.85     7000  21952539 156065655 930.94  4404430    0       0   298.14 450
2008-3 18471733 13409370 13120240 289130        2.16     7000  14567963 161408098 946.32  3309066    0       0   300.79 450
2008-4 18490214 13422786 13093103 329683        2.46     7000  11354015 161712799 950.08  3777372    0       0   300.19 450
TOTAL  18384184 13345814 12984828 360987  5.20  2.71          113035671 633149310 937.88 16682900    0       0   298.53

2009-1 18486746 13420268 12982247 438021        3.26     7000  65603359 155784989 923.07  5091898    0       0   299.94 450
2009-2 18483049 13417585 13030778 386807        2.88     7000  22182700 157701920 930.94  4503320    0       0   301.86 450
2009-3 18671228 13554191 13253637 300554        2.22     7000  14716080 163049177 946.32  3444308    0       0   303.50 450
2009-4 18689908 13567752 13227652 340100        2.51     7000  11470693 163374621 950.08  3900302    0       0   302.15 450
TOTAL  18582733 13489949 13123579 366370  5.20  2.72          113972832 639910706 937.88 16939827    0       0   301.68

2010-1 18686403 13565207 13117916 447292        3.30     7000  66732797 158987120 932.30  5201570    0       0   301.46 450
2010-2 18682666 13562494 13170156 392339        2.89     7000  22492345 160982597 940.25  4570374    0       0   303.38 450
2010-3 18872877 13700576 13396582 303995        2.22     7000  14891894 166455791 955.79  3485037    0       0   304.70 450
2010-4 18891759 13714284 13370350 343933        2.51     7000  11623617 166788453 959.58  3945547    0       0   303.12 450
TOTAL  18783426 13635640 13263751 371890  5.20  2.73          115740654 653213961 947.26 17202528    0       0   303.01

2011-1 18908771 13726633 13273740 452893        3.30     7000  67871307 162484447 941.62  5267836    0       0   302.26 450

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The third output is the Workload Projection Output. It shows quarterly estimates of the workload variables: Initial Claims, Weeks Claimed, Non-Monetary Determinations, and Appeals. This table is labeled as Table 2 (Figure 16.1.2) and follows the standard Projection Program output:

Figure 16.1.2
Table 2 of Projection Program Output

```
TABLE 2
UI WORKLOAD FORECAST

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YEAR - Q       INITIAL         WEEKS          NONMONETARY
               CLAIMS          CLAIMED        DETERMINATIONS      APPEALS

2002 - 1        98,829       1,858,285          48,506            5,581
2002 - 2        78,859       1,473,316          40,673            5,413
2002 - 3        69,236       1,395,381          44,595            5,686
2002 - 4        98,709       1,320,085          41,063            5,178
==Base==       ==Base==       ==Base==         ==Base==          ==Base==
 Totals        345,633       6,047,067         174,837           21,858
Intrastate     331,808       5,744,714
Interstate      13,825         302,353

2003 - 1       103,953       1,669,723          38,674            5,381
2003 - 2        94,025       1,325,642          33,894            5,515
2003 - 3        94,194       1,198,996          34,016            5,474
2003 - 4       133,672       1,060,962          30,647            5,368
              --------      ---------          -------           ------
 Totals        425,844       5,255,323         137,231           21,739
Intrastate     408,810       4,992,557
Interstate      17,034         262,766

2004 - 1       126,922       1,478,277          32,675            5,700
2004 - 2       108,271       1,164,509          30,508            5,892
2004 - 3       102,746       1,087,180          32,139            5,863
2004 - 4       138,896         997,613          29,640            5,742
              --------      ---------          -------           ------
 Totals        476,834       4,727,578         124,961           23,196
Intrastate     457,761       4,491,199
Interstate      19,073         236,379

2005 - 1       129,703       1,422,406          32,133            6,046
2005 - 2       109,267       1,114,463          30,182            6,204
2005 - 3       102,572       1,046,990          31,891            6,138
2005 - 4       138,751         997,306          29,449            5,980
              --------      ---------          -------           ------
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PART 3

FINANCIAL FORECAST PROGRAM

CHAPTER 17   OVERVIEW OF THE FINANCIAL FORECAST PROGRAM

The Financial Forecast Program is the second of the two programs making up the Benefit Financing Model. This program is responsible for simulating the taxation and experience rating system of a State Unemployment Insurance system and making quarterly forecasts of the trust fund balance for ten years into the future.

A. Specific Objectives of the Financial Forecast

The usefulness of the Financial Forecast Program lies in its ability to determine:

- if the current taxation system of a particular State can adequately finance the benefit outgo resulting from an assumed series of unemployment rates, increase in wages, and changes in the labor force,

- the responsiveness of the present financing arrangement to periods of high unemployment separated by periods of low unemployment of various durations,

- whether the State's current taxation system is countercyclical or not,

- the degree of experience rating which emerges both in the amount of charged benefits and in the level of regular and flat taxes collected,

- the interaction of certain financing provisions such as the transfer of negative employer experience rating reserve balances to a Solvency Account,

- the viability of alternative taxation provisions, such as a change in tax rates, or a change in tax table trigger values, or the maximum taxable wage base.

The traditional actuarial approach to making financial forecasts has been to make one set of calculations, using the best assumptions of probable future occurrences. This approach was made necessary because of the technical difficulties involved in making lengthy mathematical calculations. However, this approach has changed, due to the remarkable increase in computing power, as it is now easy to obtain, in a matter of hours or minutes, any number of financial forecasts based on alternative assumptions.

The great disadvantage of working with one set of assumptions is that the probability of the assumed occurrences actually taking place is very small, so that the forecast figures in themselves are unlikely to be accurate on a year to year basis, and can only be used as an indication of the future on an average basis.

The solvency of any Unemployment Compensation Fund, however, depends on the interaction of taxes received and benefits paid, so that the knowledge of the incidence of

cash flow from year to year is more vital than long term forecasts based on average levels of unemployment.

A series of input economic factors, as described in the Projection Program Section, should be chosen to demonstrate the responsiveness of the present financing arrangements, and other alternative financing systems, to periods of high unemployment separated by periods of low unemployment of various durations. It is the speed with which the Unemployment Compensation Fund recovers after a period of high unemployment that is the test of the financing system especially if a second period of high unemployment follows very closely on the heels of the first. Similarly, the Fund should not become unnecessarily large following a lengthy period of low unemployment.

The output from the Projection Program is used as an input to the Financial Forecast Program. It is, therefore, possible to test a given or proposed taxation system against several series of assumed future economic conditions.

Alternatively, through the input parameters, several taxation systems or modifications thereof can be run for a single output of the Projection Program; that is, under a hypothetical combination of unemployment rates, wage increases and labor force changes, one can compare the effect of changing one or several of the current taxation provisions.

Each simulation run of the Financial Forecast Program produces a wealth of information, which, if properly interpreted, will show the strengths, and weaknesses of the postulated taxation system.

CHAPTER 18   TAX LAW AND HISTORICAL DATA FOR THE FINANCIAL FORECAST

This chapter deals with the preliminary work, which should be accomplished to get prepared for using the Financial Forecast Program. It is divided into two main sections:

- Taxation and Experience Rating System, and

- Historical Data

A.   Taxation and Experience Rating System

1. Current System

The first step in preparation for using the Financial Forecast Program consists of drafting a good summary of your present taxation system. Since this program purports to test the viability of your current taxation system, a record of the historical changes of your taxation system is not required in most instances, with the possible exception of a recent change, which could affect some of the proportions and constant factors discussed in the following paragraphs.

The following list enumerates most of the major provisions of the taxation system currently employed by most all States. However, it is not intended to be exhaustive, and other items of importance specific to your own law should be watched for.

You should, therefore, assemble the following information in order that a decision can be made as to whether the program should be expanded to include any missing variables:

2. Modifications

Once the summary of your taxation system has been drafted, you should check to see if any minor modifications to the program are necessary. It is expected that minor modifications can be made by, or on behalf of, the Division of Actuarial and Fiscal Services.

B.   Historical Data

You should next prepare the following information, which will be the basis of the input data to the program.

1. Income and Outgo of the Trust Fund

A summary by calendar quarter of the income and outgo to the Trust Fund should be prepared, itemizing such data as balance in the Trust Fund, contributions collected by quarter, accrued interest, total benefits paid by type of benefits, etc.

These values should be updated as far as possible so that the starting up values of any of your projections would be the most recent experience available. And, consistency with data developed for the regression analysis in the Projection Program should be assured.

The balance in the Trust Fund as of the last computation date should be compared with the value which was used in the determination of the trigger point for the tax schedule. Any inconsistency should be scrutinized. Any major item which is overlooked by our program in arriving at the value of the Trust Fund which is used for rating purposes should be identified and corrective measure taken.

2. Income and outgo of the Solvency Account

If your state maintains a Solvency Account, the sources of income and outgo of this account, should be identified. These should be compared with the historical movement of income and disbursement of your Solvency Account.

All values reported annually in this Solvency Account should again be compared for compatibility and consistency purposes with values developed either for regression purposes or for the distribution of benefits, as indicated in the next section.

3. Distribution of Benefits

All States do not charge the entire amount of all benefits paid to the accounts of the individual employers. The Benefit Financing Model, therefore, accounts for this fact.

You should analyze past data to determine what proportion of benefits goes where. One source of information is the summarized page of the ES-204 Experience Rating Report submitted annually to the Federal Government.

It was found from an analysis of the data of several States that the proportion of benefits charged to various accounts (for instance, active and inactive employers) is fairly constant from year to year. It is believed therefore that constant proportions may be safely used by most States unless a very recent change in the law has affected the past relationship.

For instance, a change in the rules of benefit payments to disqualified claimants may affect the proportion of chargeable benefits, which are not charged. Let us analyze the particular example of a State which rescinds its provision where all disqualified claimants had to serve a waiting period of six weeks before becoming entitled to the regular benefit payments, and where such benefit payments paid to a disqualified employee are not charged to any of the base period employers. Let us presume that the new regulation requires a return to work by the claimant and a qualification for benefit entitlement.

In this case, two conclusions can be drawn: first, the total benefits paid in any given quarter will be lower since the disqualified claimants will not be entitled to benefits after

6 weeks; secondly, a larger proportion of the new level of benefit payments will be charged to the individual employers' accounts, because there are no more benefits paid to disqualified employees, which benefits were not previously charged to employers.

To properly account for these two expected charges, the user should theoretically make an adjustment to the Total Weeks Compensated (TWCR) regression and to the proportion of chargeable benefits (TBP) which are not charged (TBNC).

In practice, the experience data may not be large enough to permit a proper anticipation of the results.

You will note from Table 2 that the proportion of benefits charged to employers accounts (TBC) is related directly to the total amount of benefits chargeable (TBP) less the assumed constant dollar figure of miscellaneous benefit (TEM). TBC (TBP
 TBM) where (TBM) is the net amount of Interstate Benefits plus Combined Wage Benefit Payments plus Employer Account Adjustments (less such items as restitution of benefits, outlawed checks etc). If Extended or Dependent Benefits are charged to the Employers' Account, the proportion must therefore be defined in terms of Regular plus Extended/Dependent Benefits. In regard to the estimate of Terminated employers' transfer of book balances to the Solvency Account, most States will be satisfied to use a straight proportion of the Benefits charged to such Inactive Accounts during the last Computation Year.

4. Miscellaneous Items

Certain other items may need to be calculated in certain circumstances. For instance, a reserve multiple or Size of Fund Index State may need to be input into the program.

Similarly, a State, which wishes to simulate an Emergency Tax System described earlier, must input certain Fund Benefit Ratio (FBR) values, based on past historical data. It is felt that the descriptions of such items in other parts of this Manual are sufficiently clear to avoid having to repeat them here.

5. Initial Distribution of Employers

The actuarial methodology described in the following Chapter refers to the initial distribution of employers.   The exact specifications of such distribution are described in Appendix B. This distribution must be prepared from the latest information available, preferably as of the last computation date. If the latest ES 204 report available is not the one as of the last computation date, the program will accept the previous one and make certain adjustments to update it.

CHAPTER 19 FINANCIAL FORECAST PROGRAM METHODOLOGY

The Financial Forecast Program combines three different sources of input to derive the income and outgo of the Unemployment Compensation Fund over each quarter of the 10 year projection period.

The three input sources are:

1) The output from the Projection Program.
2) The set of data inputs consisting of:
   i) the specifications of the taxation system to be simulated, and
   ii) the initial position of the Trust Fund and related financial matters
3) The distribution of employers by Experience Rate as of the last Computation Date.

§ 19.1 INPUT VARIABLES

There are over two hundred inputs into the Financial Forecast program. The variables are broken up into the following categories in the input menu of the Financial Forecast:

Financial Forecast Input Variables

a) Base Year Financial Data
b) Tax Rates and Triggers
c) Solvency/Social Taxes
d) State Specific Variables
e) Loan Options
f) Additional Quarterly Data
g) Change in Quarterly Data
h) Specific Variables

All of the input variables are described in the input description of the Financial Forecast which is attached as an Appendix to this document. The abbreviation of every variable is also listed in the Appendix. Following is a short description of all the variables in each category:

a) Base Year Financial Data
This section consists of the following groups of variables: Base Year Start Dates, Contribution data, Benefit data, Trust Fund Data, and Taxable and Total Wage Data. The Base Year Start Dates screen contains the starting year of the Projection Program, the computation quarter, and the quarter that you would like the program to start printing on Table 1.
b) Tax Rates and Triggers
This section contains the input variables for tax rates, tax table triggers,

and experience rating definitions.

c) Solvency/Social Taxes

The addition of a flat solvency or social tax rate can be made in this section. It can be based on several triggers.

d) State Specific Variables

Any variables that are unique to the State and not modeled with any other option in the Financial Forecast are located in this section.

e) Loan Options

This section contains the variables needed to model the Title XII borrowing restrictions and conditions.

f) Additional Quarterly Data

The user can add up to three quarters of additional quarterly data beyond the computation date of the base year. The data will be entered quarterly on these screens.

g) Change in Quarterly Data

This option allows the user to simulate an entirely new tax system that will become active upon a user specified date during the projection period. This option has been disabled as of the time this Manual is written.

h) Specific Variables

The Specific Variables screen allows the user to input the abbreviation of any of the variables.

§ 19.2 FINANCIAL FORECAST METHODOLOGY

A. Start up position

The program starts with the actual amount of the Trust Fund as of the last Computation Date, it updates these values by accepting actual income and outgo for the period elapsed since such date, and then estimates, on a quarterly basis, the various elements making up the revenues and disbursements of the Trust Fund during the balance of the 10 year projection period.

It should be noted that the program is designed to account for those items for which the State is liable and responsible under its Unemployment Compensation law. Federal advances, or receivables for the Federal share of Extended Benefits, or for UCFE UCX funds are disregarded. Similarly, it is assumed that the amounts of monies receivable from reimbursable employers are paid regularly, thus their impact on other parts of the financing system is negligible. Therefore, the problem confines itself to estimating whether enough income is generated by the taxation system to pay for the benefits and other disbursements which are not directly reimbursed by other organizations.

B. Trust Fund Outgo

The disbursements from the Unemployment Compensation Fund are divided into three

categories:

      1) regular benefits
      2) State share of extended benefits, and
      3) dependent benefits

The program calculates the regular benefits payments in any particular quarter of a year by multiplying the Total Weeks Compensated (TWCR) by the Average Weekly Benefit (AWB). The values of these two variables are obtained from the output of the Projection Program. Similarly, if the Extended Benefit Trigger is `On', as determined by the Projection Program, the State share of the liability for Extended Benefit payments is calculated by multiplying TWCE by the appropriate Average Weekly Extended Benefit payment, adjusted for the State share portion. This last value is controlled by an input to the Financial Forecast Program. If dependent benefits are payable, the program multiplies the value TWCD by either a flat dollar amount, or a proportion of the regular AWB, depending upon the actual law of the State.

Once the aggregate value of the Benefit payments has been determined, the proportion of benefits, which will be charged to active employer accounts, is derived, based on historical data and estimated future trends. Table II indicates the possibilities, which can be built into the program.

By using an appropriate input parameter in the program, Extended and/or Dependent Benefits can be charged to either the individual Employer Rating Account or to the Solvency Account. If Dependent Benefits are payable during an extended benefit period, such `Extended Dependent Benefits' would be treated in the program in a manner similar to the Extended Benefits. The amount of benefits actually charged to the Employer Rating Accounts can be expressed as either a flat percentage of amount of benefits chargeable, or a flat percentage of the same less a constant number of dollars (TBM). The actual amount of benefits, which the computer program will ultimately distribute to the Employers' Rating Account, is TBCA (See Table II).

C. Trust Fund Income

The income of the Trust Fund originates from three basic sources:

      1) regular or experience rated taxes,
      2) social or flat taxes, and
      3) investment income

The regular tax income of the Fund in any calendar year is dependent upon the amount of taxable wages, the applicable tax schedule and the experience rating account balances of each employer at the end of the previous computation year.

To derive the experience rating account balances, the data for the whole State is utilized by breaking it down into groups in a manner not too dissimilar to Section C of the ES

204 annual reports submitted to the National Office. The specifications to prepare this initial distribution of employers are laid out in the Appendix.

All employers having the same Experience Rating Account Percentage on the Computation Date, for example 6.1%, are, for the purposes of measuring the effects of changing levels of unemployment on the regular tax income, considered as 'one employer'. The aggregate of the ending balances of all employers with an account percentage of 6.1% is taken as the opening balance of this `one employer' for the first computation year.  An estimate can then be made of the tax income during the year for this `one employer' as each individual employer in this Group (6.l%) is paying the same tax rate. Benefits are charged to this `one employer' by distributing the total estimated amount of chargeable benefits for the computation year (TBCA of Table II) amongst all these groups in accordance with a distribution determined from historical data obtained from the State.

An ending balance is thus obtained for this `one employer', from which a new experience rating factor at the end of the computation year is calculated, determining the appropriate tax rate for the ensuing calendar or rate year. Any applicable transfer of excess amounts to the Solvency Account is then made. The program repeats this procedure for each year of the projection period.

D. Distribution of Employers by Experience Rate

The starting point of the model consists in obtaining a distribution of employers, as of the most recent computation date, in accordance with the specifications set out in the preceding Chapter. Once summarized, the data is reduced into a maximum of 280 Groups. A smaller number of Groups should be used if some of the data cells are too small. The program will now determine the regular tax income of the Fund by simulating the movement into and out of the Experience Rating Account of each of these 280 Groups. As indicated in Table III, this input record to the Financial Forecast Program must contain at least the following items for each Group:

  - Beginning Balance
  - Benefit Charges made during last Computation Year
  - Contributions credited during the same interval (for Reserve Ratio states)
  - Ending account balance
  - Taxable Payroll during the last computation year.

When this distribution is fed into the program, two series of weights are developed; the first one is based on the proportion of benefits charged to each Experience Rating Group to the aggregate amount of benefits charged to all active employers. The second series calculates the proportion of taxable wages of each of the 28O groups of employers to the aggregate State taxable payroll.

As stated earlier it is possible, if the latest ES-2O4 data is not yet available, it is possible to input an `out of date' distribution. In such cases, the program will update it using the

same methodology as when actual amounts of benefits and contributions are inputted after the starting date.

E. Charges to Individual Employer's Experience Rating

As explained in the previous section and indicated in Table II, only, a certain portion of all benefits paid by the Unemployment Compensation Fund find their way into the employer's Experience Rating Account. This may result from direct charges to the Solvency Account (Extended or Dependent Benefits), non-charged benefits paid to disqualified claimants, voluntary quits, etc., or miscellaneous overpayments, recoveries etc.

Total benefits charged to active accounts are allocated to each Experience Rating Group during the projection period in the same proportion that benefits were charged to each such group during the basic computation year. This assumes that the relative aggregate claims experience of all individual employers within each group will remain constant from year to year. If it is judged by the State that this distribution of benefits during the basic computation year is skewed for one reason or another, then the average distribution of, say, the last three computation years can be used in order to develop the benefit charges to each group.

F. Contributions credited to each employer's account

The quarterly amounts of taxable wages as developed by the Projection Program are fed as input into the Financial Forecast Program. These taxable wages are allocated to each Experience Rating Group in the same proportion as was experienced during the basic computation year. At the initial computation date, the beginning and ending Experience Rate of each employer and the tax schedule effective for the current and following rate years are obviously known. Thus contributions are obtained for each group by the application of the appropriate tax rates to the taxable wages; as two calendar years may be involved in each computation year, two corresponding tax rates would be used in such circumstances. Contributions can be credited to the Experience Rating Accounts on either a cash (as received by Trust Fund) or an accrued (including collections due at the end of the month following computation date) basis.

If the user inputs into the Financial Forecast Program the actual amount of contributions collected between the last computation date and the start up date of the projection, these contributions will be distributed among the employer experience rating groups by adjusting the amount of contributions otherwise estimated by the program by the ratio of actual contributions to aggregate contributions estimated by the computer program. (This presents some programming difficulties when the contributions accrued in the fourth quarter of a rate year must be distributed on a cash basis in the first quarter of the next calendar year and when the computation date is December 31; however, the program is capable of handling such a distribution.)

Having determined the credits and debits to each experience rating group, the balance at

the end of the computation year for each group is then calculated as well as any amount of positive or negative excess reserve to be transferred to the Solvency Account, if this is required by law. A revised experience rating account percentage is determined by dividing this balance by the appropriate taxable or total payroll.

The summation over the 280 groups of each quarterly amount of contributions calculated in such a manner provides the regular income for the Trust Fund, on either a computation or rate year basis, as needed.

Finally, the program includes a facility to distribute the amount of investment income into each experience rating group, according to the proportion of the positive balance of each group to the aggregate of all employers positive balances; if the law so requires.

G. Tax Schedules

Each employer's tax rate applicable in the following calendar year depends upon the tax schedule triggered in on the computation date.

These triggering factors are all dependent upon the overall situation of the Trust Fund. The adequacy of the trust fund can be measured in terms of a Reserve Ratio, a Size of Fund Index (or High Cost Multiple), or flat dollar balance. In reality, the triggering mechanism is stipulated by the state UI law, but the model provides the user with capability to experiment with different triggering options, in conjunction with hypothetical tax schedules.

CHAPTER 20   VARIABLES AND CAPABILITIES OF THE FINANCIAL FORECAST PROGRAM

A large number of capabilities have been incorporated into the Financial Forecast Program (FF) in order to enable it to simulate as many taxation systems as possible. It is the purpose of this chapter to review these major capabilities in detail in order to enable the user to decide whether the Financial Forecast Program is able to simulate changes in the existing taxation system, and thus permit the user to measure the financial effect of such changes.

For convenience of reference, the capabilities of the Financial Forecast have been grouped under six headings in the Financial Forecast menu:

> A. General Financial Parameters
> B. Employer Experience Rating Accounts
> C. Tax Schedules and Triggers
> D. Social Taxes
> E. Benefits
> F. Loan Options

A. General Financing Parameters

(1) Computation Date

It is possible to enter any one of three computation dates:

> June 30
> September 30 or
> December 31

The program always starts as of a computation date this will correspond to specific State law, however a State may wish to simulate any of the available options. This variable is modified in the Base year Financial Data screen.

(2) Input of Additional Actual Quarterly Data

Actual experience of up to three additional quarters beyond the computation date may be used as input at the commencement of the projection period in the Financial Forecast. Since the program always starts on a computation date, a facility to input up to 3 quarters of actual experience is available. This will enable the user to start the projection with the most up to date financial information (such as balance in the Fund) which is available. In addition, the user may select the date when the program will start to print the quarterly cash flows. This data may be input in the Financial Forecast under the Additional Quarterly Data screen.

(3) New and Delinquent employers

An analysis of the Laws of several States and of their relevant statistics indicate a wide divergence from State to State in the treatment of new and delinquent employers, and in the statistical significance of their special treatments on the overall income of the Unemployment Compensation Fund. A check must first be made to decide if anything special needs to be done. This test is based on the percentage of the aggregate taxable payroll pertaining to both new and delinquent employers. If such percentage is substantial (say, greater than 3%), some options are offered.

Generally speaking, a number of States handle these employers as follows:

   (a) New or Ineligible Employers, either:

      i) pay a special flat tax rate (say, 2.7%) for as long as they remain ineligible under State Law, usually for a period varying from one to three years; with all their contributions being credited to their own rating account from their first day of coverage under the Law, or

      ii) are subject to experience rated taxes only once they have become eligible, with their rating account accruing as of that date only. They may pay taxes at a flat rate while ineligible, with those being credited to the Solvency Account.

   (b) Delinquent Employers, either:
      i)   pay a fine or penalty which is credited to special administration account, or
      ii) pay a special flat tax rate (say, 2.7%) which is credited to their own rating, or
      iii) pay the normal tax rate, but will not receive credit in their own rating account for their contributions; these are then redirected to the Solvency Account.

In its present form, the program can handle each of those approaches in the following manner:

      b-i) needs no special adjustment.

      a-ii) and b-iii) are handled by inputting into the program, through the use of a parameter value the proportion of aggregate contributions which is so directed towards the Solvency Account. This proportion is obtained from an analysis of the experience of the past few years.

      a-i) and b-ii) require a more detailed analysis as explained in the following paragraphs:

The user should first determine the proportion of Taxable Wages which is subject to such treatment. If this proportion is not substantial, say, less than 3 to 5%, no action is probably required. On the other hand, if it exceeds this limit, the user will need to

calculate from the three summarized distributions of ineligible, delinquent and aggregate employers the ratios, by experience rating groups, of their respective taxable payrolls.

These ratios will then be incorporated into the Financial Forecast Program. Once incorporated, the program will determine an adjusted tax rate for those experience rating groups where a proportion was calculated.

(4) Change in Taxation System

As indicated above, the program permits a redefinition of some of the features of the system during the projection period. This redefinition is allowed only once and can be made at any computation date throughout the 10 year period. Almost all of the variables which describe the financing laws can be changed in order to simulate an entirely new tax structure during the projection period. The simulation of an entirely different tax system, after a certain date in the projection, can be done through the Financial Forecast data screens under Change in Taxation System option.

(5) Rate of Interest

An assumption must be made as to the yearly rate of interest that will be credited to the trust fund during each year of the projection period. The income earned from interest may be credited either to the Solvency account or to the employers' rating accounts (only positive accounts). There is no interest earned if the Unemployment Compensation Fund is in deficit, instead the State is charged interest at previous years rate (actual FUTA law stipulates it is the fourth quarter of the previous year).

B. Employer Experience Rating Account

The experience rating account percentage is defined in the law of each State as being the quotient of the employer's rating account balance and his payroll. The numerator (balance) and the denominator (payroll) may have different meanings in different States. The options available to define each item in this ratio are as follows:

(1) Numerator

> a) The balance can be on a cash or on an accrued basis as of the computation date. (accrued balance would include contributions charged but not yet collected)

> b) The State may establish some limitation on the maximum values which the experience rating level will not be allowed to exceed. In such cases, an amount sufficient to bring the experience rating balance within the limit will be transferred from the employer's account to the Solvency Account. These limits are flexible.

> c) Flexibilities on chargability of Extended and Dependent Benefits are also

possible as is the option to credit interest earned by the trust fund .

(2) Denominator

      a)   The payroll used may be either the taxable payroll or the total payroll.

      b)   The definition of the 'payroll year' can be any of the following 12 months period ending:

                1) on the computation date
                2) 3 months prior to computation date
                3) 6 months prior to computation date
                4) the preceding calendar year

      c)   The payroll year(s) to be used to calculate the denominator can be:
                1) the last one
                2) the average of last two, three, four or five years
                3) the maximum of last one, or average of last two
                4) the total of last three

C. Tax Schedule and Triggers

(1) Tax Rates

The Financial Forecast requires the input of all of the State's tax rates and experience rating intervals. The rates should be entered in percent format with the highest tax rate first. The program will automatically assign a tax rate to each experience rating interval. The user should be careful to enter a tax rate for each experience rating interval group defined plus one.

(2) Number of Tax Schedules

In most States, a table of tax schedules is used to determine the regular tax rate of every employer. These schedules may either be multiples of a base schedule, or different schedules defined in the law, and their number varies from State to State. As of each computation date, a triggering mechanism is used to select the schedule that will be effective during the following rate year. Certain minimum or maximum rates may, however, be applicable in certain specific cases, such as in the case of an employer who benefits from a transfer of part of his negative account to a Solvency Account. The options available under selection of tax schedules include:

    - The inclusion of any number of schedules up to 15

    - A new series of tax schedules may be inputted when the entire taxation system is changed during the projection period

    - A limit to the number of changes in tax schedules from one year to the next. That is to say, no more than 'X' schedules can be skipped from one year to the

next.

(3) Triggering mechanisms
Any one of the following mechanisms is available to trigger on the regular tax schedules:

(a) Number of dollars in the Unemployment Compensation Trust Fund

(b) The ratio of the number of dollars in the Fund to the aggregate payroll, (in such case, the trust fund balance may be cash or accrued and the same definitions of payroll and payroll years are available as for the experience rating account measure). However, the user may use different definitions for the experience rating account and for the triggering mechanism. It is also possible to use either taxable or total payroll. This measure is commonly referred to as the State Reserve Ratio.

(c) The Reserve Multiple is defined as the number (or fraction) of years for which the trust fund has sufficient assets, excluding further contributions, to provide benefits based on the then current total wages at unemployment levels equal to the worst experienced in the State in recent times. This measure is commonly referred to as the Size of Fund Index or the High Cost Multiple.

It is calculated as follows:

$$\text{SOFI} \ = \ \frac{\text{Exposure Criterion (EC)}}{\text{Cost Rate Criterion (CRC)}}$$

where:

EC = Total cash or accrued Fund as of the computation date divided by the Aggregate total payroll of the preceding payroll year.

CRC = The highest value of the following ratio: Benefits paid during a 12 month consecutive period divided by the Total payroll for the payroll year applicable on the computation date which is nearest to the date of calculation.

Under each of the three triggering mechanisms described above, the trigger points are defined by the User.

(4) Experience Rating Account Intervals
As stated above, the applicable tax rate, once the tax schedule has been selected, will depend solely on the employer's Experience Rating Account Percentage which will be

Reserve Ratio, Benefit Ratio, or Benefit Wage Ratio. There are two ways of entering the values which the Experience Rating Account Percentage can take:

(i) Seriatim approach:
By actually reading into the program all the negative and positive experience rating account percentages corresponding to each tax rate, for the current taxation system and for any other tax schedules which it may be desired to evaluate.

(ii) Constant interval approach:
This option can be used by Reserve Ratio experience rating States, which have specific constant intervals between the positive and negative experience rating intervals. If the user selects the constant interval method, the program will automatically generate intervals between -10% and 0% by steps equal to the negative constant, and between 0% and 15% by steps equal to the positive constant.

However, the program will not accept more than 82 tax rates so that the intervals should be designed accordingly. These two approaches are interchangeable during the projection period.

D. Additional Tax Rates

Types of Taxes
A social tax is a flat tax paid by each and every employer independently of his experience rate. There are various types of social taxes, the best known being the solvency tax. There are also the Emergency and Extended Benefit taxes. The employer does not usually receive any credit for such contribution.

                (a)   Social/Solvency or General Tax
                (b)   Emergency Tax
                (c)   Extended Benefit Tax

(1) Social/Solvency or General Tax:

Several States maintain a separate account where all items, which are not credited or debited to the individual employer's rating account, are channeled.

The most common income and outgo items are:

- Income:
  - Solvency contributions
  - Emergency contributions
  - Interest credits
  - Penalties on delinquent employers
  - Transfer of positive balance excess reserves
  - Transfer of positive balances of inactive employers

- Outgo:
  - Extended benefits
  - Dependent benefits
  - Non-charged benefits (on account of overpayments, voluntary quits, etc.)
  - Transfer of negative balance excess reserves
  - Transfer of negative balances of inactive employers

Each of these items can be simulated as previously described.

The only new item consists of the transfers of the book balances of inactive employers. By comparing historical values of benefits charged to inactive employers (TBCI) with the NET (negative less positive) transfers of outstanding book balances to the Solvency Account, it was found in several States that a relatively constant relationship between these two could be assumed. An easy way would therefore be to develop such a proportion from historical data. One should not be overly concerned about accepting a general ratio because of the unimportance of this item in the overall forecast.

Trigger:
        1) Dollars in the Solvency Account
        2) Ratio of dollars in Solvency Account over aggregate payroll

In addition, the following options appear for derivation of the solvency tax and trigger:

- The solvency tax schedule trigger may be cash or accrued as measured in taxable or total wages

- The payroll definition and payroll years used will be the same for the tax schedule trigger and the Solvency Account trigger

- The number of tax rates will be determined according to the number of trigger points entered by the user.

- These tax rates will automatically be assigned by the program, starting with a value of 0% and increasing by .1% up to a maximum of 2.0%; that is, you need to define 20 trigger points to obtain the full range of 21 tax rates (0% to 2%).

There can be a maximum increase in the rate from one year to the next.

Special minimum tax rate:
It is possible to set a minimum tax rate for those employers who benefit from a transfer of part of their negative balances to the Solvency Account. If an employer has benefited from such a transfer in any of the last 'y' years, his regular tax rate will not be allowed to fall below x% at the time this calculation is made (any computation date).

(2) Emergency Tax

In times of emergency, several States replace their normal tax schedules by a special schedule where the range of the tax rates is very limited, sometimes even being made uniform for all employers.

This special schedule is usually made effective when very low value of the normal tax schedules triggering mechanism is reached. If this is so, the program has no difficulty in simulating such an emergency system (since you only need to add the special tax schedule to your normal schedules).

(3) Extended Benefit Tax

At the present time 50% of the cost of Extended Benefits has to be paid for by the State. The present taxation system of most States has never been modified directly to allow for the cost of these benefits. A special tax system can, therefore, be incorporated in the Financial Forecast Program which the user may wish to evaluate.

 A tax rate is calculated at each Computation Date by dividing 50% of the amount of extended benefits actually disbursed in the prior 12 months by the taxable payrolls for the preceding payroll year. If the rate so calculated is less than .2%, this minimum rate is charged; if the rate so calculated is greater than .2% the actual rate is charged subject to the following modification:

At each Computation Date, 50% of the accumulated extended benefits paid since the inception of this Special Tax is compared with the accumulation of the taxes paid. If taxes exceed benefits, this excess is used to reduce the extended benefits tax rate as calculated above for the following calendar year, subject to the minimum tax of .2%. However, if the reserve of such accumulated excess taxes becomes larger than 1% of the total taxable wages paid during the payroll year preceding the Computation Date, no extended benefits tax is charged.

The minimum rate of .2% is flexible and can be set lower or higher, if desired. In order to control the combined level of flat taxes, a State may set a maximum combined tax rate. This flat rate is applied to the balance in the Trust Fund at the end of each calendar quarter, and such income is credited to the Fund the following quarter.

E. Benefits

There are three types of benefits:

> 1) Regular
> 2) Dependents
> 3) Extended

Even though the basic information necessary to calculate the amount of benefits that will be paid throughout the projection period comes out of the Projection Program, the actual

calculation of these benefits is made in the Financial Forecast Program.   The benefits are charged to different accounts depending upon the experience rating philosophy of each State. The benefits that are chargeable to the employer account have to be distributed among those that will ultimately be charged and those that will not.

Options for the Derivation of Benefits

      1) There are no options for the calculation of regular benefits.

      2) Extended benefits may be determined either:

            a) As a percentage of total regular benefits

                or

            b) By multiplying the total number of weeks of extended benefits compensated by a percent of the average weekly benefit amount.

      3) Dependents benefits may be expressed either as:

            a) A dollar value,
                or
            b) Each dependent multiplied by total weeks compensated to dependents,
                or
            c) A percent of the average weekly benefit multiplied by the total weeks compensated to dependents.

Charging Benefits
Regular Benefits are always chargeable to an employer's account. Dependent Benefits may be chargeable either to employer's account or to a Solvency Account. Extended Benefits may be chargeable to employer's account, or a Solvency Account and the portion of extended benefits that is paid to the dependents is charged to the same account as the extended benefits.

The distribution of benefits chargeable to employers, as shown in Table II, are first distributed among charged and non-charged. Using percentages and constant factors. The charged benefits are then redistributed between those charged to active accounts and inactive accounts, using a variable percentage. Lastly, those charged to inactive accounts can ultimately be transferred to the solvency general account using either:

            a) a fixed percentage of benefits charged

                or

     b) a variable percentage based on the average of the last 3 years annual insured rate of unemployment.

In all cases where there are percentages or constants these are defined by the user based on historical averages.

F. Loan Options

The Financial Forecast allows for almost a full simulation of available options under Federal Unemployment Insurance Tax Act (FUTA) Title XII borrowing guidelines. A State may either begin the forecast period in debt or fall into debt during the forecast period. For a complete simulation of the FUTA loan options all of the following input parameters must be filled out in the loan screens:

    a) outstanding loan amount,
    b) interest due,
    c) planned amount of payback from outside funds,
    d) FUTA wage base,
    e) the proportion of State taxable wage base to Federal taxable wage base,
    f) the percentage of benefits to total wages for the previous five years,
    g) planned application for cap or avoidance of FUTA credit reduction.

Using these inputs, the Financial Forecast program will run a comprehensive number of algorithms to model all of the following options under FUTA law:

Each quarter all revenue received will be applied to repay all outstanding balances.

Interest will be charged on all outstanding balances on a quarterly basis. The interest rate that will be used is the previous years rate earned by the Trust Fund (since the previous fourth quarter rate is not input).

If a loan is made on or after January 1 and completely repaid on or before Sept. 30 of the same year no interest is charged. Borrowing again before the next January 1 causes interest to be retroactively payable on all loans made during the calendar year.

Interest charged on all borrowing cannot be paid from funds in the Unemployment Insurance Trust Fund. An additional interest tax can be included to pay interest charges.

All applications for caps, avoidance and deferrals of interest will be input by the

user for a specified period and not forecasted by the program.

If a State has a loan outstanding on January 1, and has not repaid completely by November 10, the State's employers are subject to a FUTA offset credit reduction to repay the loan. If any January 1 passes with no outstanding balance, the year count starts over with the next loan. The following FUTA credit reduction schedule is incorporated into the program:

Years After Loan	Credit Reduction	Additional Credit Reduction	Total FUTA Rate
1	0.0%	0.0%	.8%
2	0.3	0.0	1.1
3	0.6	2.7 Add-on*	1.4 or more
4	0.9	2.7 Add-on*	1.7 or more
5	1.2	BCR Add-on**	2.0 or more
15	5.4	BCR Add-on**	6.2 or more

*   2.7% Add-on = ((2.7 * 7,000/US Avg. Ann. Wage) -Avg.TaxRate)*AAW/7,000
** Benefit Cost Rate Add-on = (higher of BCR and 2.7%) - Avg. Tax Rate

CHAPTER 21   FINANCIAL FORECAST OUTPUTS

Following is a general description of the output tables and variables of the Financial Forecast program. Some output tables and variables have been modified for individual States and therefore may not conform to the description below.   It is the analysis of the information contained in these tables which will allow you to determine whether the postulated taxation system meets your objectives of adequacy, responsiveness, degree of experience rating, etc.

A. Output Table 1: Quarterly Trust Fund Accounting
This Table produces a quarterly cash flow of the income and outgo of the Unemployment Compensation Fund over a period of ten years. It specifically tracks the various types of benefits and taxes as disbursed and received by the Trust Fund.

The specific items are, by line identification:

l. Assumed Unemployment Rate
These are the quarterly assumed insured unemployment rates that were input into the Projection Program. If semi-annual total unemployment rates are assumed as input into the Projection Program, these will be reproduced on this line.

2. Beginning Fund Balance
The first value is the actual balance in your employment Trust Fund at the commencement date of the projection period. The balance shown at the beginning of each subsequent quarter is equal to the value at the end of the preceding quarter, as developed by the program. The cash flow into and out of the Compensation Fund is calculated for each quarter, it being assumed that all contributions accruing in the first quarter will be received in the second quarter, and so on for each of the four quarters.

3. Contributions
The dollar amount of contributions shown on lines 4 to 9 represent the estimated amount of dollars received in the quarter in which it is shown. Therefore, in any calendar year, the largest income is received in the second quarter, given that the accrued contributions are largest in the first quarter. Contributions are derived by aggregating the amount from each of the employer groups.

4. Regular Tax
This is the dollar amount of contributions collected from the operation of the tax schedule effective in the preceding quarter. These contributions are credited to the individual account of the employer, with the possible exception of delinquent employers.

5. Solvency Tax
This item represents the dollar amount of income generated by the operation of a Solvency or General Account. The income shown on this line has not been credited to the individual account of each employer.

6. Emergency Tax
The dollar amount of contributions collected in any given quarter through the operation of an emergency tax system is shown on this line. These contributions may or may not be credited to the Employers' account depending upon the specifications of the simulated taxation system.

7. Special Tax
The program allows for the possibility of incorporating into it any special or emergency tax which is not otherwise readily accessible. The income generated from such a special system would be shown under this caption.

8. Extended Benefits Tax
The dollars collected through a special Extended Benefits Tax system are shown here. This income is credited to a special new account. See Output Table 3B.

9. Total
The summation of lines 4 to 8.

10. Benefits
The dollar amounts of benefits paid in any given quarter are indicated, by type of benefit, on lines 11 to 14.

11. Regular
The amount of benefits paid during the regular benefit period are shown on this line, by quarter. This amount should equal the average weekly benefit multiplied by the regular total weeks compensated for the corresponding quarter on the Projection Program.

12. Dependents
If dependent benefits are payable, the estimated amount of quarterly outgo, paid during the regular benefit period, is indicated on line 12.

13. Extended Benefits (State Share)
The State Share of Extended Benefit payments is given here, including employee and dependent disbursements, during an extended benefit period.

14. Total
The summation of lines 11, 12 and 13.

15. Interest
The amount of investment income assumed to be earned on the Trust Fund Balance. It is calculated by dividing the annual input interest rate by four and multiplying that number by the average Trust Fund balance for the quarter.

16. Ending Fund Balance
The arithmetic result of:

line 2
plus line 9
minus line 14
plus line 15

B. Output Table 2: Yearly Trust Fund Solvency

This Table presents by calendar year, in terms of ratios to the taxable and total payroll, the dollar amount results from Table 1, as well as a number of other significant ratios.

This Table is extremely important as it indicates, for each year of the projection period, the actual relative financial position of the Fund, as well as permitting a straight comparison of the distribution of income and outgo. The specific items are; by line identification:

1. Assumed Unemployment Rate
Depending upon the assumed input to the Projection Program, this line will show:

- the annual insured rate of unemployment, or
- the annualized total rate of unemployment.

2. Maximum Taxable Wage Base
The actual maximum taxable wage base for each year of the projection period from which the aggregate taxable wages were estimated in the Projection Program.

3. Tax Schedule in effect
The actual tax schedule effective during each calendar year, under both the present and alternative taxation systems when a change in tax schedules is simulated. The regular contributions are derived from the application of the tax rates corresponding to the tax schedule shown on this line.

4. Average Weekly Wage
This figure represents the annual average weekly wage derived in the Projection Program based on the total wages of all covered workers.

5. Replacement Ratio
This is the annualized average weekly benefit developed quarterly by the Projection Program for each calendar year of the projection period divided by the average annual weekly wage for covered employment.

6. High Cost Multiple (previously known as **Fund Reserve Multiple)**
This is the UCF Reserve Ratio (item7) divided by the high cost rate (highest rate of total calendar year benefits paid to total wages). A double asterisk indicates whether item 6 or 7 is used by the program for triggering the tax schedule shown in the following rate year.

7. UCF Reserve Ratio

The ratio of the Unemployment Compensation Fund (UCF) to a Specific twelve month total payroll. This number is calculated as of the Computation Date falling in the calendar year shown and is printed on Line 7 accompanied by a double asterisk. As an aid to the user, this UCF reserve ratio is also printed when the trigger is a flat dollar amount.

8. Average High Cost Multiple

The UCF Reserve Ratio (item 7) divided by the 3-year aveage high cost rate (item 23)

9.Solvency Reserve Ratio

This is the ratio of the balance in the Solvency Account to the aggregate wages of the payroll year as determined on the Computation Date falling in the calendar year shown.

10 to 15. Contributions as a Percent of Taxable Payroll

To measure the yield of total taxes during a rate year, the contributions accrued in each calendar year are expressed as a percentage of the taxable wages on which they were levied. This yield is shown for the regular tax as well as for each kind of flat tax (Solvency, Emergency, Special and Extended previously described.

(Note: It is worth mentioning again that in the Output Table 1 Contributions are shown in the quarter in which they are collected while in the Output Table 2 the ratios are calculated according to the quarters in which contributions are accrued.)

16 . Benefits as a Percent of Taxable Payroll

The three different types of benefit payments are related to the taxable wages of the rate year. These ratios represent the benefit cost rates in terms of taxable payroll. After accounting for the non-chargability portion of each benefit, these benefit cost rates can be compared with the experience rated and flat taxes to determine which of these two categories of taxes is self supporting.

17. Contributions as a Percent of Total Payroll

This overall contribution ratio in terms of total payroll is a measure independent of the level of the Maximum Taxable Wage Base, and can thus be used to measure tax yields over the whole projection period.

18. Benefits as a Percent of Total Payroll

The level of benefits is generally related to the total wages of the claimant. This benefit cost rate is therefore a more realistic statistic than the one on line 20 and can be directly compared to the contribution ratio on line 21 without having to account for the effects of changes in the taxable wage base.

19. 3-Yr. Average High Benefit Cost Rate

The average of the three highest calendar year cost rates. The cost rates are the total benefits paid divided by the total wages for covered payroll (item no. 22). For the first year of the projection these rates are input by the user.

20. Ratio of Taxable to Total Payroll
This ratio indicates the annual proportion of total wages which are subject to being taxed. The effect of a change in the taxable wage base can therefore be immediately recognized.

21. Maximum QI for Solvency (1yr)
This is the insured unemployment rate that would have to occur in the following year in order for the trust fund to go to a zero balance. It is calculated by adding the year ending trust fund balance, total contributions expected in the upcoming year, and expected interest to be earned by the fund and equating that to a level of benefits that would have to be paid out. An unemployment rate is then derived which would create that level of benefits.

22. Tax Capacity Per Employee (Max/Avg)
This number attempts to show the approximate dollar charges to employers for each employee. The first number is derived by multiplying the taxable wage base by the maximum tax rate in the active tax schedule. The second number is derived by multiplying the taxable wage base by the average tax rate for the year. It must be mentioned that the average cost per employee may differ according to the actual average salary in that State, which may at times be less than the taxable wage base.

23. Benefits paid per $100 of Income
This number compares the income and outgo of the Trust Fund. The first number listed is calculated by dividing the total benefits paid during the current rate year by the total contributions received during the same period, and then multiplying by 100. The second number listed simply includes the amount of interest earned over the same period into the total contributions.

C. Output Table 3: Solvency Account

The objective of this table is to itemize the various elements being credited and debited to the Solvency Account. All results are shown for the twelve months period ending on the Computation Date of each year of the ten
year projection period. The specific output may vary according to the calculation of the solvency tax in that State, or this output may appear on an additional table.

This Table is labelled '3A' if Table '3B' is printed. The specific columns are:

1. Aggregate Taxable Wages
This column provides for the wages paid during the payroll year, as defined in the Solvency Reserve Ratio.

2. Beginning Fund Balance
This represents the balance in dollars of the Solvency Account at the beginning of each computation year. In normal circumstances, Columns 1 and 2 should provide the user

with sufficient information to determine which Solvency Tax rate will be applicable in the following rate year. The user can verify if the program is using the correct yield on line 11 of Output Table 2.

3. Solvency Contributions
The cash or accrued (as defined) contributions derived from the existence of a Solvency Tax are reported in this column.

4. Emergency Contributions
When the Emergency system described in this Manual is simulated, the resulting amounts of contributions are indicated here.

5. Delinquent Employers Contributions
A number of States penalize delinquent employers by not crediting their regular tax to their own account but rather to the Solvency Account. The proportion of the overall amount of regular contributions which is subject to this penalty is applied to give the result shown in this column.

6. Interest
Quarterly investment income earned in the Trust Fund is accumulated over each computation year and shown here when credited to the Solvency Account.

7. Non-charged Benefits
The amount of benefits which is not charged to the employers accounts is reported in this column. It includes a proportion of the Extended and Dependent Benefits which are not charged unless these last two are entirely charged to the Solvency or Special Extended Benefit Account.

8. Transfers of Inactive Employers
This is the estimate of the net book balance of all terminated employers which is transferred to the Solvency Account.

9. Transfers of Excess Accounts
A number of States will not allow an individual employer`s rating account percentage to exceed certain limits, whether positive or negative. Employers exceeding these limits have their Rating Account Percentage adjusted to the maximum and any excess balance is transferred to the Solvency Account.

10. Dependent Benefits
Entire amount of dependent benefits when they are not charged to the Employers' Accounts.

11. Extended Benefits
Entire amount of the State Share of Extended Benefits when they are not charged to either the employer experience rating group or the Special Extended Benefit Fund.

12. Constant
This constant is the net of the miscellaneous receipts and disbursements of the Solvency Account.

D. Table 3B: Movement of Extended Benefits Fund

If the special Extended Benefits Tax provided for in the program is used, this Table shows the amounts of income and outgo of the Extended Benefit Account, by computation year. This Table is printed only when this special tax is assumed to be effective and part of the taxation system.

E.Table 4: Summary of Transfers

Summary by computation year of the aggregate employers reserve balances before and after the transfer of reserve balances in excess of the Experience Rating Account Percentage limits specified in the State Law. The excess reserve is also broken down between the positive and negative groups.

F. Output Table 5: Distribution of Taxable Payroll by Experience Rating Group
This table show the percentage of taxable payroll that is assigned to each of the experience rating intervals.

G. Output Table 6: Distribution of Total Payroll by Experience Rating Group
This table show the percentage of total payroll that is assigned to each of the experience rating intervals.

H. Output Table 7: Distribution of Total Benefits Charged by Experience Rating
This table show the percentage of total benefits charged to each of the experience rating intervals.

**I. Output Table 8: Distribution of Total Contributions Credited by Experience
                 Rating**
This table shows the percentage of total contributions received from each of the experience rating intervals. The experience rating intervals are from the state tax table.

J. Output Table 9: Total Benefits, Contributions and Wages by Computation Year
For each of the ten or eleven computation years the following items are printed: yearly total amount of interest earned, the computation year ending trust fund balance, total benefits paid (divided between regular, extended and dependent) contributions (divided between regular and social) and wages (taxable and total) are printed.

K. Output Table 10: Total Benefits, Contributions and Wages by Calendar Year
For each of the ten or eleven calendar years the following items are printed: yearly total

amount of interest earned, the December 31 trust fund balance, total benefits paid (divided between regular, extended and dependent) contributions (divided between regular and social) and wages (taxable and total) are printed.

L. Output Table 11: Title XII Loan Summary

This table describes the payment and repayment of any loan made to the State. The beginning amount of interest bearing loan made to the State as of the first computation date is listed on top of the table. Following are the columns listed for the table:

1. Interest Rate
This is the interest rate charged for any loans taken out in the corresponding year. This rate is actually the previous years interest rate earned by the trust fund and is a proxy for the previous year's fourth quarter rate. It is applied to any outstanding balances during the corresponding calendar year.

2. Interest Bearing Loan as of Dec. 31
This is the total amount borrowed by the State during the previous calendar year.

3. Interest Due on Amounts Prior to Jan 1- Dec 31
This is the amount of interest owed for all loans taken out during the previous calendar year.

4. Interest Due on Amounts from Jan 1- Sept. 31
This is the amount of interest owed for all loans taken out from January 1 to September 30.

5.Interest Payable on September 31
The total amount of interest due for all outstanding loans on September 31.

6. FUTA Credit Reduction
The amount of percentage reduction in the FUTA tax rate that is charged to the States employers for outstanding loans. The schedule for repayment as stipulated in FUTA is for all loans unpaid for two January firsts,

7.Aggregate Tax Rate

8.Amount Paid as Result of FUTA Credit Reduction- January 31

APPENDICES

APPENDIX A

TESTING PROCEDURE FOR THE ACCEPTANCE OF A REGRESSION FORMULA

As previously covered, both the Projection Program and at times the Financial Forecast can use regression analysis to forecast variables. The Projection Program annually dervives four variables using regression analysis: the rate of insured unemployment, the taxable to total wage ratio, the average weekly benefit, and the total regular weeks compensated.

The program will automatically run a series of all the regression equations whenever there is a yearly update of the base year data. This section is included to both aid each user in understanding the procedure undertaken by the program or, if desired, run their own regression equations and input the coefficients into the model.

Regression Procedure Steps
The initial step is to identify and list the variables which rationally can be linked. We then try to formalize these links through a multiple linear regression formula which uses a least squares minimization approach to quantify the parameters of that equation. All of the equation specifications used by the model have been documented in Chapter 12.

A linear approach is used for a number of reasons:

> 1. In many States, experience has indicated a very high linear correlation between a great number of UI variables, within the same time period or in successive time frames.

> 2.A linear formula lends itself to much easier interpretation and communication to third parties.

> 3. Since the regression formulas are developed from a limited range of data, and since the Projection Program often extrapolates outside that range, we feel that using formulas of a higher order could magnify distortions in the results.

The last point raised, namely that the regression formulas are often used for extrapolation instead of interpolation, leads us to favor the expression of the variables in the form of ratios instead of absolute numbers wherever possible, so as to minimize the possibility that the application of the formula will necessitate such extrapolation beyond the range of data under study.

Step 1.) Identify the Variables

Given the dependent variable Y we list the independent variables X for which a causality

link with Y can be rationalized. For example,

given: Y = (Taxable Wages / Total Wages)
it is reasonable to expect that Y will be dependent on:

X1 = (Maximum Taxable Wage Base / Average Annual Wages)

which gives the proportion of each employee's wage that is subject to taxation, and also to:

X2 = rate of unemployment

which gives an indication of the proportion of workers which will not be subject to the UI tax.

We have tried adding other variables, but those chosen have proven to be those which are common to all Unemployment Insurance systems with which we have been involved, and which yield acceptable results. Although experimentation with other variables might be undertaken, those listed in this manual should normally be adequate for most cases.

Step 2) Identify the period over which the parameter estimation will be done
Prior to estimating the parameters of the regression formula, it is essential to ensure the homogeneity of the data. This is often easier said than done, and, as will be discussed later, changes in administrative procedures can often be identified only during the procedure of testing the acceptability of a specific formula. The best results will probably be obtained by examining 7 to 12 years of data because:

(i) although the number of data points are few, they are sufficient to see if a linear relationship exists;

(ii) such a time span includes variations in the levels of unemployment; seasonal patterns linked to relatively recent changes in industry mix within each State will also appear;

(iii) changes in methods of gathering statistics can still be traced back and explained.

Step 3) Use of Stepwise Regression Analysis
Given that the dependent and independent variables have been identified, and that the historical data for each of these variables has been gathered, it is necessary to develop estimates of the parameters in the regression equation:

$$Y = \beta_0 + \beta_1 X_T$$

We thus input historical data for the independent variable Y and each of the independent

X variables into a stepwise regression analysis program which computes a sequence of linear regression equations in a stepwise manner. At each step one variable is added to the regression equation; the variable added is the one that makes the greatest reduction in the sum of squares error term.

The program should produce the following statistical information at each step of the stepwise regression:

> i)   Multiple R (correlation coefficient)
> ii)   Standard error of estimate
> iii)   Analysis of variance table
> iv)   Regression coefficient for each of the variables in the equation.

This statistical output is used to determine what regression equation, if any, should be incorporated in the Projection Program. The analysis leading to this determination is done in the following steps:

Correlation Coefficient
We expect the correlation coefficient between the dependent variable (y) and the first independent variable (x) brought into the stepwise regression to be in the (-1;-.9) or (.9;1) ranges.

Our experience has been that for the relationships that we have established this criteria is generally satisfied, thus indicating a high degree of linear correlation and justifying the use of a linear regression approach. Should the correlation coefficient between these two variables be substantially below these ranges, the regression analyst should:

> i) plot the data points on a two dimensional grid;

> ii) graph the regression line produced by the program for the simpler linear regressions;

> iii) identify the data points that seem out of line;

> iv) review the underlying calculations associated with these data points, and inquire as to any administrative changes that might have had an effect on the compilation of statistics for that particular period.

Should this exercise reveal no anomaly in the validity of the data then one of two alternatives can be taken:

> i) discard the formula as presented and search for an alternative formula, including a higher or lower degree equation;

> ii) if the correlation coefficient is not too far outside the expected range, continue with the testing procedure, which could give an indication of any

bias which the formula may introduce. Such continued testing may also uncover the reasons for the deviation.

Test the extrapolation limits applicable to the regression formula

Having completed the above steps, and assuming that a regression formula has been judged acceptable to this point, the final testing procedure involves the introduction of arbitrary values of the independent variables outside the n dimensional space defined by the historical data points, to verify the reasonableness of the values produced for the dependent variables. In other words, if the regression formula is in the form:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2$$

we try different combinations of X1 and X2 to determine the flexibility of the formula outside the range where it is established.

This test is obviously subjective and assumes that the analyst has a considerable knowledge of different State Unemployment Insurance systems and can judge the acceptability of the values produced for Y.

Step 5) Final Considerations

Once all the relationships have been formalized and tested, they form the basic model that will be used in forecasting. The coefficients from these equations are then output on the regression data screens for each individual variable. They will be combined with estimates of the explanatory variables to produce forecasts of the dependent variables. Different scenarios of unemployment rates, and changes in the population and salary trends, are then applied to this model. Although the model is theoretically sound, the model cannot produce workable estimates and projections from an incoherent group of input variables. The regression analyst must ensure, therefore, that the input variables are realistic within the context of the particular State.

APPENDIX B

CREATING AN EMPLOYER DISTRIBUTION FOR
THE BENEFIT FINANCING MODEL

Part of the methodology used in the Benefit Financing Model to calculate total contributions requires the use of a distribution of the State's employers by experience rate. This data is placed in a computer file by the State office and sent to the National office either on a disc or by email.

Each State's Data Processing unit should be able to supply a list of the employers in that State ranked by Reserve Ratio, (or Benefit Ratio, or Benefit Wage Ratio) similar to the one created for the ES-204 report. The file created for the Benefit Financing Model will contain similar variables for each employer group as section C of the ES-204 report, but will consist of more employer groups.

The list of employers in each State will probably consist of the following types of employers:

> * Regularly Rated Employers
> * Ineligible or New Employers
> * Delinquent Employers
> * Inactive Firms
> * Reimbursable Firms

A file containing only regularly rated employers is necessary for the Benefit Financing Model. The remaining groups of employers should be removed from the distribution file. If your file does contain both ineligible and delinquent employers then these two categories can be included in the overall distribution of regularly rated employers. However, it must be ascertained what percentage of taxable wages these two categories occupy in the distribution.

After eliminating all but regularly rated employers the next step is to combine the individual employers on this list into larger groups of employers. This is done by adding the amount of wages, benefit charges, and contributions (for Reserve ratio states only) of single employers into larger groups. In the following example the three individual employers are combined into a single group called Group 1.

Example (for Reserve Ratio State):

	Reserve Ratio %	Beg. Bal. (mil)	Tax. Wages (mil)	Tot. Wages (mil)	Ben. Charged (000)	Cont. (000)	End Bal. (mil)
Employer 1	9.2	15	150	410	1200	200	14

Employer 2	9.0	18	200	630	800	600	18
Employer 3	9.8	9	100	300	200	200	9

These employers are then aggregated into one group for the employer distribution file:

Group 1	9.1	42	450	1340	2200	1000	41

Example for Benefit Ratio State, (which aggregates three years of benefits divided by three years of taxable wages for calculating the Benefit Ratio):

	Ben Ratio %	Tax. Wages yr (000)	Tax. Wages yr-1 (000)	Tax. Wages yr-2 (000)	Ben. Char. yr (000)	Ben. Char. yr-1 (000)	Ben Char. yr-2 (000)
Employer 1	2.0	1000	1000	3000	10	70	20
Employer 2	1.3	5000	5000	5000	60	90	50
Employer 3	1.3	2000	2500	4500	30	20	70

These employers are then aggregated into one group for the employer distribution file:

Group 1	1.4	8000	8500	12500	100	180	140

The new Group 1 was created simply by adding up each of the employers' data columns, from which a new Reserve Ratio or Benefit Ratio can be calculated.

The individual employers should be combined into a maximum of 280 groups. If, for example your State has 60,000 rated employers you could combine these employers into 280 groups with 214 employers in each group. The decision of how many employers to place in each of the groups can be made by allocating a certain amount of taxable wages to each group or by simply making a cutoff point at certain Reserve Ratio or Benefit Ratio intervals and placing all of the employers within those intervals within one group, for instance:

For Reserve Ratio's ranging from -99.0% to -20.0% the intervals can range between 10 to 20 percent.

For Reserve Ratio's ranging from -20.0% to 10.0% intervals of 1.0 percent.

For Reserve Ratio's ranging between negative 10% to positive 15% intervals of 1/10th of 1 percent.

For Reserve Ratio's ranging from 15% to infinite positive, the intervals can range between 5 to 10 percent.

This should give you a good outline for dividing up your State employers. It is more effective for the Benefit Financing model to divide the employer distribution into the maximum number of groups possible, while not going over the prescribed maximum.

Once all of the relevant employers have been placed in groups the aggregated information on those groups should be sent to the National Office in the following format[*]:

For Reserve Ratio States

Column	Description
1 - 4	Reserve Ratio
5 - 13	Beginning Balance
14 - 21	Benefits Charged
22 - 29	Cash or Accrued Contributions
30 - 38	Ending Balance
39 - 45	Taxable Payroll: Avg. of Last 3 Years
46 - 52	Taxable Payroll: Last Payroll Year
53 - 59	Taxable Payroll: Next Preceding Year
60 - 66	Total Payroll: Avg. of Last 3 Years (optional)

For Benefit Ratio States:

Column	Description
1 - 4	Benefit Ratio
5 - 12	Benefits charged 2 years previous to last computation year
13 - 20	Benefits charged 1 year previous to last computation year

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[*] The actual format may vary slightly in accordance with the specific requirements of the state.

21 - 29	Benefits charged in last computation year
30 - 36	Taxable Payroll for 2nd year prior to last computation year
37 - 43	Taxable Payroll for 1 year prior to last computation year
44 - 50	Taxable Payroll for computation year
51 - 53	Tax Rate for base year (if available)

State's using only the last year of taxable payroll in the denominator of the Reserve Ratio are not required to fill in the column relative to average of last three payroll years and next preceding payroll year.

This data can then be e-mailed or placed on a floppy disc or CD and sent to the National Office.

APPENDIX C

VARIABLES USED IN THE BENEFIT FINANCING MODEL

Following is an alphabetical list of variables used in the Benefit Financing Model. The variables are divided into two sections. The first section describes variables located in the Projection Program and the second section describes variables used in the Financial Forecast Program. A short description is provided for each variable and the variable abbreviation as used in the program is provided. The abbreviation may be used in the specific variable option in order to access and edit this variable directly without having to go through any additional screens.

C.1   PROJECTION PROGRAM VARIABLES

Abbreviation	**Variable Description**

A
AAWB	Average weekly benefits, for current data.
AAWW	Average weekly wages, for current data.
AILF	Insured Labor Force, for current data.
ATLF	Total Labor Force, for current data.
ATWCD	Weeks compensated to dependents, for current data.
ATWCE	Extended weeks compensated, for current data.
ATWCR	Regular weeks compensated, for current data.
AUI	Insured unemployed, for current data.
AWBADJ	Percent of the AWB adjustment factor. (e.g. 1% s/b .01)
AWBQ	Average weekly benefits, for the base year
AWWQ	Average weekly wages, for the base year.

B
BENWX1	Total Benefit Wages for the 1st qtr. of the year prior to the base year.
BENWX2	Total Benefit Wages for the 2nd qtr. of the year prior to the base year.
BENWX3	Total Benefit Wages for the 3rd qtr. of the year prior to the base year.
BENWX4	Total Benefit Wages for the 4th qtr. of the year prior to the base year.

C
CILFQ	Insured Labor Force for the base year
CILFQX	Insured Labor Force for the 2nd qtr. prior to base year

D
DAHO	Option to end extended benefits when EB triggers off, rather than a gradual drop-off in benefits.
DRA	Trigger value to calculate Extended Weeks Compensated using a regression equation or a constant factor.

F

FADJ   Determines method of rounding for Maximum Weekly Benefit

I
IAWB   Option to round down Avg. Week Ben. 0 No, 1 Yes.
IEQTAX   Trigger value for TAXTOT regression, linear or non linear equations are used.
IROUND   Trigger for Computing Wage Base rounding.
IURB   IUR for 4 quarters respectively of the base year.
IURX   IUR for 4 qtrs of the calendar year before the base yr.
IVAO   Option to add the adjustment factor to AWB.
IYMAX   Calendar year to change Max Weekly Benefit Amount (last 2 digits)

K
KBL   Calendar base year. (Two last digits only). This year must be the last completed calendar year for which the data was used in the development of the regression formulas.
KCD   Cal qtr of the Computation Date as defined in Financial Forecast Program.
KDB   Opiton to trigger Dependent Benefits as payable or not payable.
KEBC   Extended benefit trigger at the end of the quarter.(Base Year)
KFPY   Cal. year including the starting Computation date, as defined in the Financial Forecast Program.
KFWBO   Flexible taxable wage base option.

M
MABE   If Max. Weekly Ben. is inputed, read 12 years of Benefits here.
MACH   The first quarter during which Maximum Weekly Benefit will change.
MACHX   The second quarter during which the Maximum Weekly Benefits will change
MAFO   Determines the manner with which the Maximum Benefit is defined for the years of projection.
               1) Maximum Benefit is a percentage of the average weekly wages during the preceding calendar year.
               2) Maximum Benefit is increasing at the rate of increase in wages rounded to nearest dollar.
               3) Maximum Benefit is read directly for each year of projection.
               4) Maximum Benefit is a percentage of the average weekly wages during the 12-month periods ending other than calendar years rounded to the next higher dollar or the nearest dollar as will be noted by the user.
MAXB   Maximum Weekly Benefit effective at the end of the base year.
MAXCST   Amount of Maximum Benefit that is held constant.
MTWB   Maximum Taxable Wage Base for the 12 years of projection.

N
NEBI   Trigger to use 6% rule for EB
NEBQ   Extended benefit trigger at the end of the qtr. for actual data.
NQ   Number of quarters for which the output is replaced by actual data.

Depending upon this variable, we will have 0, 1, 2 or 3 additional quarters of data.

P

PAWW	Ratio of AWW for each quarter over AWW for the year.
PCTAW	Percentage of average annual wage from second prior year.
PMA	Percent of AWW used to define the Maximum Weekly Benefit
PMAX	For the 1st qrt. of change, % used to define Maximum Weekly Benefit.
PMAX1	For the 2nd qrt. of change, % used to define Maximum Weekly Benefit.
PROO	The proportion of regular weeks compensated in first quarter of change that is subject to previous maximum.
PROO1	The proportion of regular weeks compensated for the succeeding quarter when the maximum benefit changes, that is subject to the previous maximum.
PROOX	The proportion of regular weeks compensated in the second quarter of change that is subject to previous maximum.
PROOX1	The proportion of regular weeks compensated for the succeeding quarter when the maximum benefit changes, that is subject to the previous maximum. (2nd change)
PTLF	Ratio of total labor force for each quarter over total labor force for the half year, respectively for the first and second quarters to the first half year and the third and forth quarters to the second half year.

Q

QIA	Annual rate of insured unemployment for the base year and the twelve years of projection respectively.
QIE(1)	IUR for the 4 quarters of the calendar year before the base year.
QIE(2)	IUR for the 4 quarters respectively of the base year.
QIEXQI	IUR for the 4th quarter of the year that is 2 calendar years before the base year.
QT	Annual TUR for the base year and the 12 projection years.
QTH	Half yearly TUR for base year and the 12 projection years.

R

RQI	This variable can take the value of "0" or "1".
	0) TUR will be read in the program.
	1) QI will be read in the program.
RQT	This variable can take the value of "0" or "1".
	0) TUR read on a half year basis.
	1) TUR read on a yearly basis.
RTLF	Trigger value for the Total Labor Force. "0" or "1".
	0) Use annual rate of increase in Total Labor Force.
	1) Total Labor Force will be read directly.

S

SALI	Assumed annual rate of increase in average weekly wage for each year of

projection.

T

TAXQ	Taxable wages, for the base year.
TAXQ2	Taxable wages, for actual data
TAXWAG	Series of MTWB (Ex. INCREASING)
TITLE1	1st line of identification on output tables.
TITLE2	2nd line of identification on output tables.
TLFH	Total Labor Force is read by half year for 12 yrs of projection.
TLFI	Annual rate of increase in labor force (Ex: 3.00 = 3 percent).
TLFQ	Total Labor Force, for the four quarters of the base year.
TOTQ	Total wages, for the four quarters of the base year.
TOTQ2	Total wages, for current data
TOTQX	Total wages for the second quarter prior to the base year.
TOTQX1	Total wages for the last quarter prior to the base year
TWCD	Weeks compensated to dependents, for the base year
TWCE	Extended weeks compensated, for the base year.
TWCR	Regular weeks compensated, for the base year.

U

UIQ	Insured unemployed, for the base year
UIQX	Insured Unemployment for the second quarter prior to base year.
UIQX1	Insured Unemployment for the last quarter prior to base year.

W

WAWK1	Intercept of QI for Average Duration Regression. (for waiting week calculation)
WAWK2	Coefficient of QI for Average Duration Regression.
WAWK3	Intercept of QI for Exhaustion Rate Regression
WAWK4	Coefficient of QI for Exhaustion Rate Regression
WAWKT	Waiting Week Trigger.

X

XAWB1	Coefficient of MWBx(t/4) (AWB regression)
XAWB2	Coefficient of AWWx(t/4) (AWB regression)
XAWB3	Coefficient of QIx(t/4) (AWB regression)
XAWBI	Intercept (AWB regression)
XCILFQ	Insured Labor Force for the last quarter prior to base year.
XPC1	Coefficient of QIx(t/4) (Multiply by 100) (TAXTOT regression)
XPC2	Coefficient of (MTWBx(t/4) / AWWx(t/4) X 52) (TAXTOT regression)
XPC3	Coefficient of MTWB. (TAXTOT regression)
XPCI	Intercept. (TAXTOT regression)
XPILF1	Trigger for Labor Force regression.
	Coefficient of QTx, unless "0" which will let XPILFI represent the constat ratio of the insured labor force to the total labor force.
XPILFI	Intercept for QI regression

XQI1	Coefficient of QI(x1) (Previous). (QI regression)
XQI2	Coefficient of QIx (Current). (QI regression)
XQI3	Coefficient of QI(x+1) (Next). (QI regression)
XQII	Intercept (divide by 100). (QI regression)
XTWCD	If Dependent benefits are payable, this represents the ratio TWCD/TWCR.
XTWCE1	Coefficient of variable describing number of weeks off.(EB regression)
XTWCE2	Coefficient of UI(t1/4) (EB regression)
XTWCE3	Ratio of extended weeks compensated to regular weeks compensated.
XTWCE4	Coefficient of UI(t2/4) (EB regression)
XTWCEI	Intercept. (EB regression)
XTWCR1	Coefficient of UIx(t/4) (TWCR regression)
XTWCR2	Coefficient of ABAW, the ratio of the AWBA to the AWW. (TWCR regression)
XTWCRI	Intercept (TWCR regression)
XUH	Product of two ratios combining interstate claims and non-reimbursable claims.
XUIQ1	Coefficient of UIx-1(t-1/2) (UI regression)
XUIQ2	Coefficient of UIx(t-2) (UI regression)
XUIQ3	Coefficient of UIx(t+1/2) (UI regression)
XUIQI	Intercept (UI regression)
XUJ	Ratio of XUH (see above) to covered
XUNE1	Coefficient of UTx(t-2) (UNE regression)
XUNE2	Coefficient of UTx-1(t-1/2) (UNE regression)
XUNEI	Intercept (UNE regression)
XUR	Percent reimbursable claims.
XUT1	Coefficient of UT(x1) (UT regression)
XUT1	Coefficient of UT(x) (UT regression)
XUTLF1	Coefficient of TLFx(t/2) 1st half of the year. (UNE regression)
XUTLF2	Coefficient of TLFx(t/2) 2nd half of the year. (UNE regression)
XUTNI1	Intercept for 1st half. (UNE regression)
XUTNI2	Intercept for 2nd half. (UNE regression)
XUTUT1	Coefficient of UTx(t/2) for 1st half. (UNE regression)
XUT2	Coefficient of UTx(t/2) for 2nd half. (UNE regression)

C.2   FINANCIAL FORECAST INPUT VARIABLES

Abbreviation   **Variable Description**

B

BENSBK1	Total benefits paid in 5th year prior to computation year. (millions)
BENSBK2	Total benefits paid in 4th year prior to computation year (millions)
BENSBK3	Total benefits paid in 3rd year prior to computation year (millions)
BENSBK4	Total benefits paid in 2nd year prior to computation year (millions)
BENSBK5	Total benefits paid in 1st year prior to computation year (millions)

K

KCD	Calendar quarter of the computation date. 2 - June 30 3 - September 30 4 - 4 December 31
KCHAD1	Where will Dependent Benefits will be charged? 1 Employers Accounts 2 - General Account
KCHAD2	Same as KCHAD1 after the tax change. 1 Employers Accounts 2 - General Account
KCHAE1	Where will Extended Benefits will be charged? 1 Employers 2 - General Account, 3 - Special Fund
KCHAE2	Same as KCHAE1 after the change. 1 Employers 2 - General Account, 3 - Special Fund
KCREE1	Where will the Emergency contributions be credited 1 employers 2 - General Account
KCREE2	Same as KCREE1 after the tax change.
KD	Tells how dependent benefits are figured. 1 No benefits 2 - TWCD * % of AWB (Regular), 3 - Flat amount per dependent * TWCD
KE	Tells how extended benefits are figured. 1 No benefits 2 - TWCE * % of AWB (Regular) 3 - %of regular benefits
KEMCC	If the quarterly Emergency Tax is already built into the state taxation system and if this tax was payable during the last quarter preceding the beginning of the program, list the # if quarters elapsed since the last anniversary. (From 1 to 4).
KEME1	Is Emergency Tax payable and if so how often is the test made? 1 Not paid, 2 - Payable, annual test, 3 - Payable, quarterly test.
KEME2	Same as KEME1 after the change.
KEXT1	Is Extended Benefits Tax payable? 1 No 2 Yes
KEXT2	Same as KEXT1 after the tax change.
KFPQ1	1st quarter to be printed.
KFPY	Calendar year with starting computation date (Fictitious calendar year 2) Enter last 2 digits.
KFPY1	1st calendar year to be printed. Enter last 2 digits.
KIOW1	Do you want to use Iowa's array method? 0 No 1 Yes
KIOW2	Same as KIOW1 after change of tax table.
KKSCH	Do you want to select the regular tax schedules starting with the 2nd year

	of projection?
KMAXT	Maximum variation of Regular Tax Schedules of 2 consecutive years. Default value is 99. From 1 to # of regular tax schedules.
KNI	# of solvency tax rates possible. Up to 9.
KNRI	# of RAP intervals should be equal to the number of tax rates in each schedule less 1. Specified only if RAP intervals are variable.
KNT	# of regular tax schedules. Up to 15.
KNY1	# of years during which one keeps track of negative transfers.
KNY2	Same as KNY1 after the change.
KNYNER	Is the distribution technique used to adjust for new employers? 0-No 1- Yes
KPY	Payroll year definition for RAP. Same possible values as variable KPYRR.
KPYRR	Payroll year definition for regular tax schedule trigger and/or solvency tax rate trigger. Needs to be specified only if reserve ratio is used for either trigger. 12 months period ending:1 - computation date 2 - 3 months before the computation date, 3 - 6 months before the computation date 4 - last calendar year
KQI	# of quarters for which actual experience is inputed, from 0 to 3 Quarters.
KQS	Quarter in which the change of tax system is effective
KQVOL	The quarter in which the voluntary contributions will take effect. (Iowa)
KRAPC	Basis of the fund used for RAP 1- accrued 2 - cash
KRAPNY	Payroll years to be used for denominator of RAP. Same possible values as variable KPYRR.
KRI	Parameter indicating whether RAP intervals are constant or variable. 1-constant 2 - variable
KRNKC1	The % of excess rank to be used for construction employers. (Iowa)
KRNKC2	% of excess rank used for construction employers if a change is desired. (Iowa)
KRNKN1	% of excess rank used for new employers. (Iowa)
KRNKN2	The % of excess rank used for new employers if a change is desired. (Iowa)
KRR	Will regular tax tables be changed during the forecasting period? 1-No 2- Yes
KRS	Will Solvency tax rates be changed? 1- No 2 Yes
KRT1	Indicates whether taxable or total payroll will be used a denominator for employers experience rate.1- taxable 2 - total
KRT2	Same as KRT1 after the change.
KS	Does change in taxation system occur during the projection period? 1- No change 2 - Changes made
KSCH(J)	Regular tax schedules effective starting with the 2nd year of projection. (Iowa)
KSF1	Tells type of wages in denominator of the Reserve Ratio when the size of fund index is used as the regular tax table trigger. 1- taxable 2 - total

KSF2	Same as KSF1 after the change.
KSOLF	Tells whether fund used in triggering mechanisms on an accrued or cash basis. 1- accrued 2 - cash
KST1	Solvency tax rate trigger.
	0- No tax 1 - Reserve Ratio of Solvency Fund
	2 - Reserve Ratio of the Trust Fund 3 - $ value of Trust Fund
KST2	Same as KST1 after the tax change.
KTA0	Regular tax schedule effective during fictitious calendar year 2.
	1 - lowest yield 2 - 2nd lowest yield etc..
KTA1	Same as KTAO except for year 3.
KTT1	Identification of Regular Tax Table Trigger.
	1 - $ value of the fund (millions)
	2 - Reserve Ratio based on the taxable payroll
	3 - Reserve Ratio on the total payroll
	4 - Size of Fund Index
	5 - Fund Factor
KTT2	Same as KTT1 after the change.
KTTI	Tax schedule labels (A, B etc.) There should be as many letters as the number of regular tax schedules. Maximum of 15, lowest schedule 1st.
KTTTNY	Payroll years to be used for denominator of regular tax table trigger and/or Solvency tax rate trigger. Needs to be specified only if reserve ratio is used for either trigger. 1 last one
	2 - average of last 2
	3 - average of last 3
	4 - average of last 4
	5 - average of last 5
	6 - total of last 3
	12 - maximum of 1 and 2
	13 - maximum of 1 and 3
KUCF	Tells if the fund used in triggering mechanism is on an accrued or cash basis. 1 accrued 2 - cash
KYS	Calendar year including the computation date from which the change of taxation system is effective. Last 2 digits.

M

MAXX	Indicates number of years which the payroll is averaged in order to determine RAP or Reserve Ratio

P

PAY	Taxable and Total payroll, by quarter, for year 1 and year 2. (In 000's)
PAYY(1KR)	Aggregate payroll (taxable or total depending on KRT1) during the payroll year immediately preceding the computation date of fictitious calendar year 1 which is used to calculate the RAP. (EX: If computation date is 6/30/99 then enter Aggregate payroll for the period 6/30/98 through 6/30/99)
PAYY(2,KT)	Aggregate payroll (taxable or total, depends on KTT1 used to figure Trust

Fund and /or Solvency Reserve Ratio.

PERNEW(K) % of taxable wages represented by new employers (11 years start from base year).

PINTF(K) Interest rate(%) earned by Trust Fund. (e.g., 10% should be 10.0)

PINTMX Maximum interest rate(%) charged for loan   e.g., 10% s/b 10.0

PMAX Max. solvency rate (%)   (Ex. 5% should be 5.0)

Q

QIA(1) Annual insured rate of unemployment for the calendar year preceding the starting date.

QIA(2) Same as QIA except for fictitious calendar year 2.

QLOAN1 Interest bearing loan made in 1st quarter of the base year. (millions)

QLOAN2 Interest bearing loan made in 2nd quarter of the base year. (millions)

QLOAN3 Interest bearing loan made in 3rd quarter of the base year. (millions)

QLOAN4 Interest bearing loan made in 4th quarter of the base year. (millions)

R

RAPLO Lower limits of affected RAP intervals.

RAPUP Higher limits of affected RAP intervals.

RATE18 Special rate.   e.g. 1.8% should be 1.8

RBEND Dependent benefits paid in quarter.

RBENE Extended benefits paid in quarter.

RBENR Regular benefits paid in quarter.

RBTBK1 % of regular benefits to total wages for 4th year prior to the computation year.

RBTBK2 % of regular benefits to total wages for 3rd year prior to the computation year.

RBTBK3 % of regular benefits to total wages for 2nd year prior to the computation year.

RBTBK4 % of regular benefits to total wages for 1st year prior to the computation year.

RBTBK5 % of regular benefits to total wages for the computation year.

RCASH Total cash in the quarter. (For GA only, in thousands)

RCOEM0 Emergency tax rate effective during fictitious calendar year 2.

RCOEM1 Same as RCOEM0 except for year 3.

RCONB Special contribution accrued in quarter. (Actual Experience)

RCONB0 Special tax rate effective during fictitious calendar year 2.

RCONB1 Same as RCONB0 except for year 3.

RCONE EB contributions accrued in quarter. (Actual Experience)

RCONE0 Extended Benefits tax rate effective during fictitious calendar year 2.

RCONE1 Same as RCONE0 except for year 3.

RCONEM Emergency contribution accrued in quarter. (Actual Experience)

RCONR Regular contribution accrued in quarter. (Actual Experience)

RCONS Solvency contribution accrued in quarter. (Actual Experience)

RCONS0 Solvency tax rate effective during fictitious year 2. e.g., 10% s/b 10.0

RCONS1 Same as RCONS0 except for year 3.

RFUNDT1	Trust Fund at the end of the quarter (accrued basis. For GA only, in thousands)
RFUNDT2	Trust Fund at end of quarter (cash basis. For GA only, in thousands)
RINTF	Trust fund interest accrued in quarter. (Actual Experience)
RLOAN0	Non interest bearing loan in quarter. (Actual Experience)
RLOAN1	Interest bearing loan in the quarter. (Actual Experience)
RTRAN	Fund transfer in the quarter. (Actual Experience)

T

TAXNEW(K)	Tax rate(%) of new employers (11 years of projection start from base year.
TBEN	Total benefits paid during each of the 3 quarters preceding the starting date.
TCON	Total contribution accrued, for quarter including the computation date.
TCONR	Regular contribution accrued, for quarter including the computation date.
TINTL(1)	Total of interest due in year 1 (millions)
TINTL(2)	Total of interest due in year 2 (millions)

X

XCREI1	% of interest to be credited to employers' account.
XCREI2	% of interest to be credited to employers' account. after any changes.
XDELCO	% of regular contributions made by delinquent employers which are credited to the Trust Fund.
XDEP	Dependent Benefits rate.
XEMR	Emergency Tax Rate, if applicable.
XEXTMI	Minimum Extended Benefits Tax Rate
XINTQ23	Amount of interest due in 3rd quarter year 2 (millions)
XINTQ24	Amount of interest due in 4th quarter year 2 (millions)
XINTQ32	Amount of interest due in 2nd quarter year 3 (millions)
XINTQ33	Amount of interest due in 3rd quarter year 3 (millions)
XIOWC	Portion of taxable payroll that will be allotted for construction employers. (Iowa)
XLOAN1	Amount of interest bearing loan (in millions)
XMAXI	Maximum variation of solvency tax rate
XMISCO	Amount of sundry incomes credited annually to the Solvency Fund.
XNRAP	Size of negative RAP intervals.
XPEXT	% used to calculate extended benefits.
XPRAP	Size of positive RAP intervals.
XRAPI	RAP limits. Lowest one 1st.
XRAPLN(1)	Negative RAP limit for transfers.
XRAPLN(2)	Negative RAP limit for transfers after the change.
XRAPLP(1)	Positive RAP limit for transfers.
XRAPLP(2)	Positive RAP limit for transfers after the change.
XRATEM	Minimum regular tax rate for those who had a negative transfer.
XRATES	Regular tax rates for each schedule (A, B etc.)
XSEXMA	Combined maximum of solvency plus extended benefits tax rates.

XTBCA   % of charged benefits, which is charged to active accounts.

XPC   % of total benefits, less miscellaneous benefits, which is charged to the employer.

XTBPM $ amount of miscellaneous benefits.

XTRIG   Triggering limits used by the tax table trigger system. There should be as many limits as the number of schedules less one. Lowest one 1st.

XTRIGS   Triggering limits used to determine the solvency tax rate.