

RATIONAL EXPECTATIONS

MODEL SIMULATION

PROGRAM MANUAL

By

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This manual describes a program that implements the extended-path algorithm designed to solve non-linear rational expectations models. The program was used for the simulations of the multicountry model described in *Macroeconomic Policy in a World Economy: From Econometric Design to Practical Operation*, W. W. Norton, New York 1993, by John B. Taylor. The extended-path algorithm is discussed in Chapter 1 of that book.

The rational expectations model simulation program was developed at Stanford University by Andrew Levin, Ellen McGrattan, John B. Taylor, and John C. Williams.

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Table of Contents

1. Getting Started	1
Designating the files	
Obtaining the files over a network	
Compiling and running the program	
2. Interactive versus Data File Input for Specifications	5
3. Directory Structure	5
4. Choosing Simulation Specifications	6
Alternative Deterministic Simulations	
Alternative Policy Rules	
5. Perfect-tracking Residuals	12
6. Simulation Periods	12
7. Convergence Issues	13
8. Example job.dat File	14
9. Program Output	14
Output Conventions	
Variable Names	
10. Example print.dat File	17
11. Related Data and Programs	22

1. Getting Started

The program is setup so that the user need only respond to prompted questions regarding the type of simulation to be conducted. Many of the simulations are variations on those reported in *Macroeconomic Policy in a World Economy: From Econometric Design to Practical Operation*. Alternatively, the program can read the simulation specification from a user written data file named `job.dat` (see below for details). Output is written to a file that can be read by any standard spreadsheet or word processing program.

The program needs to be compiled using a Fortran compiler. Unless the user wishes to change the functional forms of the equations of the multicountry model, the program files need not be modified.

This manual focuses on implementing the program on a UNIX-based system. In particular, the program and files described here are typically run on SUN SPARCSTATION and IBM RS/6000 computers. Of course, users can, if desired, adopt the program for use on other computers with appropriate speeds and memory.

Designating the files

The program makes use of the following files:

FORTRAN FILES

`extpath.f`
`files.f`

SPECIFICATION FILES

`job.dat`
`print.dat`
`eqno.dat`
`shocks.dat`

DATA FILES

`bl.dat`
`coefs.dat`
`dlist.dat`
`ratio.dat`
`vcov.dat`
`wage.dat`

OUTPUT FILE

`remxxxxx.vu`

The files for running the program are Fortran source code files with an "f" extension and data files with a "dat" extension. The file `"extpath.f"` contains the extended path algorithm and does most of the number crunching. More information about the contents of the files are found in Appendix 2 of *Macroeconomic Policy in a World Economy: From Econometric Design to Practical Operation*.

Obtaining the files over the World Wide Web

You can download zipped versions of all the files listed in this document by clicking on the appropriate files on Professor John Taylor's webpage at <http://www.stanford.edu/~johntayl/>

Obtaining the files over a network

The data and program files are stored on a computer at Stanford University that is connected to the Internet system. You can retrieve these files via anonymous FTP. To do so, you must have an account on a system that is part of the Internet system. You need at least four megabytes of free storage. To access the files, follow the directions below:

1) establish a connection to the machine where the files are stored by typing:

```
ftp macroecon.Stanford.EDU and press ENTER.
```

2) when you are prompted for your user name, type:

```
anonymous and press ENTER.
```

3) when you are prompted for your password, type your complete username with system name, e.g., johndoe@usa.edu. and press ENTER.

4) move to the subdirectory where the files are stored by typing:

```
cd pub/macropolicy and press ENTER.
```

5) retrieve the files to your account/storage device by typing:

```
mget *.* and press ENTER. Answer yes to each query to retrieve all the files in the subdirectory.
```

6) exit the FTP program by typing:

```
quit and press ENTER.
```

Compiling and running the program

You must first compile the program files on the computer you will use to run the program. You must link files `extpath.f` and `files.f` when you compile them.

Once you have successfully compiled the program, run it by giving the appropriate execute command (e.g., ``a.out'`) and you will be prompted for simulation specifications. All questions must be answered with an integer input, unless otherwise specified. In Fortran, a real number must include a decimal point, e.g. 3.0 is the correct specification of the number 3; the numeral 3 is interpreted to be the integer 3. In many cases a series of inputs is requested. In such a case, leave a space between each response and do not press the [ENTER] key until you have typed all the inputs for that question. For "yes" or "no" questions, type

the numeral 1 for yes and the numeral 0 for no (do not use the letters y,n,o, or l).

Following is a review of the questions you will need to answer:

- (1) Have you written your simulation specification to a file "job.dat"?
(If so, this file will be read and you will not be prompted for any other replies. If not, you must answer the following questions:)
- (2) Is the simulation stochastic?
 - (i) If yes to (2), how many times should the simulation be repeated using a different set of shocks each time?
 - (ii) If yes to (2), should only a subset of the equations be shocked?
 - (iii) If yes to (2ii), how many equations are to be shocked?
- (3) Is the simulation deterministic?
 - (i) If yes to (3), what type of policy change? (See list below)
- (4) Which type of monetary regime is to be used? (See list below)
- (5) Are exchange rates flexible (vs. fixed/EMS)? (1 = yes, 0 = no or EMS)
- (6) Are perfect-tracking residuals to be added to the equations?
(1 = yes, 0 = no)
- (7) What are the first and last periods for the simulation? (1=1971:1)
- (8) What are the first and last periods for output? (1=1971:1)
- (9) Are the default values for iteration specifications to be used?
 - (i) If no to (10), what are the convergence criteria for type I, type II, and type III iterations? (real numbers)
 - (ii) If no to (10), what is the maximum number of iterations for type I and type II?
 - (iii) If no to (10), how far into the future should the path extend?

Once these questions are answered, the program will work on its own, conducting type I, II, and III iterations for the specified number of periods and simulations. For a definition and discussion of these iterations, see the 1983 Econometrica paper by Ray Fair and John B. Taylor listed above. Statements indicating the program's progress are sent to the screen. These can be redirected to an output file on a UNIX system.

2. Interactive vs. Data File Input for Simulation Specifications

Note that the first question asked by the program is whether the job specifications have been written to a file. If the answer is no, then the program assumes you want to use the interactive prompts responding to questions at the keyboard.

You also have the option of writing the specifications to a file named job.dat. If you choose this approach, you must have a properly arranged file named job.dat (see below). If you want to eliminate all interactive prompts entirely, you can modify the file extpath.f. Instructions are included in the file extpath.f (on the first page of text). If you change extpath.f, you will have to recompile the program.

Other simulation specifications included in the files print.dat, eqno.dat, and shocks.dat are read directly from files and cannot be input from the keyboard.

3. Directory Structure

The files.f file indicates the program where the Fortran, specification, data, and output files are located on your directory tree. The default setting is that all files reside together in one directory. If you do not use such an arrangement, you need to modify the files.f file by changing the relative path to your files from the subdirectory where the Fortran files reside.

The default settings are given in the following listing of files.f.

```
C*****
C  SUBROUTINE FILES
C*****
C  THIS SUBROUTINE INDICATES WHICH FILENAMES ARE
  ASSOCIATED WITH WHICH UNITS USED BY EXTPATH.F
  SUBROUTINE FILES
  WRITE(*,*) 'LOCATING DATA AND OUTPUT FILES.'
  OPEN(UNIT = 2, FILE = 'bl.dat')
  OPEN(UNIT = 3, FILE = 'wage.dat')
  OPEN(UNIT = 4, FILE = 'coefs.dat')
  OPEN(UNIT = 8, FILE = 'eqno.dat')
  OPEN(UNIT = 9, FILE = 'shocks.dat')
  OPEN(UNIT = 10, FILE = 'ratio.dat')
  OPEN(UNIT = 11, FILE = 'job.dat')
  OPEN(UNIT = 15, FILE = 'dlist.dat')
  OPEN(UNIT = 16, FILE = 'print.dat')
  OPEN(UNIT = 21, FILE = 'vcov.dat')
  RETURN
```

END

4. Choosing Simulation Specifications

The program associates values of program variables to your simulation specifications. The names of these variables are given in parentheses below to aid in organizing your job.dat file if you use the noninteractive approach.

A simulation must be either deterministic (ISTOCH=0), in which case there are no random shocks, or stochastic (ISTOCH=1), with random shocks occurring each period.

Deterministic simulations are used to investigate the effects of a shift in the fiscal or monetary policy instruments such as an increase in government spending.

Stochastic simulations are used to investigate the effects of different exchange rate or monetary policy regimes in a stochastic environment. For stochastic simulations you may want to conduct a number of simulations in order to construct a set of time series. The number of simulations (NSIMLS) can be any number from 1 to 100. The random shocks are generated using a random number generator. For each simulation, an integer between 1 and 32000 is required to 'seed' the number generator. This seed value (ISEED) uniquely determines the entire set of random shocks, so choose different values for each simulation.

Normally the program adds shocks to all appropriate equations (ISUB=0). If you wish to restrict the number of equations shocked (ISUB=1), you need to list the equation numbers to be shocked in a file named eqno.dat. There are 112 equations in the model, corresponding to the 112 variables. The variables are listed in order in the print.dat file supplied with the program (the remaining 35 variables on the list cannot be shocked). Note that equations 71-77 correspond the GNP identities and should not be shocked. A sample eqno.dat file is also included.

Alternative Deterministic Simulations

For deterministic simulations, the policy (IDTYPE) can be any of those listed below. For example, to choose a permanent 3 percent increase in the German money supply anticipated two years in advance, set IDTYPE to 24. (For stochastic simulations, the policy should be

IDTYPE=0).LIST OF DETERMINISTIC POLICY RULES:
THE FIRST DIGIT GENERALLY INDICATES THE TYPE OF
POLICY, THE SECOND THE COUNTRY CONDUCTING THE
POLICY (TYPES 71, 72, AND 73 ARE EXCEPTIONS) FOR IDTYPE
SPECIFICATION, THE COUNTRIES ARE NUMBERED AS
FOLLOWS:

- 1 UNITED STATES
- 2 CANADA
- 3 FRANCE
- 4 GERMANY
- 5 ITALY
- 6 JAPAN
- 7 GREAT BRITAIN
- 8 G7 (ALL SEVEN COUNTRIES FOLLOW SAME POLICY)-
THIS OPTION IS ONLY ALLOWED FOR POLICY TYPES
5, 8, AND 9.

IDTYPE 1-7:
PERMANENT MONETARY STIMULUS
3 PERCENT INCREASE IN MONEY STOCK
PHASED-IN OVER ONE YEAR

IDTYPE 11-17:
PERMANENT UNANNOUNCED GOVERNMENT SPENDING
INCREASE
1 PERCENT OF GNP (GDP)

IDTYPE 21-27
ANTICIPATED PERMANENT MONEY STIMULUS
3 PERCENT INCREASE IN MONEY STOCK
ANTICIPATED TWO YEARS IN ADVANCE

IDTYPE 31-37
ANTICIPATED PERMANENT GOVERNMENT SPENDING
STIMULUS
1 PERCENT OF BASELINE GNP (GDP)
ANTICIPATED TWO YEARS IN ADVANCE

IDTYPE 51-58
UNANTICIPATED TEMPORARY GOVERNMENT SPENDING
STIMULUS
1 PERCENT OF GNP (GDP)
SHOCK BEGINS IN FIRST PERIOD OF SIMULATION AND LASTS
ONE YEAR

IDTYPE 61,66
PERMANENT MONETARY STIMULUS
3 PERCENT INCREASE IN MONEY STOCK PHASED-IN OVER
ONE YEAR
FIXED EXCHANGE RATES (IFLEXE=0, IPRULE=0 OR 10 FOR
IDTYPE=61;
IPRULE= 5 OR 15 FOR IDTYPE=66)
(ONLY UNITED STATES AND JAPAN ARE ALLOWED)

IDTYPE 71-73
U.S. PERMANENT GOVERNMENT DEFICIT REDUCTION
IDTYPE=71: TEMPORARY INCREASE OF 1 PERCENT OF GDP
FOLLOWED BY DECREASE IN GOVERNMENT SPENDING
REACHING 3 PERCENT OF GDP AFTER TOTAL OF SIX
YEARS

IDTYPE=72: SAME AS 71 EXCEPT NO TEMPORARY STIMULUS
IDTYPE=73: 3 PERCENT PERMANENT DECREASE IN
GOVERNMENT SPENDING PHASED IN OVER FIVE YEARS

IDTYPE 81-88
UNANTICIPATED PERMANENT MONETARY STIMULUS
1 PERCENT OF MONEY STOCK
PHASED IN OVER ONE YEAR

IDTYPE 91-98:
PERMANENT UNANNOUNCED GOVERNMENT SPENDING
STIMULUS
1 PERCENT OF GNP (GDP)
PHASED IN OVER ONE YEAR

Alternative Policy Rules

The exchange rate regime may be either flexible (IFLEXE=1), or fixed (IFLEXE=0). Any version of the EMS is considered fixed for this purpose (IFLEXE=0).

The monetary regime (IPRULE) is chosen from the following list. The monetary rule must be consistent with the exchange rate regime for the program to operate correctly.

LIST OF MONETARY POLICY RULES

FOR FLEXIBLE EXCHANGE RATES THERE ARE TWO OPTIONS:

IPRULE=0: INTEREST RATE DETERMINED BY INVERTED
MONEY DEMAND EQUATION AND
EXOGENOUS MONEY SUPPLY

IPRULE=1: INTEREST RATE DETERMINED BY INTEREST
RATE REACTION FUNCTION AND MONEY
SUPPLY ENDOGENOUS REACTION FUNCTION
PARAMETERS ARE INPUT BY USER AS MATRIX
PARG(.,.)

FOR FIXED EXCHANGE RATES THERE ARE A NUMBER OF
OPTIONS:

IPRULE=0: U.S. LEADER IN FIXED EXCHANGE RATE
REGIME U.S. SETS INTEREST RATE
ACCORDING TO INVERTED MONEY DEMAND
EQUATION AND EXOGENOUS MONEY SUPPLY.
REMAINING COUNTRIES FIX INTEREST RATES
TO THAT OF U.S.; THUS, THEIR MONEY
SUPPLIES ARE ENDOGENOUS

IPRULE=5: SAME AS IPRULE=0, EXCEPT
SUBSTITUTE JAPAN FOR U.S. AS LEADER

IPRULE=10: U.S. LEADER IN FIXED EXCHANGE
RATE REGIME U.S. SETS INTEREST RATE
ACCORDING TO INTEREST RATE REACTION
FUNCTION. U.S. MONEY SUPPLY
ENDOGENOUS. REMAINING COUNTRIES FIX
INTEREST RATES TO THAT OF U.S.; THUS,

THEIR MONEY SUPPLIES ARE ENDOGENOUS

IPRULE=15:SAME AS IPRULE=10, EXCEPT SUBSTITUTE
JAPAN FOR U.S. AS LEADER

IPRULE=20:EMS WITH GERMANY AS LEADER AND
INTEREST RATES OF GERMANY AND NON-EMS
COUNTRIES DETERMINED BY INVERTED
MONEY DEMAND EQUATIONS

IPRULE=21:EMS WITH GERMANY AS LEADER AND
INTEREST RATES OF GERMANY AND NON-EMS
COUNTRIES DETERMINED BY INTEREST RATE
REACTION RULES

IPRULE=22:SYMMETRIC EMS (EMS INTEREST RATE SET
ACCORDING TO EMS INTEREST RATE
REACTION RULE, OTHERS CHOSEN BY OWN
INTEREST RATE REACTION RULES)

For monetary regimes characterized by interest rate reaction rules, you must specify the parameters of each rule for each country (PARG(1-2,0-6)).

The first seven parameters signify responsiveness to percent deviations from target of the price level (i.e., 0.8 signifies that if the price level is 1 percent above target, the short-term interest rate is increased by 80 basis points) for the seven countries in the order listed above. The next six parameters signify responsiveness to percent deviations from target of real GNP (GDP) for the seven countries. For a nominal GNP (GDP) rule the two parameters for a country should be set equal.

5. Perfect-tracking Residuals

Perfect tracking residuals can be added to the equations (IRES=1). Perfect-tracking residuals are additive adjustments to each equation that insures that the baseline path is a solution if there are no shocks (policy or stochastic). If this option is used for deterministic and stochastic simulations, then the results of your simulations should be stated as deviations from whatever baseline you chose.

6. Simulation Periods

The data set used for the simulations includes 240 periods representing quarterly data from 1971:1 to 2030:4. The data are either the actual data used to estimate the model or projections beyond the model estimation period. You can start your simulation from any period from 1972:1 (NBEG=5) on.

For a deterministic simulation, you need only 'solve' for one period (NEND=NBEG), as the extended path algorithm automatically solves into the future. For stochastic simulations you need to 'solve' for as many periods as you want data (40 quarter runs are good).

7. Convergence Issues

Critical values (CR1, CR2, CR3) determine the precision of the solution. Small values slow the progress of the algorithm, while large values can lead to misleading solutions. It is recommended you initially use the default specifications (CR1 = 0.00001, CR2=0.00002, CR3=0.00008) to see how the program runs, then adjust the specifications according to your needs for time and accuracy.

If there is difficulty in attaining convergence, one possibility is to attenuate the speed of the adjustment process of the solution algorithm. By setting SCALE1 and SCALE2 to smaller values (they must both lie between zero and one) the steps the algorithm takes are smaller, making divergence less likely. This adjustment should only be used if the simulation fails to converge.

The maximum number of iterations for the TYPE I (MAXIT1) and TYPE II (MAXIT2) solution algorithms should be set to around 500 each.

The final choice is the number of periods into the future to be solved (NFUT1). For deterministic simulations a large number such as 80 (20 years) is acceptable; for stochastic simulations a smaller number such as 20 or 30 is advisable to speed up the algorithm. The TYPE III solution check is made by solving one period beyond NFUT1 and seeing if first period solution changes.

There is no guarantee that the extended path algorithm will successfully converge. In some cases, convergence may be very slow. Small values for the convergence criteria increase accuracy and computing time, as do large values for the length the path is extended into the future.

8. Example job.dat File

A sample job.dat file follows. Note that once the specification values have been read from a given line any additional characters are ignored; thus the ordered variable names can be written as below without causing any difficulties.

```
*****
SAMPLE job.dat FILE:
*****
0 1 0          ISTOCH (0=DET., 1=STOCH.)), NSIMLS,ISUB
999           ISEED (NSIMLS INTEGERS)
71           IDTYPE (0=NO SHOCK)
21           IPRULE
.8 .8 .8 .8 .8 .8 .8RESPONSE TO PGAP (6 REAL NUMBERS)
.8 .8 .8 .8 .8 .8 .8RESPONSE TO YGAP (6 REAL NUMBERS)
0           IFLEXE (FLEX. EX. RATES: 0=NO,1=YES)
1           IRES (PT RESIDUALS: 0=NO,1=YES)
81 81        NBEG, NEND (1 = 1971:1)
81 120       NBEP, NEEP (1 = 1971:1)
.0001 .0002 .0008CR1, CR2, CR3
1.0 1.0      SCALE1, SCALE2
500 500      MAXIT1, MAXIT2
```

60

NFUT1

9. Program Output

The output of the program is printed to a file, the name of which corresponds to the type of specification chosen according to the following:

output file: rem IDTYPE IFLEXE IPRULE.vu

For example, if IDTYPE=51, IFLEXE=0, IPRULE=21, the viewing file is:

Output rem51021.vu

The output file contains the requested time series in columns. To save space, restrict the printing of output to the periods of interest. (NBEP is first output date, NEEP is last output date.) The output file prints six of these columns across (for convenient viewing on an 80-column screen) and stacks these sets of time series. This matrix of variable names and data can then be imported into a spreadsheet program and used.

You have a number of choices regarding which time series are printed and in which format. In the print.dat file is a list of all the variables that are available for output. Next to each variable name (in ' ' marks), are three columns of integers. The value of the integer in each column determines in what forms the variable is printed in the output files according to the following table. The name given to modified variables is also indicated in the table in parentheses (for variable 'x').

1st column=0: NOT PRINTED
 =1: LEVEL ('x')
 =2: NATURAL LOGARITHM ('logx')

2nd column=0: NOT PRINTED
 =1: DIFFERENCE FROM BASELINE ('dftx')
 =2: PERCENTAGE DEVIATION FROM BASELINE ('pdtx')

3rd column=0: NOT PRINTED

- =1: DIFFERENCE FROM PREVIOUS QUARTER ('df1x')
- =2: PERCENTAGE INCREASE FROM PREVIOUS QUARTER ('pd1x')
- =3: FOUR-QUARTER DIFFERENCE ('df4x')
- =4: PERCENTAGE INCREASE OVER FOUR QUARTERS ('pd4x')
- =5: DIFFERENCE OF FOUR-QUARTER DIFFERENCE FROM TREND ('d4tx')
- =6: DIFFERENCE OF PERCENTAGE INCREASE OVER 4 QUARTERS (p4tx')FROM TREND

A variable may be printed in up to three ways. For example, 'RS0' 1 3 indicates the variable RS0 will be printed in levels, differences from baseline, and four quarter differences.

Output Conventions

Interest rates are printed in 100 basis point units, i.e., 3.0 equals 3 percent per annum. Percentage changes are printed such that 3.0 equals a 3 percent change. One quarter changes are NOT annualized.

The following variables can only be reported as differences from baseline or one quarter differences:

RRL_: real interest rates
REX_: net export/GNP
NEX_: (net nominal export)/(nominal GNP)

The following variables can only be reported as percent deviations from baseline or one quarter percentage changes:

M_: nominal money stock
G_: Government purchases

Variable Names

The variable names correspond to the names used in Macroeconomic Policy in a World Economy: From Econometric Design to Practical Operation; this also applies to the use of a number to reflect the country. For this purpose the correspondence between number and country is given by:

0 UNITED STATES
1 CANADA
2 FRANCE
3 GERMANY
4 ITALY
5 JAPAN
6 GREAT BRITAIN

Note that this is different from the system used in specifying IDTYPE (see above).

10. Example print. dat File

A sample print.dat file appears below. Any extraneous characters that follow the needed information is ignored so variable descriptions are allowed as below.

```
*****
SAMPLE print.dat FILE:
*****
'RS0'0 1 0 Short-Term Interest Rate
'RS1'0 1 0
'RS2'0 1 0
'RS3'0 1 0
'RS4'0 1 0
'RS5'0 1 0
'RS6'0 1 0
'E1 '0 2 0 Exchange Rate: U.S. cents per foreign currency unit
'E2 '0 2 0
'E3 '0 2 0
'E4 '0 2 0
'E5 '0 2 0
'E6 '0 2 0
'RL0'0 1 0 Long-Term Interest Rate
'RL1'0 1 0
'RL2'0 1 0
'RL3'0 1 0
'RL4'0 1 0
'RL5'0 1 0
'RL6'0 1 0
'CD0'0 2 0 Durables Consumption (U.S., Canada, France, Japan,
U.K.)
'CNO' 0 2 0 Nondurables Consumption (same)
'CS0'0 2 0 Services Consumption (same)
'CD1'0 2 0
'CN1'0 2 0
'CS1'0 2 0
'CD2'0 2 0
'CN2'0 2 0
'CS2'0 2 0
'C3 '0 2 0 Total Consumption (Germany, Italy only)
'C4 '0 2 0
'CD5'0 2 0
'CN5'0 2 0
'CS5'0 2 0
'CD6'0 2 0
'CN6'0 2 0
'CS6'0 2 0
'INE'0 2 0 Equipment (Machinery) Investment (U.S. only)
'INS'0 2 0 Structure (Non-Residential) Investment (U.S. only)
'IR0'0 2 0 Residential Investment (U.S., France, Japan, U.K. only)
'II0'0 1 0 Inventory Investment (all)
'IF1'0 2 0 Fixed Investment (Canada, Germany, and Italy only)
'III'0 1 0
'IN2'0 2 0 Non Residential Investment (France, Japan, U.K. only)
'IR2'0 2 0
'II2'0 1 0
'IF3'0 2 0
```

'II3'0 1 0
'IF4'0 2 0
'II4'0 1 0
'IN5'0 2 0
'IR5'0 2 0
'II5'0 1 0
'IN6'0 2 0
'IR6'0 2 0
'II6'0 1 0
'EX0'0 2 0 Exports
'EX1'0 2 0
'EX2'0 2 0
'EX3'0 2 0
'EX4'0 2 0
'EX5'0 2 0
'EX6'0 2 0
'IM0'0 2 0 Imports
'IM1'0 2 0
'IM2'0 2 0
'IM3'0 2 0
'IM4'0 2 0
'IM5'0 2 0
'IM6'0 2 0
'Y0 '0 2 0 GNP(GDP)
'Y1 '0 2 0
'Y2 '0 2 0
'Y3 '0 2 0
'Y4 '0 2 0
'Y5 '0 2 0
'Y6 '0 2 0
'X0 '0 0 0 Contract Wage
'X1 '0 0 0
'X2 '0 0 0
'X3 '0 0 0
'X4 '0 0 0
'X5 '0 0 0
'X6 '0 0 0
'W0 '0 2 0 Wage
'W1 '0 2 0
'W2 '0 2 0
'W3 '0 2 0
'W4 '0 2 0
'W5 '0 2 0
'W6 '0 2 0
'P0 '0 2 0 Gnp(Gdp) Deflator
'P1 '0 2 0
'P2 '0 2 0
'P3 '0 2 0
'P4 '0 2 0
'P5 '0 2 0
'P6 '0 2 0
'PI0'0 2 0 Import Price
'PI1'0 2 0
'PI2'0 2 0
'PI3'0 2 0
'PI4'0 2 0
'PI5'0 2 0

'PI6'0 2 0
'PE0'0 2 0 Export Price
'PE1'0 2 0
'PE2'0 2 0
'PE3'0 2 0
'PE4'0 2 0
'PE5'0 2 0
'PE6'0 2 0
'RL0'0 1 0 Real Interest Rate
'RL1'0 1 0 reported as 'dtrrl_' for difference from baseline
'RL2'0 1 0 and 'dlrrl_' for one quarter difference
'RL3'0 1 0
'RL4'0 1 0
'RL5'0 1 0
'RL6'0 1 0
'EX0'0 1 0 (Net Real Export)/(Real GNP) Ratio
'EX1'0 1 0 reported as 'dtrex_' for difference from baseline
'EX2'0 1 0 and 'dlrex_' for one quarter difference
'EX3'0 1 0
'EX4'0 1 0
'EX5'0 1 0
'EX6'0 1 0
'EX0'0 1 0 (Net Nominal Export)/(Nominal GNP) Ratio
'EX1'0 1 0 reported as 'dtnex_' for difference from baseline
'EX2'0 1 0 and 'dlnex_' for one quarter difference
'EX3'0 1 0
'EX4'0 1 0
'EX5'0 1 0
'EX6'0 1 0
'M0 '0 2 0 Money Stock
'M1 '0 2 0
'M2 '0 2 0
'M3 '0 2 0
'M4 '0 2 0
'M5 '0 2 0
'M6 '0 2 0
'G0 '0 2 0 Government Purchases
'G1 '0 2 0
'G2 '0 2 0
'G3 '0 2 0
'G4 '0 2 0
'G5 '0 2 0
'G6 '0 2 0 *****END OF THE README.MCM FILE.

11. Related Data and Programs

The data used to estimate the multicountry model is available upon request to John B. Taylor, Department of Economics, Stanford University, Stanford, CA 94305.

Most of the equations of the model were estimated using the statistical program TSP with a user-written subroutine to provide generalized method of moments estimates. More recent commercially-available versions of TSP have such an estimation method as one of the standard routines. Estimation of the wage equations of the model was performed using a matrix factorization method.