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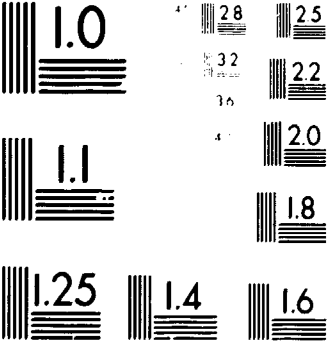
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THE IDIOM USER'S HAND BOOK FOR POLICY-ORIENTED MODEL-STRUCTURES*

World Modelling Working Paper

Prepared by the
Global and Conceptual Studies Branch

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Foreword

The aim of this manual is to clarify the use the IDIOM program-package for some, partly pre-specified, model-structures, which are formulated to simulate impacts of policies regarding

a) foreign trade,
b) investment and
c) consumption.

Policy variables supplied by the models include direct and indirect taxes, subsidies, direct income transfers, government's current expenditures and investments, investment allowances and foreign trade agreements. With means of these policy measures a broad range of policy mixes can be described and checked for their sectoral and macroeconomic consequences for the time period under investigation. The model-structures specified here are best suited to tackle short and medium term problems.

The description is based on the previous 'IDIOM Users' Handbook', prepared by the Global and Conceptual Studies Branch in 1983, but has been made more specific for the given modelling purposes and completed by much technical advice and experience, gained during a series of test-runs.

The main objective was to provide a simple and clear formulation of the proposed model-structures and include only so much of IDIOM's general features as unavoidably necessary. Examples, prototype input files and a list of variables (and their units) are supplied as well.

1. INTRODUCTION

1.1 WHAT IS IDIOM ?

IDIOM is a FORTRAN-programme package developed by the Cambridge Growth Project to aid the specification and solution of large-scale demand-driven input-output models. Different factors of final demand, i.e. private consumption, government's expenditures, investments, stock changes, exports and imports can be described with the help of specific functions for any year of the model run. When total final demand is determined at given prices, production is calculated using an input-output table. Given production, incomes and income flows, employment and unemployment and the new prices are determined. Using these results, the model can start calculations for the next year of the run.

The package can handle a wide variety of models of this class by offering the user considerable flexibility in the specification of economic relationships, types of incomes and institutional sectors. IDIOM supplies several options for the functions describing final demand, production, prices, labour costs and income flows. The user can choose from them according to his modelling concept and data availability. With the specification of the functions the user can determine if a variable should be dealt with exogenously or endogenously. (Labour costs, employment, competitive imports are typical examples of variables which might be dealt with endogenously or exogenously depending on the functional option selected by the user.) It is also possible to disaggregate the different components of the final demand at different levels.

The user has considerable freedom in determining the level of disaggregation of the different variables as well. The package allows the application of different levels of disaggregation on the supply side and on the demand side. (It is also possible to disaggregate the different components of the final demand at different levels.)

In addition to the flexibility with regard to model specifications, the main advantage of the package is that it includes accounting and book-keeping routines, supplying the user information on income flows, usually described in social accounting matrices.

The user however is required to supply the estimated parameter values of the functions selected.

IDIOM is very appropriate for policy simulation, as it offers specification of several policy variables. Effects of policy measures regarding goverment's current expenditures and capital formation, direct and indirect taxes, import quotas, foreign trade agreements and different direct income transfers (such as foreign aid, for instance) can be simulated. Questions such as how export prices and volumes will develop assuming different export taxes and subsidies, what will be the consequences on government's budget, on domestic production and supply, on employment and on incomes, can be answered. Similar problems concerning investments, consumption, etc. can be investigated.

The models which can be specified within the IDIOM-framework are best suited (for the investigation of these questions) for a medium time-horizon, say five to ten years.

A complete description of the package, as adapted for UNIDO and the history of it is provided in "The IDIOM User's Handbook", prepared by the Global and Conceptual Studies Branch in March 1983.

The purpose of the present manual is to aid users in specifying models in terms of the package and to supply technical information required to use IDIOM. Within the specification possibilities of the IDIOM-framework we have elaborated model-structures which allow policy simulations regarding a) foreign trade, b) investment and c) consumption. The proposed model-structures are not completely pre-specified. The user has sufficient flexibility in the exact formulation of his model, but those parts of the model-structure which are less relevant for the given policy-simulation can be viewed as fixed. During this specification procedure we also tried to take account of the "average" data availability of developing countries.

Through this partial pre-specification of models we intend to simplify the usage of IDIOM. We concentrate only on features and functional options of the package which we actually need for our policy-oriented models.

1.2 READER'S GUIDE TO THE MANUAL

In the following chapters of this manual we give a general picture of the IDIOM-framework and of the characteristics of models which can be handled within this framework (Chapter 2); we describe how a concrete model can be specified with the help of the package (Chapter 3); and supply technical information on the running procedure of an IDIOM-model (Chapter 4). Three appendices complete the manual.

When describing the IDIOM-framework in Chapter 2, we deal with the general economic structure of the IDIOM-models (Section 2.1) and give a technical introduction to the package (Section 2.2).

In Section 2.1 we describe the main economic relationships, the principal exogenous and endogenous variables and the general economic features of the IDIOM models.

In section 2.2 we deal with the main concepts of IDIOM, such as classifications and classification converters, with the naming convention, with the units of variables and with the treatment of time.

When elaborating on the model specification in Chapter 3, we deal with the disaggregation of the IDIOM classifications (Section 3.1). To aid the user in choosing suitable disaggregation for the different classifications we have included proposals and examples as well.

In Section 3.2 we describe the converters, define the meaning of their elements and explain their usage.

Section 3.3 contains the proposed functional options for the main economic relationships, from which the user might choose the appropriates which correspond to his modelling concept. In Section 3.3.1 we list and describe the functions proposed for models simulating foreign trade policies. Section 3.3.2 includes similar information for models simulating investment policies and Section 3.3.3 deals with the functional options for models analyzing consumer demand.

Chapter 4 is a technical description of how to run an IDIOM model. Section 4.1 deals with problems of reading and storing parameter matrices. Section 4.2 describes how values of parameters and exogenous variables can be modified during the run. A prototype input-file (the so-called directive-file) is analysed in Section 4.3. Section 4.4 includes information on how to interpret a dump produced during a run. Data produced by a standard model-output is described in Section 4.5.

In Appendix I we give a full list of IDIOM-variables, their dimensions and units. Appendix II contains prototype input-files. The so-called directive files are supplied for each of the proposed policy simulation models. To show how a directive file and an input-data file correspond to each other we also attach a so-called rundata-file and its commented version, a so-called fulldat-file. Appendix III provides an example of an IDIOM-output.

2. THE IDIOM-FRAMEWORK

2.1 GENERAL ECONOMIC STRUCTURE OF MODELS HANDLED BY IDIOM

This section describes the broad features of the types of models which can be built with IDIOM without reprogramming. We do not describe here the details of particular functions, but rather the broad concept and structures of the models as a whole.

2.1.1 The Main Functional Relationships

(i) Relationships describing final demands:
Different categories of final demand may be modelled explicitly using functions whose arguments are drawn from all parts of the model. They are the prime movers of the model in that supply expands to meet whatever is demanded, although there is room for feedbacks from supply to demands, e.g. imports rising and exports falling if demand exceeds "normal" supply. The following elements of demand may be explicitly modelled:

q_x exports

(In the notation we use q to represent quantities - given in money terms - and the subscripts refer to different items of final demand.)

q_c consumption
q_v investment
s stock-building
q_g government expenditure
q_m imports - treated either as negative final demand, or as non-competitive imports.

(ii) Relationships describing production:
Supply is met by combining labour, capital and materials. The material demands are handled via the input-output segment (although input-output coefficients are not necessarily fixed); the remaining

two are derived from production relationships. A number of different relationships allow the user to derive investment by asset and employment by type, given gross output, material inputs, various prices and certain exogenous data. Given the employment for each industry, aggregate employment and unemployment can be derived. Finally the stock-building relationships determine stock-building within each sector from gross output and, possibly, other data.

The final demands and production are linked by a commodity balance which states that supply and demand for each commodity must be equal. Hence, writing q for total domestic output:

$$q + q_m = q_c + q_v + q_g + q_s + q_x + q_n$$

where q_n is intermediate demand by commodity

$$q_n = A_{ij}y$$

where y is output by industry, and A_{ij} the input-output (mix) matrix giving commodity inputs per unit of industrial output.

The commodity balances are the lynch-pins of the whole of IDIOM's accounting system and modelling approach.

Related but less important are the industry balances which state that inputs and outputs must balance by industry. Hence y, the gross output of any industry can be computed as

$$y = (e'A_{ij}y)' + w + \Pi + t + m_d$$

w   wage and salary bill (including national insurance, etc.)

Π profits, etc.

t   indirect taxes

m_d direct imports of goods and services (i.e. firms' imports not entering commodity accounts e.g. business travel, may be zero)

e   is a vector containing 1-s.

$(e'A_{ij}y)'$ is total intermediate input (y denotes a matrix comprising zeroes except for the elements of y down the diagonal; hence $A_{ij}y$ gives the matrix of intermediate flows and e' sums it for each industry - column sums).

(iii) The price relationships:

Industrial prices are basically cost determined, being driven by labour costs, material costs, occasionally capital costs and indirect taxes. Material costs may include a substantial element of import costs. Alternatively, industrial prices may be constrained to equal import prices or can be derived from cost, but with a variable mark-up (leading possibly to something akin to neo-classical pricing behaviour), depending on which option of function-specification is chosen by the user.

Given industrial prices, the prices of other elements of final demand may be computed. Import prices may be related to local prices (hence p_q and p_m are mutually dependent) or merely fixed in foreign currency. Export prices may similarly either reflect the domestic economy (via p_q) or be constrained to world levels. The price of domestic absorption (namely consumption, government's current expenditure, private and government's investment and stock-building) - presumed common to the remaining elements of final demand - is fixed as a weighted average of prices of domestic output and import prices. It may be necessary to convert these prices to the correct classification before use in their relevant functions.

(iv) Relationships describing the cost of labour:

The average wage may be a function of taxes, inflation etc. This enters the employment functions, where employment, and from this, noting any non-constant returns (to labour or to overall scale), unit labour costs emerge. These may then determine prices if required by selecting the proper option for the specific functional relationship.

(v) <u>The income flows</u>:

For each type of income (e.g. wages and salaries, profits, taxes) accounts are kept and for each institutional sector (households, companies, etc.) both incomes and expenditures are calculated. These may feed back into the demand equations most obviously via the consumption function, but also possibly through investment being related to profitability etc. The accounts also form the basis for a complete set of financial accounts showing flows of funds etc. All these accounts allow for government taxes and transfers.

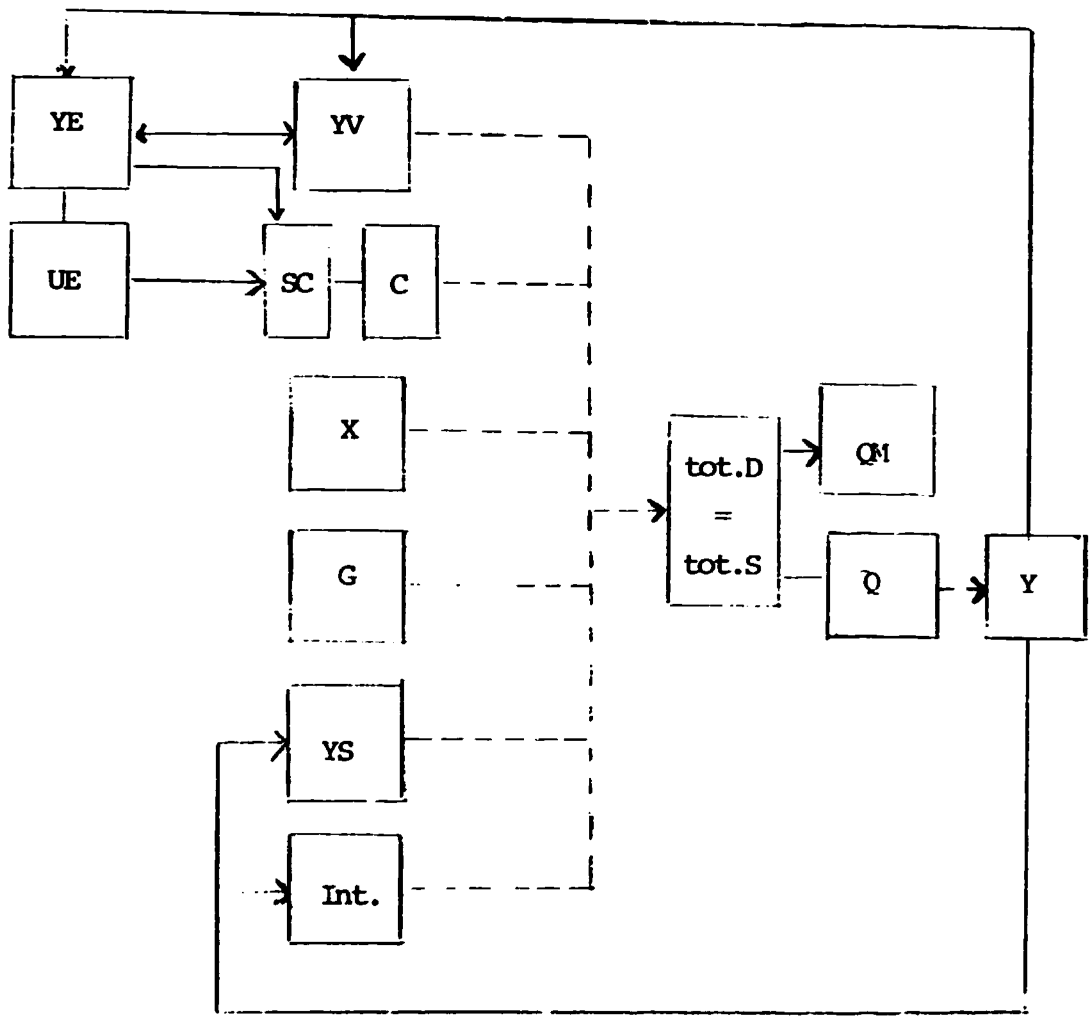
The main causal chains and interactions in basic IDIOM are represented below. Two types of link are represented: the behavioural links (solid lines) where the user defines the nature of the link by means of IDIOM functions, and the accounting links (broken lines) which are carried out by the model independently. The latter comprise either aggregations or conversions from one classification to another.[1/]

The diagrams show the direct links between the variables they contain. They do not, however, show either the indirect links or a full set of determinants of each variable. In figure 1 for example, the demand categories depend on prices, altough these are not explicitly included. The main links between the real and price sector are established by such indirect links.

The variables are referred to by their standard names (see Naming Conventions below) and potentially each of them, has its own classification (i.e., the variables are grouped - classified - according to the economic concepts to which they belong).

1/ The classification converters themselves are often endogenous, but the process of conversion is automatic.

Figure 1. The Main Links of the Real Side



The sumbols are standard names as defined in "The Naming Conventions", below.

Int. is intermediate demands

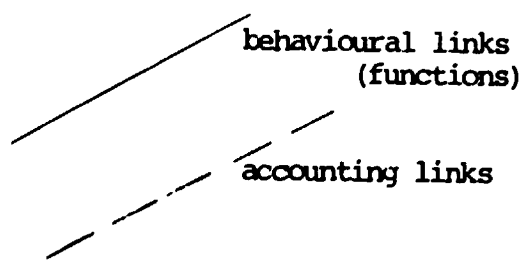
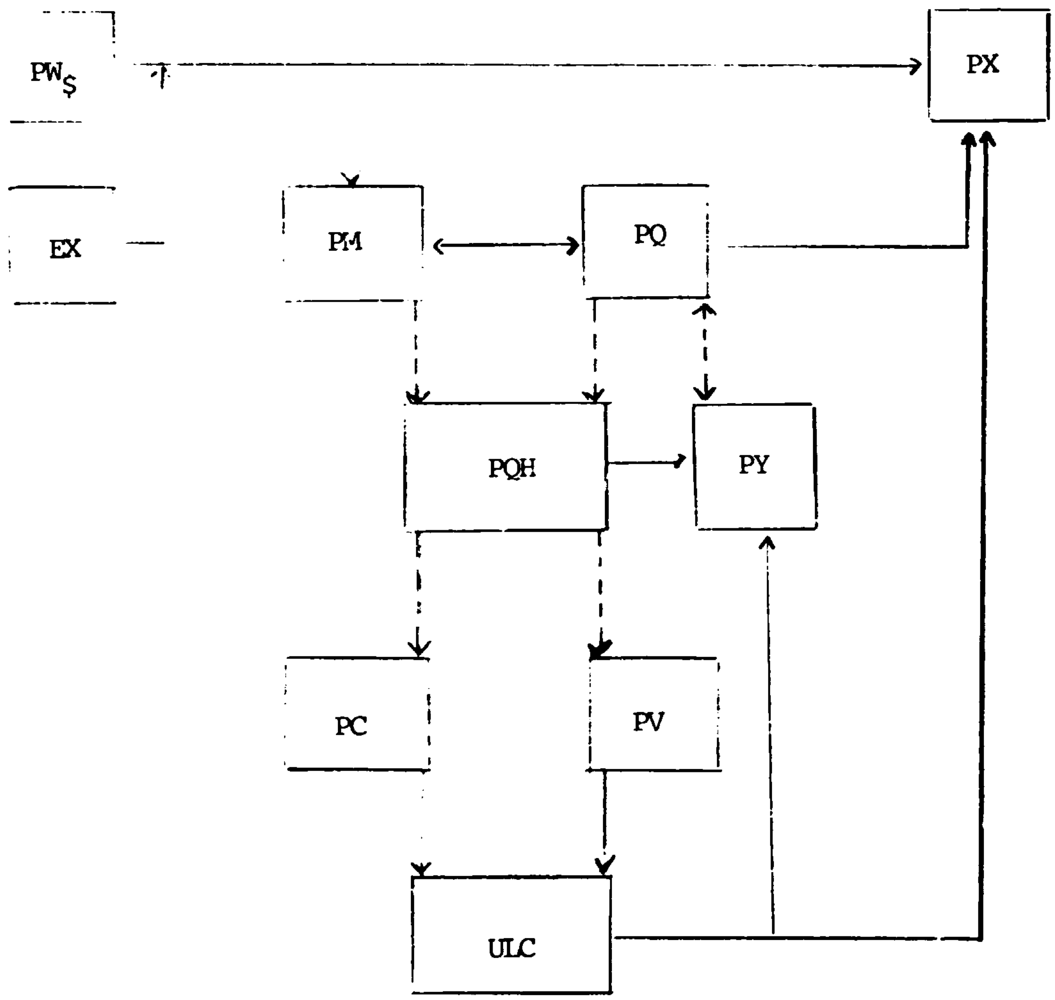
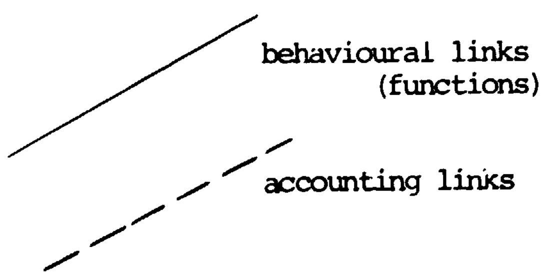


Figure 2. The Main Links in the Price Sector



The symbols are standard names as defined in "The Naming Conventions", except for $PW_{\$}$ which is general world prices in foreign currency



2.1.2 Principal endogenous variables

The principal endogenous variables of the models handled by IDIOM refer to

(i) different categories of the final demand, namely to

exports
consumption
investment
imports
stock-building

The two last elements, imports and stock-building can also be dealt with exogenously by selecting the proper "functional" option.

(ii) production

(iii) prices (Some of them, e.g., import prices and export prices, might be handled exogenously, selecting the proper "functional" option.)

(iv) labour costs

(v) incomes of economic actors

2.1.3 Principal Exogenous Variables

(i) variables referring to the rest of the world
- incomes and prices
- foreign exchange rate (this could be fairly easily endogenized if desired)

(ii) demographic variables
- population
- labour participation rates
- dependency ratios

(iii) variables referring to economic policy
- especially tax system
- government expenditure

(Some elements here are defined such that while the policy variables are exogenous, the actual expenditures are not - e.g. unemplovment benefits depend on unemployment, which are endogenous.)

(iv) the economic behaviour of actors represented in the model is handled exogenously including the formation of expectations, i.e. obviously IDIOM needs to be supplied with parameters for each of its behavioural functions.

2.1.4. General economic features

(i) basically "Keynesian" approach

(A) no supply constraints: supply expands to meet demand in all markets, although this might affect prices and hence feed back onto demands and supplies.

(B) fix-price model structure: prices are basically cost determined rather than market clearing.

(C) Financial variables do not directly influence the equations of real variables. They may feature by altering income flows or, via interest rates, affecting costs, but the effect on real variables is always indirect.

(D) it aims at equilibrium of flows: little attention is paid to the equilibrium of stocks in the asset markets although it influences the behaviour of investments.

(ii) it is dynamic - in the sense that one year is, to a considerable extent determined by the previous ones. Many relationships incorporate lags, and all could be forced to do so if required. It is dynamic also in the sense that the sources of economic growth have to be found within the model; hence growth of the capital stock is only possible through investment, the resources for which must be found from within the model.

(iii) it allows for disequilibria - most markets clear, (in that supply equals to demand) but neither one necessarily attains its long-run values (given the time path of exogenous data) immediately. Endogenous cycles are possible - even likely. Two crucial markets do not clear even in the sense used earlier: both the labour market and the foreign exchange markets can show persistent excess supply or demand if government policies are assumed unresponsive to their condition. The labour market may be controlled to some extent by the handling of wages endogenously, but in plenty of cases stable under-employment solutions can be reached. Otherwise, in the foreign exchange market the exhaustion or over-accumulation of reserves is assumed to act via changes in government policy (which is always determined exogenously by the user) rather than endogenously and directly on the exchange rate.

(iv) it is monetary oriented - subsistence sectors can be fully modelled only to the extent that they can be valued in money terms. However, since the personal sector can employ workers directly (at a given wage) the absorption of surplus labour in rural sectors can be modelled.

(v) national - it handles one nation (or region) at a time, taking the rest of the world as exogenous.

2.2 A TECHNICAL INTRODUCTION TO IDIOM

The most crucial concept in IDIOM is the classification which defines the disaggregation of each major variable. We start by discussing the classifications (and hence implicitly defining the major endogenous variables). After that we consider the conversion between different classifications. We deal with the naming conventions and units of variables, with the treatment of time and with the accounting relationships in IDIOM.

2.2.1 Classifications and classification converters

One of the most obvious yet significant features of IDIOM is that it is disaggregated. Virtually every important economic variable may be disaggregated in IDIOM models, (e.g., different export commodities, categories of consumer demand, etc.) and potentially at least, each may have a different disaggregation. This allows the user to exploit local data and adopt whatever classification best suits a particular sector for the specific research undertaken. The only requirement is that he should be able to supply a converter, or bridge matrix to convert data from one classification to another.[1/] The list of classifications used by IDIOM is given in Table 1 below.

The user may have as many or as few elements as he wishes in each classification with the following restrictions:

(i) each classification must have at least one element

(ii) The number of industries can not be more than the number of commodities. Each industry must have a principal product (a commodity which accounts for a large part of its output and may roughly be taken as representative for its output).

(iii) R, the receipts and payments classification must include at least the following five categories:

wages and salaries
profits
indirect taxes
direct imports
goods and services

1/ Obvioulsy all classifications do not have to be mutually linked. The list of required conversions is given in Table 2.

TABLE 1: IDIOM CLASSIFICATIONS

Classification		Description
Q	1	Commodities
Y	2	Industries
C	3	Consumer expenditure categories
G	4	Government expenditure categories
R	5	Types of receipt and payment
H	6	Income-receiving sectors
S*	7	Stocks/inventories
V	8	Gross capital formation assets
F*	9	Financial assets
X	10	Exports
M	11	Imports
E	12	Employment
D	13	Direct tax brackets (income distribution)
T	14	Indirect taxes
A	15	World areas
K	16	Social capital formation
O	17	Overall classification (dummy: used to hold data relating to classifications 1-11)

* redundant in IDIOM version 3

(iv) H, the institutional sector's classification must include at least the following four sectors:

households
corporations
central government
rest of the world

(v) O must contain 11 elements

According to this system of classifications a series of bridge, or converter matrices are needed to link different classifications. The converter matrices are listed in Table 2.

2.2.2 IDIOM naming conventions

The following conventions are used for referring to variables both within the FORTRAN source of IDIOM and for communication with the programme during the various phases of using IDIOM. They will also be used fairly freely within this hand-book. In addition to this, the user should also consult the dataset IDIOM.VARIABLS in the Appendix, which defines all the vectors and matrices used in IDIOM, along with their dimensions and units.

Classifications

The essence of the naming convention, as well as of the whole modelling package, is the classification system. The seventeen classifications, along with their identifiers, are given in Table 1.

Most variables have at least two letters in their names, even without the qualifiers that we shall describe shortly. The first defines the classification over which the data are defined and the second the economic concept considered. For example:

QC consumption by commodity
YS stock-building by industry

If, however, the two letters are be identical, they are collapsed into one, e.g.:

C consumption by consumption group

V investment by asset

Qualifiers

The above names require qualifiers in fairly obvious circumstances. The latter include:

pre-fix:

B	parameter matrix referring to entity concerned
S	sum of entity concerned
N	number of items in entity concerned
P	price of entity concerned
SP	current price sum of entity concerned
L	location in workspace of entity concerned (This is of significance only to programmers, rather than users)
JSW	(or JS) switch for entity concerned

post-fix:

Ln	lag of n years on entity concerned (L is sometimes suppresed)
TI	titles for entity concerned
Ø	row sum of entity concerned (If attached to an entity which is normally a vector ignore it)
R	receipts by entity concerned
P	payments by entity concerned
TZ	base year taxes on entity concerned as proportion of base year output
B } C }	classification converter (more details follow)

Examples	BPY	parameters for industry prices, dimension (NY, NBPY)
	NY	number of industries
	NBPY	number of parameters for industry prices
	LBPY	position of start of BPY in ZZ
	SG	total government current expenditure (constant prices)
	PSG	price of total government expenditure
	SPG	current price sum of government expenditure
	PXL1	price of exports lagged once
	PXL2	price of exports lagged twice
	QTI	commodity titles
	QM	imports by commodity
	JSWPX	switch controlling export price formation
	QMTZ	tariffs on imports in base year

The wide range of classifications in IDIOM necessitates a large number of conversions from one classification to another. These are accomplished by linear converters, or bridge matrices. Hence, given consumption by consumption categories, we may calculate the commodity demands they imply by means of a consumption - commodity converter, e.g.:

$$\underset{(NQ,1)}{QC} = \underset{(NQ,NC)}{QCC} * \underset{(NC,1)}{C}$$

where QCC is the converter (postfix C) from consumption (C) to commodity (Q).

The full range of converters has been defined in Table 2. Some have the postfix B, rather than C. This is of no real significance, but arises because the matrices are used in precisely the same manner as converters (i.e. straight-forward linear multiplications of matrices), although they are conceptually more akin to parameter matrices.

The user has to supply IDIOM with the data for each converter. A more detailed description of the converters follows in Chapter 3.2.

Additional Names:

In addition to the classifications defined so far, certain other concepts are frequently referred to in IDIOM and have their own mnemonics, many of which are qualified in exactly the same way as the classifications. The main additional concepts are as follows, grouped according to their classification:

(a) by industry

ULC	unit labour costs (sometimes referred to as YULC)
YEXP	expected output
VA	value of tax allowances on investment
SA	stock appreciation
YH	hours worked
YVP	investment in plant

(b) by commodity

PQH	the price of domestic absorptions of commodities
PQHH	the price of commodities both produced and sold at home
QMQ	import quota variable
QY	total intermediate demands for each commodity

(c) macro-concepts

UE	unemployment (sometimes UNEM; lagged UNL1)
EMPL EMP	Employment, often qualified by sector - see below
AW	average wage, at current price often qualified as AWY, AWG, AWC
EX	exchange rate (an index variable, taking the exchange rate of the base year as 1.0)
WAGE WAG	wage bill at current price often qualified as WAGY, WAGG, WAGC
GDP	gross domestic product
PDI	personal disposable income (prefix R real PDI; E expected PDI; real PDI lagged 1 and 2 RDI1, RDI2)
HUC	home unit costs (GDP deflator)
PCE	consumers' expenditure deflator (instead of name PSC)

macro-qualifiers:

In addition to the qualifiers already mentioned[1/] macro variables are frequently qualified by the sector of demand to which they refer. We use the postfixes and prefixes:

C	consumer expenditure
G	government
Y	industry

e.g.	EMPC	employment arising directly from consumer expenditure (rather than via industry); includes for example domestic servants, charity workers
	SCVA	value-added arising directly from consumer expenditure
	SPCM	value of imports arising from consumer expenditure

additional macro-names:

DFE	domestic final expenditure
WVOL	volume of world output
WPRI	world prices
POP	population
WPOP	working population
PW	personal wealth, at current prices (within the income class considered)
PWPH	personal wealth per head, at current prices (within the income class considered)

(d) consumers expenditure:

HPD	hire purchase debt variable

1/ For macro-variables the prefix B is replaced by a post-fix B to denote a parameter of some sort.

TABLE 2: IDIOM CLASSIFICATION CONVERTERS

Classification	Identifier	Identifier of Resulting Matrix	Description
T	QM	TQMB	Tax rates on imports
T	Y	TYB	Tax rates on industries
T	C	TCB	Tax rates on consumer expenditure
T	G	TGB	Tax rates on government expenditure
T	V	TVB	Tax rates on fixed investment
T	QX	TQXB	Tax rates on exports
R	Y	RYB	Value-added parameters (industries)
R	C	RCB	Value-added parameters (consumption)
R	G	RGB	Value-added parameters (government)
R	V	RVB	Value-added parameters (investment)
Q	Y	QYC1/	Commodity requirements per unit industry output
M	Q	MQC	Classification converter: commodities-imports
Y	Q	YQC2/	Classification converter: commidities-industry
Q	C	QCC	Classification converter: consumption-commodities
Q	G	QGC	Classification converter: government-commodities
Q	S	QSC*	Classification converter: stocks-commodities
Q	V	QVC	Classification converter: investment-commodities
Q	X	QXC	Classification converter: exports-commodities
V	K	VKC	Classification converter: social capital formation-assets
Q	YP	QYPC	Classification converter: plant-commodities
E	YE	EYEC	Classification converter: industrial employment-employment by type
E	CE	ECEC	Classification converter: consumer employment-employment by type
E	GE	EGEC	Classification converter: government employment-employment by type
H	R	HRC	Classification converter: receipts-sectors
D	R	DRC	Classification converter: receipts-tax brackets
Q	YS	QYSC	Classification converter: industrial stocks-commodities

1/ This is the conventional commodity-industry input-output matrix

2/ This is the conventional industry-commodity make matrix

* redundant to IDIOM Version 3

(e) foreign classifications:

PC prices of competing exports (by export good)

PW domestic prices in export markets (by export area)

DI1 special export effects (by export area), such as effects of trade agreements; etc. a dummy. The exact meaning of this variable can be defined by the user.

DI2 special export effects (by export commodity) by trade agreements; a dummy. Similarly to DI1, this variable can be defined by the user.

(DI1 and DI2 are referred to elswhere as "institutional" variables.)

AD1 two aggregate demand variables expressing of world demand

AD2 areas considered for exports of the nation modelled

PFM world prices of import goods in foreign currency (in import classification)

(f) employment classification:

LF labour force

PE "price of employment" - essentially the average wage by employment class

(g) tax bracket classification:

D income tax payed by people in each tax bracket

DN proportion of working population with income within each bracket

DBT lower limit of each bracket

DAB per capita allowances by bracket and income type

DDB marginal tax rate by bracket and income type

DPOP population in each bracket

DPDI disposable income by bracket

DPCE deflator for consumer expenditure by bracket

DSC total consumer expenditure by bracket

DSPC total current price consumer expenditure by bracket

(Note: an individual is defined as belonging to the tax bracket corresponding to the highest marginal rate paid by the individual.)

When describing the concrete functional forms proposed, we will give a precise list of the meaning of all variables included. The full list of IDIOM-variables is given in the Appendix along with their dimensions and units.

2.2.3 Units of IDIOM variables

The units in which variables are to be measured are stated in UWM.IDIOM.VARIABLS, which may be set by the user (see in Appendix). IDIOM requires consistency over the units of variables, and requires that the following rules be adherred to.

- aggregates, whether in constant or current prices, must all be in the same units.

- workers and population may be in any units as long as "per capita" or "per worker" is interpreted to mean per unit as declared in IDIOM. Work-force variables must all have the same units and so must population variables, but the two do not need to be identical.

- "per worker" variables are measured in units 10^{-3} smaller than the aggregates (i.e. IDIOM requires a 1000 x larger number to denote the same quantity).

- "per capita" variables are not similarly adjusted; they are simply aggregate unit per population unit.

Prices

All prices are measured as index numbers, and all should have the same base year. This base year has to be defined in the directive file as PBAS, for prices, and for the quantities as QBAS

The price indices are current weighted; i.e. they are deflators. The basic variables of IDIOM are mostly measured in constant prices (income flows being the main exception) and so in order to preserve the value identity of prices, they have to be measured as current weighted indices.[1/] Hence:

1/ A constant price aggregate is merely the product of a base weighted quantity index and a base year value.

value = (value at constant prices) x (current weighted price index). Wherever prices are mentioned in the manual, price indices are meant.

Currencies

IDIOM expects all variables to be measured in domestic currency, except for:

foreign prices	PCL , etc.
	PWL , etc.
	PFM
foreign demands	AD1, AD2, DI1, DI2
and the exchange rate	EX

These will be most probably defined by the user as index numbers or quantity indicators rather than constant price amounts. The only rule is that any input to IDIOM should be commensurate with what was used in the estimation stage:

Foreign prices only occur together with the exchange rate. The former should be measured in some foreign currency (or bundle of currencies) and the latter should give the number of foreign units per domestic unit; i.e. EX uses the British exchange rate convention of quoting, say, $ per £. Since the foreign prices are all index numbers, EX may also be quoted in this form (again assuming that the index form has been used in estimation).

For example consider the test job described below. It crudely applies to the UK:

- aggregates are measured in £ millions
- work-force statistics in "000"s
- and population in millions.

Consider, now, a "per worker" variable. In the initialization phase:

- direct employment by consumers (EMPC) = 100
- the wage bill paid by consumers (WAGC) = 130
- the average wage (wage per worker) (AWC) = 1300

In natural units this means that 100,000 people were employed and they earned £130,000,000 at an average of £1,300 each. To IDIOM it means £130 million was paid to 100 thousand workers or 1.3 aggregate units per worker unit, which is 1300 in "per worker" units.

Consider also a "per capita" variable. Aggregates are measured in millions as is population. Hence, in IDIOM "per capita" consumption is interpreted as £ millions consumed per million population, but it is obvious that this is simply £ per consumer.

2.2.4 The treatment of time

Several variables in IDIOM refer to time. All are integers:

(a) In functions: Two variables appear regularly in functions - they are both initialized by the user and care should be taken to ensure that the values used in projection are compatible with those implied by the parameter matrices.

The variable YA70 - appears in function sub-routines as NYEARS used as the time trend variable in functions, i.e., if YA70 is set to one in the directive file, any trend function of the form $y = a+bt$ will be computed for the first year of run taking $t = 1$, for the second year $t = 2$ etc. Care has to be taken, that YA70 corresponds to the time variable used when estimating the parameters.

The variable YA72 - appears in function sub-routines as NTD used as the power of ρ (the autocorrelation coefficient) in determining the expected error of the projection by the equation, i.e., if YA72 is set to one in the directive file, the residual term stored in the parameter matrix will be used as the residual term of the base year.

(b) In control: It is important to distinguish the first year that is projected in any particular run of IDIOM from the first year that could be projected. They may differ if an IDIOM run is restarted from a dump (using PUTGET ALL and GET ALL commands). Under these circumstances all IDIOM store is filled with the values for the year indicated in the GET ALL command, just as if the model had been solved from the start. Hence, as far as IDIOM is concerned, the "real start" of the run is the first year that was solved in order to produce the dump from which the re-start was initialized. The following variables are used:

START — The first year of the dump. Measured in actual time e.g. 1973.

FINISH — The last year of the dump. This is set by IDIOM, the user need not set this.

YEAR — The year being solved, relative to START.

For convenience we would recommend adopting the test run's conventions except where there are pressing reasons to the contrary. If changes are made you should try to keep them by multiplying each unit by 10^i where i is any positive or negative integer.

IDIOM does not require a base year in the sense that some known year of the economy is updated in order to get projections of a future year. Nevertheless, there are "base year" type concepts required.

(i) The initialization year

IDIOM solves year by year, taking as given the solution for the previous year. To start the model off for year T, therefore, it is necessary to fill the store of IDIOM as if it has just solved for year (T-1), which we call the initialization year. All the scalars, vectors and matrices of variables (and to some extent those of parameters) have to be filled with values for (T-1).[1/] IDIOM then undertakes such UPDATING as is necessary to prepare for the solution of year T.

To the extent that the solution for year T requires lagged values of data it is essential that values filled into the store of IDIOM are correct, or at least plausible values. Most cases where this is significant are obvious enough from the functional specifications. However, there are some cases where this is not so. Since the solution for (T-1) provides the starting point for the iterations in the solution of T, and so the more realistic the initializations are, the quicker IDIOM is likely to solve for year T. From both points of view it is desirable that the initialization values are generally plausible and internally consistent.

(ii) Accounting

All real variables are measured in constant prices in IDIOM, and naturally all have to use the same year's prices. Thus, there is a "base year" for the price indices. This is called as PBASE.

Certain data are required for the base year indices - specifically the overall rates of tax on each taxable activity - i.e. government, consumers, industry, etc. These are necessary for the definition of tax-inclusive price index numbers from IDIOM's basically tax-exclusive indices, and also for evaluating the tax component of various transactions at constant prices.

1/ IDIOM will flag any store that is not initialized. While many values are not strictly necessary to start the solution, this feature should not be over-ridden for it is surprising how often errors creep in from the failure to initialize some crucial variable.

2.2.5 Accounting relationships

We distinguish three elements of model building - housekeeping, accounting and behaviour. The first includes such things as keeping track of information, input and output, error trapping, diagnostics etc. It is essentially a question of computer programming, thus we do not deal with it here. The interested reader is refered to Chapter III of the Handbook. The last two elements are the economic features. The distinctions between these two elements tend to be obscure but one could say that behaviour covers those areas of the model where economic agents may exercise their discretion, while accounting covers those areas - mostly comprising definitions - where there is no scope for variation.

Among the more obvious examples of accounting we have the commodity and industry balances, the definition of personal disposable income, the calculation of indirect tax receipts once quantities and prices are known, and the calculation of stock levels from stock-building data. Possibly less obviously perhaps, but still basically accounting, are conversions from one classification to another. This is carried out by using bridge, or converter matrices which express the elements of one classification as proportions of the elements of another. For instance, given a vector of exports disaggregated according to the export classification, we have to convert this to the (domestic) commodity classification in order to use it in the commodity balances. This is accomplished by using a matrix (QXC), a typical row of which shows the proportion of each export group entering the commodity of that row. Similarly, given the prices of commodities on the domestic market (PQH), we can generate the prices of each element of the consumers' expenditure classification by means of a commodity - consumer converter (QCC). (The usage and precise interpretations of each converter will be given in Section 3.2.)

Stretching the definition of accounting still further we can also include the standard input-output calculation by which intermediate demands by commodity are calculated from the industry gross outputs (Y), and the mix matrix (QYC) which shows inputs per unit of output. From this example it will be seen that the column sums of the converters need not necessarily add up to unity (for total intermediate input is less than gross output). Later it will be shown that although the converter is fixed exogenously to any particular accounting operation, it may still be endogenized elsewhere in the model. Accounting operations which are similar in nature to the input-output operation include the calculation of value-added in the various non-industrial sectors (given the proportions of any class of expenditure that is value-added, e.g., indirect taxes on consumption, exports, etc.).

The importance of separating accounting from behavioural operations in IDIOM is that the former are programmed directly and for the user are fixed, whereas the latter offer the user considerable flexibility. Although the user determined the elements of the converter matrices, he has no control over how and when the operation is carried out. The rationale behind this is that we believe that no user would actually wish to alter the standard procedures and offering him a choice would needlessly complicate the use of IDIOM. The full set of accounting operations is not specified anywhere - the majority being far too obvious to enumerate - but a list of required converters - and hence of feasible accounting conversions - was given in the section Naming Conventions (2.2.2).

3. MODEL SPECIFICATION IN TERMS OF THE PACKAGE

With the framework discussed in the preceeding chapter, a model can be specified by determining the disaggregation of the variables (or, in IDIOM - context: by dimensioning of the different classifications) and by the choice of functions describing economic relationships. As the converter matrices are dependent on how the model variables are disaggregated, and their correct use is of basic importance for any IDIOM run, we deal with them here.

3.1 DISAGGREGATION OF DIFFERENT IDIOM-CLASSIFICATIONS: SOME PROPOSALS

Classification	Dimension	Description
Q	NQ	Commodities, which appear as products on the supply side of the model
Y	NY	Industries, which appear as producer activities on the supply side of the model

Proposal: For the sake of simplicity, it is strongly advised to define industries and commodities to be the same, using some already existing input-output matrices (which in most cases, are quadratic). In addition, the actual disaggregation of commodities (and industries) should be chosen in a way that other IDIOM-classifications could be easily and meaningfully converted to them.

To illustrate this let us assume that we have a highly disaggregated I/O matrix containing separately tea, cocoa and coffee, but we are interested in (or have data only on) the consumption (or export) of the group of beverages. In this case it is preferable to aggregate all beverages also on the production side, (unless for some special reason we wish to keep them separate), otherwise in the consumption to commodity (or export to commodity) converter we have to define the share of tea, cocoa, coffee etc. in one unit of consumption (or export) of beverages. (On this problem see also the description of converters in the next chapters.)

In general one could suggest that the commodities defined on the production side should correspond to commodities defined at any of the final demand factors, or should be more aggregated in order to avoid conversion difficulties.

Classification	Dimension	Description
C	NC	Consumers' expenditure categories.

Proposal: In the case where the model is used to simulate foreign trade policies or investment policies, consumer expenditure categories should be defined in the same manner as the commodities in the Q classification. If consumption analysis is being carried out, the disaggregtion of C has to reflect the actual modelling purpose (and of course, the data structure of consumption statistics available). In this case however, much care has to be taken when constructing the consumption to commodity converter, QCC.

Classification	Dimension	Description
G	NG	Government current expenditure categories

Proposal: As Government is dealt with exogenuously in IDIOM, the disaggregation of government current expenditure will depend on, the desired detail of government policies with regard to current expenditures should be taken into account. If G is to be disaggregated as general services, social services, and economic services, different commodity demands and employment figures arising from these three factors can be calculated separately, assuming that the corresponding converters are properly defined . If such a differentiation is not aimed at, or the converters cannot be filled up meaningfully, it is preferable to handle government current expenditure in the aggregate. How these exogenous expenditures will be financed (and as a consequence how the governmet's financial balance will emerge) will be automatically computed by IDIOM, taking account of all direct and indirect taxes and any other income flows, such as foreign aid, etc., specified elsewhere in the model.

Classification	Dimension	Description
R	NR	Receipts and payments

Proposal: The following receipts and payments should be differentiated: 1) wages, 2) profits, 3) taxes, 4) direct imports and 5) goods and services. While the first four income flows are connected to value added, the fifth flow, labelled as 'goods and services' is not and is used in IDIOM's bookkeeping routines to facilitate the presentation and balancing of the income and expenditure accounts. The user has merely to define it, but no other entries are necessary.

Classification	Dimension	Description
H	NH	Institutional sectors

Proposal: The following institutional sectors should be differentiated: 1) households, 2) corporations, 3) central government, 4) rest of the world. If nationalized industries play an important role in the country to be modelled, these should also be defined as an institutional sector. Through the definition of the institutional sectors IDIOM will be able to allocate (using some functions, which will be described later) payments and recepts to the corresponding sectors. (e.g., households receive wages, governments receives taxes, etc.)

Classification	Dimension	Description
S	NS	Stockbuilding

Proposal: As no stockbuilding-policies are intended to be simulated, stockbuilding should not be disaggregated, but treated as total stockbuilding. Even if no stockbuilding will be calculated, (i.e., the actual values will be set to zero) IDIOM requires specification of the dimension of this classifier, which will be 1 in our case.

Classification	Dimension	Description
V	NV	Fixed investment by asset

Proposal: In the IDIOM framework investment by asset can be differentiated. This feature should be exploited if the package is to be used for simulation of investment policies. If, however, foreign trade policies or consumption policies are to be simulated, it is proposed to define V as total fixed capital investments, and given the value NV=1.

If investment policies are to be simulated, it is desirable to differentiate, at least, among a) fixed industrial capital investments, b) investment in dwellings, and c) other non-industrial capital formation. The last term can be flexibly specified for any given modelling exercise, or can be further disaggregated according to actual requirements. This might be useful if investment policies investigated focus on social capital formation, which is the next classification in IDIOM.

Classification	Dimension	Description
K	NK	Social capital formulation

Proposal: Social capital formation is exogenous in IDIOM. For any year of the model run, the user must specify it. If investment policies are investigated, it might be useful to disaggregate it, since the commodity requirement of such investments might be quite different. (e.g., investment in roads, bridges, etc. create production requirements almost exclusively for the construction sector, but investment in hospitals, telecommunication systems, etc. imply demand for other sectors as well).

Since IDIOM adds (with the help of a converter) social capital formation to investments by asset, as defined in the V-classification, and calculates commodity requirements by asset, the disaggregation of these two classifications should be compatible. For this purpose one might disaggregate the non-industrial capital formation in the V classification such that it corresponds to the disaggregation of K.

Classification	Dimension	Description
F	NF	Financial investment

Proposal: As this classification is redundant in the present IDIOM-version, the user does not need to care about it, NF merely must be set to 1.

Classification	Dimension	Description
X	NX	Exports

Proposal: If investment-policies or consumption analysis is to be carried out, the disaggregation of exports should be the same as the disaggregation of the Q classification. If foreign trade analysis is being carried out, export commodities might be different than the produced commodities, according to specific modelling requirements.

When defining export commodities, one should keep in mind, that these have to be converted to commodities produced, thus the choice should allow for a meaningful conversion. In general it is preferable if export commodities are less aggregated than the commodities produced (see also the discussion of the Q classification).

Classification	Dimension	Description
M	NM	Imports

Proposal: As IDIOM basically operates on commodity balances, imports should be disaggregated according to the Q classification. If in any foreign trade analysis one is interested in some other disaggregation of imports, this can be introduced. One should remember however, that in the first step IDIOM calculates imports of commodities (according to the Q classification), which will be converted to the import classification if necessary.

Classification	Dimension	Description
D	ND	Tax brackets

Proposal: Only in the case where consumption analysis is carried out should the tax brackets be differentiated among income classes, otherwise one tax bracket should do. As data on income distribtion is usually scarce, but for the consumption patterns in developing countries it is of crucial importance, it is suggested to differentiate between (at least) rural and urban (population) income classes.

Classification	Dimension	Description
T	NT	Indirect taxes

Proposal: Although IDIOM allows for several types of indirect taxes, we consider only ad valorem taxes (i.e., NT=1). These can be applied to on almost all activities described in IDIOM.

Classification	Dimension	Description
A	NA	World areas

Proposal: Only in the case of foreign trade analysis should world areas be differentiated, otherwise NA should be set equal to 1. The disaggregation of this classification is only of importance if exports of different commodities to different world areas are to be analyzed. IDIOM then calculates exports for each export commodity and each destination.

Classification	Dimension	Description
E	NE	Employment

Proposal: With this classification different types of labour can be introduced. (e.g., skilled, unskilled, agricultural: traditional and modern, etc.) This might be of interest if investment policies are simulated.

3.2 CONVERTERS

As IDIOM allows for different disaggregations in almost all of its classifications, the converters are of crucial importance. In the following description we clarify the exact meaning of elements of different converters, their special characteristics, and their dimensions.

As already mentioned, IDIOM allows on the supply side for differentiation between commodities produced and industries, thus they have to be mutually converted to each other by two converters:

QYC industry to commodity converter; size: NQ x NY. This is the usual absorption coefficient matrix, any Y_{ij} element of it expresses how much of commodity i is needed to produce one unit of output of industry j.

YQC commodity to industry converter; size: NY x NQ. This is the so-called make-matrix, (more precisely the market-share matrix). Any q_{ij} element expresses the share of industry j in unit output of commodity i. (I.e., the column sums have to equal one.) In general, if commodities and industries are to be the same, and the model is highly aggregated, this tends to be an identity-matrix. (I.e., a matrix with 1-s in the diagonal, all other elements being zeros.)

On the demand side IDIOM allows for different aggregation for different demand types. As the model basically operates on commodity balances according to commodities defined on the supply side, the following converters have to be introduced:

QCC consumption to commodity converter; size NQ x NC. This converter translates consumption by consumer goods categories to a vector of consumer demand by commodities produced. However, if consumption is a source of value-added, (there are indirect taxes of consumption) the column sums of this converter are not necessarily equal to one, but are in fact unity less value-added per unit of consumption (in the base year). This occurs because consumer prices comprise a material input part (calculated via this converter) and a value added part, and are calculated according to the formula

$$\underline{PC} = (QCC)' \, \underline{PQH} + (C)^{-1}\underline{CRO}$$

where

$\underline{PC}$ is the vector of consumer prices,

(QCC)'

is the transpose of the converter,

$(C)^{-1}$

is a diagonal matrix of order NC, with elements 1/Cii, Cii being the consumption of commodity i (according to the consumption classification)

$\underline{CRO}$ is the vector (with NC elements) of total value added generated by consumption of consumer goods categories Ci, (e.g., indirect taxes on consumption or wages of domestic servants, if these expenditures are treated as a consumer category)

PQH is the vector (with NQ elements) of prices of home sales of commodities Q_i.

Let us illustrate this in a simple example. We assume NQ = 3 and NC = 2, and that the consumption of unity of C_1 and C_2 create value added of 0.05 and 0.1, respectively. We also assume that the demand for commodity C_1 is fully met by commodity Q_1, and the unit demand for commodity C_2 is met by the commodities Q_2 and Q_3 in the proportion of 0.8 and 0.2, respectively, i.e., the QCC converter, without taking into account the value added would be

$$QCC^* = \begin{bmatrix} 1. & 0. \\ 0. & 0.8 \\ 0. & 0.2 \end{bmatrix}$$

If we consider the value added as well, the correct converter will look like

$$QCC = \begin{bmatrix} 0.95 & 0. \\ 0. & 0.72 \\ 0. & 0.18 \end{bmatrix}$$

In the simple case, however, if no value-added is generated by consumption, the column sums have to equal one, and if consumer commodities are defined to be the same as commodities produced, (which is proposed for simulation of foreign trade and investment policies) this results in an identity-matrix.

QGC government to commodity converter; size NQ x NG. This converter translates government consumption categories (such as general services, social services, economic services, etc.) into commodity demand categories, completely analogous to the QCC converter.

QSC stocks to commodities converter; size NQ x NS. As stockbuilding cannot be a source of value-added, unlike the two converters described above, its column sums must always have to equal one. This converter is redundant in the present IDIOM version,

instead,

QYSC industrial stocks to commodity converter; size NQ x NY has to be used. Since stock-building is determined by industries, according to functions YS these have to be translated by the converter QYSC to the respective commodity demand. Thus, any q_{ij} element of the converter expresses the proportion of commodity i demanded by one unit of stock-building in industry j.

QVC investment to commodity converter; size NQ x NV. With the help of this converter investments by asset are translated to commodity requirements. (Here it should be noted, that investments in industry i are not equal to commodity i invested, even if commodities and industries are defined to be the same, YV = QV. In the case, where only industrial investments are considered and no value-added is generated by investment, any element q_{ij} of the converter expresses how much commodity i is required by a unit of investment in industry j. If, however, investments generate value-added, the situation is completely analogous to converters QCC and QGC.

QYPC industry plant to commodity converter; size NQ x NYP. As we do not deal with industrial investment in plant in any of the proposed model structures, this converter will not be used.

QXC export to commodity converter; size NQ x NX. As IDIOM calculates exports by export commodities and areas, (according to the classifications X and A) the sum of export commodities over areas has to be translated into exports of commodities according to the classification Q. Any q_{ij} element of the converter expresses the share of commodity i (according to the commodity classification used on the production side) in a unit of export commodity j. (Thus column sums have to equal one).

MQC commodities to imports converter; size NM x NQ. This converter works in the "opposite direction" than the ones discussed above. As imports and import prices are determined on a commodity base in IDIOM, this converter translates commodity imports according to the Q classification to import categories according to classification M. Direct imports of industries are not accounted for here, but as a part of value-added in the converters RYB, RCB and RGB (see later).

PQH is the vector (with NQ elements) of prices of home sales of commodities Q_i.

Let us illustrate this in a simple example. We assume NQ = 3 and NC = 2, and that the consumption of unity of C_1 and C_2 create value added of 0.05 and 0.1, respectively. We also assume that the demand for commodity C_1 is fully met by commodity Q_1, and the unit demand for commodity C_2 is met by the commodities Q_2 and Q_3 in the proportion of 0.8 and 0.2, respectively, i.e., the QCC converter, without taking into account the value added would be

$$QCC^* = \begin{bmatrix} 1. & 0. \\ 0. & 0.8 \\ 0. & 0.2 \end{bmatrix}$$

If we consider the value added as well, the correct converter will look like

$$QCC = \begin{bmatrix} 0.95 & 0. \\ 0. & 0.72 \\ 0. & 0.18 \end{bmatrix}$$

In the simple case, however, if no value-added is generated by consumption, the column sums have to equal one, and if consumer commodities are defined to be the same as commodities produced, (which is proposed for simulation of foreign trade and investment policies) this results in an identity-matrix.

QGC government to commodity converter; size NQ x NG. This converter translates government consumption categories (such as general services, social services, economic services, etc.) into commodity demand categories, completely analogous to the QCC converter.

QSC stocks to commodities converter; size NQ x NS. As stockbuilding cannot be a source of value-added, unlike the two converters described above, its column sums must always have to equal one. This converter is redundant in the present IDIOM version,

instead,

QYSC industrial stocks to commodity converter; size NQ x NY has to be used. Since stock-building is determined by industries, according to functions YS these have to be translated by the converter QYSC to the respective commodity demand. Thus, any q_{ij} element of the converter expresses the proportion of commodity i demanded by one unit of stock-building in industry j.

VKC social capital formation to assets converter; size NV x NK. It translates different forms of social capital formation into assets. Any element v_{ij} expresses the share of asset i in a unit of social capital formation of type j.

EYEC employment by industries to employment by type converter; size NE x NY.

ECEC employment by consumers to employment by type converter; size NE x NC.

EGEC employment by government to employment by type converter; size NE x NG.

Although employment is calculated in the aggregate in IDIOM according to the function YEO, several types of labour can be differentiated (e.g., skilled, unskilled, etc.) The converter EYEC translates the aggregate labour demand by industries to total labour demand by type of labour. Any a_{ij} element of EYEC expresses the share of labour type i in a unit labour demand of industry j.

The converters ECEC and EGEC function similarly, but one has to remember that as a first step employment by consumer category i and by current government expenditure category i have to be formed according to the formulas

$$CEO_i = CEOB_i * C_i \text{ and}$$

$$GEO_i = GEOB_i * G_i$$

where

CEO_i and GEO_i refer to total employment created by consumer category i (C_i) and government expenditure i (G_i),

$CEOB_i$ and $GEOB_i$ being coefficients expressing how much employment is generated directly by a unit of consumption of C_i and by a unit government expenditure G_i, respectively.

RYB value added by industries to receipts and payments converter; size NR x NY

RCB value added by consumption to receipts and payments converter; size NR x NC

RGB value added by government current expenditure to receipts and payments converter; size NR x NG

This class of converters determines different value added factors (wages, profits, indirect taxes, direct imports) stemming from industrial production, consumption, government's current expenditures and investments, respectively. They are actually used as parameter matrices, which is also shown in the notation. Since IDIOM calculates profits in its bookkeeping routines and indirect taxes are calculated elsewhere, these rows do not need to be filled up in these converters. Only the flow of wage and salary payments and the share of direct imports must be given.

(i) Wage and salary flows. For each industry (j)

$$Z_j = \beta_j * YE_j * AWY * .001$$

where:

Z_j is the wage and salary flow for industry j

β_j is the element for industry j in the wages row of RYB

YE_j is employment in j } standard IDIOM names

AWY is the average industrial wage }

The value 0.001 arises because per worker variables (like the average wage) are stored in units 10^3 times smaller than aggregates (see section "Units in IDIOM").

β_j can play the role of a wage deviation factor among industries. For consumption, and government current expenditure the formulas are:

$$Z_j = \beta_j * CEO_j * AWC * 0.001$$
$$Z_j = \beta_j * GEO_j * AWG * 0.001$$

The β_j-s must be filled into the row, which corresponds to the wages in the converters RCB and RGB, respectively.

(ii) Direct imports, i.e., imports which are directed to an industry rather than to a commodity, e.g. business travel:

$$Z_j = \beta_j * Y_j * PSYM$$

Direct imports are proportional to output in constant prices. The flow is the constant price amount times the direct import price (common to all industry direct imports). The formulas of direct imports for consumption, for government current expenditure and for investment the formulas are:

$$Z_j = \beta_j*C_j*PSCM$$
$$Z_j = \beta_j*G_j*PSGM$$
$$Z_j = \beta_j*V_j*PSVM$$

The row corresponding to the direct imports in each of the converters RYB, RCB, RGB and RVB must be filled up with the β_j parameters.

<u>HRC</u> <u>receipts to institutional sectors converter</u>; size NH x NR. When income flows have been calculated by the appropriate converters dealt with above, these must be translated to receipts by institutional sectors with this converter. Any h_{ij} element expresses the share of income type j transferred to institutional sector i (thus column sums have to equal one). Additional income flows, not connected to value-added (such as foreign aid, emigrant workers' remittances etc.) can be introduced with the help of a function, described in section 3.3. (This converter is sometimes referred to as HRB.)

DRC <u>receipts to tax brackets converter</u>; size ND x NR. This converter is used in IDIOM accounting routines to express the proportion of total income to type j accruing to individuals in tax bracket i. (This converter is sometimes written in the program as DRB.)

TYB tax rates on industries converters; size NT x NY

TCB tax rates on consumption converter; size NT x NC

TGB tax rates on government current expenditure converter; size NT x NG

TVB tax rates on investments converter, size NT x NV

TQMB tax rates on imports converter; size NT x NQ

TQXB tax rates on exports converter; size NT x NQ

These converters are used as parameter matrices, where the interpretation of the parameters depends on the tax functions chosen. If for instance ad valorem taxes are considered, the TYB converter should contain the B_j parameters of the expression $ZT_j = B_j * PY_j * Y_j$, where ZT_j is the payment of these taxes by industry j; Y_j is the constant price output of industry j and PY_j is the corresponding price index. The other converters are analogous.

3.3. PROPOSED FUNCTION OPTIONS OF THE PRE-SPECIFIED MODEL-STRUCTURES

For the description of each element of final demand, for various elements of the production process, for various income flows and for most prices, IDIOM supplies the user several options of functional relationships.

From these we have chosen three different sets, according to our three policy-simulation models. These sets of functions will be described in full detail in this chapter.

The models allow the user to simulate impacts of different policy-mixes, represented by policy-variables like direct and indirect taxes, subsidies, direct income transfers, government current expenditures, social capital formation, investment allowances and foreign trade agreements.

Thus any concrete economic problem can be captured by the choice of the proper functional forms, describing the relevant relationships in question and by setting the policy-variables to the desired values. The model will calculate macroeconomic and sectoral results, as well as financial balances for the time-span required.

The user has to select the desired option for the following functions:

1. imports (function QM);
2. exports (function XA);
3. overall investment (function V);
4. industrial investment (function YV);
5. industrial stockbuilding (function YS);
6. aggregate consumption (function DSC);
7. consumer expenditure (function DC);
8. industrial employment (function YE);
9. unemployment (function UE);
10. earnings (function PE);
11. industrial unit labour costs (function YULC);
12. import prices (function PQM);
13. domestic prices (function PQY);
14. export prices (function PX);
15. indirect taxes (function T);
16. receipts and payments (function R);
17. institutional sectors (function H);
18. commodities and industries (function Q);
19. input-output table (function A) and
20. the payments and receipts (function HRP).

General remarks on the description:

Since certain features appear quite regularly in the functional description, they are dealt with here in order to facilitate the understanding of the specific functions.

(i) Working constant: The solution routines for IDIOM are divided into two phases - the UPDATE phase and the COMPUTE phase. The former is executed once per year of the solution, while the latter is iterated around each year until convergence is achieved. In most functions there are components which can be executed in the UPDATE phase - e.g. inclusion of lagged values, time trends, exogenous data etc. The working constant transfers the results of the UPDATE calculations to the COMPUTE phase where the final estimate of a variable is found as the sum, product etc. of the working constant and the COMPUTE calculations. The working constants need not be initialized to any particular value on input. (The parameter matrix, however, has to be filled up in such a way that IDIOM can insert the calculated value. This place in the parameter-matrix we denote as w.c. On the input it is the best to set it to zero.)

(ii) The regression constant: This is the constant of the equation defining the function, usually of a corresponding regression equation.

(iii) ρ and Uo: Many functions may be estimated allowing for first order auto-correlation of the residuals. This affects the predictions given by the equation and so IDIOM should be told if this possibility is used. Auto- correlation means that

$$E\ (U_t) = \rho U_{t-1}$$

hence if the equation $Y_t = \chi'_t$ has been estimated allowing for the optimal prediction of Y_t given χ_t is

$$\hat{Y}_t = \chi'_t \beta + \rho U_{t-1}$$

and for $\hat{Y}_{t+1}$

$$\hat{Y}_{t+1} = \chi'_{t+1} \beta + \rho^2 U_{t-1} \text{ etc.}$$

In the parameter matrices ρ refer to the auto-correlation parameter and U_o to the expected error in the base year of the projection exercise (usually the year preceding the first that could be projected but not necessarily the first year in any particular run, since IDIOM can start up from the middle of the projection period if required). The value U_o may come directly from regression results if the base year is part of the sample period, or it may have to be projected itself prior to entering IDIOM. If auto-correlation is permitted, but not actually used, set $U_o = \rho = 0$.

(iv) JSWxx (where xx is a variable name) These are switches (one for each element of vector xx) which control the function used to estimate xx. They are integers and corresponding to the key word definitions, which, are in fact built up by IDIOM during the initialization phase. As the user chooses the function by specifying its optional name, these switches are set by the programme automatically. They are merely for internal use. (The user can check, with the help of the switches if the specification sequence in the directive file is correct. See also "interpreting a dump".)

(v) Time: Many functions allow for time trends. IDIOM assumes that the trend variable is zero when NYEARS is zero. NYEARS is incremented by one at the end of the updating routine and must be initially set equal to YA70 by the user. The regression constant must be calculated on this assumption. (See also "Time in IDIOM".)

(vi) Parameter matrices' dimensions: Each parameter matrix has its final dimension set automatically by IDIOM. This dimension refers to the number of parameters used by the functions and is set equal to the maximum number required for any function being used for this variable. For any concrete function the dimension of the parameter matrix, as well as the matrix structure i.e., the position of each parameter in the matrix, is given.

In virtually all functions the final column of the parameter matrix is used as a working constant. This is always indexed as column NBxx (for variable xx), so that even if a particular function does not use the full set of parameters available, the working constant appears at the end of the matrix rather than in the last column that the particular function requires. (There are two exceptions however, the export function and the export price function, where the working constant is stored in the first place.)

Notation for the Functional Specification

Wherever possible we refer to variables by their IDIOM names (see Naming Conventions). Most of the variables determined by the functions are vector variables, i.e. their classifications contain more than one element. The functions, however, usually determine their values element by element. Below we represent the equations in this scalar form.[1/] Hence in the functional definitions of this section the use of an IDIOM vector variable implies a typical element of that vector rather than the complete vector itself. Where we wish to denote the whole vector the name is underlined, and where we wish to show a matrix the name is enclosed in square brackets. Usually the subscripts are suppressed in our equations since the same subscript appears on each "subscriptable" variable. Where this is not the case, subscripts are

1/ In one or two cases it is necessary to use a more complex notation. This is explained below.

explicitly used and appear as subscripts, rather than in brackets, as they would in FORTRAN. The time subscript does not appear, and lags of k years are denoted by the subscript $_{-k}$.

We refer to parameters in the following way. Assuming that there is no possibility of confusion about which parameter matrix is being referred to (e.g. because there is only one possibility), and assuming also that the element subscript has been supressed (as for the variables - see the previous paragraph), we refer to the j^{th} parameter merely as β_j. The only exceptions are ρ and U_o, which have already been explained.

The time trend is always referred to as t.

* denotes multiplication (used only between two IDIOM variables)

$\tilde{xx}$ denotes that variable xx has been converted from its own classification to that of the dependent variable before use in the equation. (IDIOM does not have a separate name for the converted variable if it is not stored, in which case the result of the conversion is kept in workspace and lost at the end of the subroutine in question.)

NTD is a timing variable incremented by one per year and initialized for the first projection year to YA72.

xx a fixed value for variable xx (this is only used where necessary for expository reasons; i.e. not every exogenous variable is so marked.)

Z... Names beginning with Z are not proper IDIOM names (because IDIOM does not need to store the variable), but are used here for expositional purposes. They are explained as they occur.

YEAR a timing variable equal to 1 plus the number of years solved since the year of original initialization.

3.3.1. PROPOSED SPECIFICATION OF FUNCTIONS FOR SIMULATION OF FOREIGN TRADE POLICIES

1. Import functions QM

Imports are determined on a commodity basis (Q classification) rather than on an import basis (M classification). This is to ensure that demand for any commodity is precisely balanced by domestic supply, less exports, plus imports. Three forms are proposed:

a) Specification FIXQ: (switch JSWQM = 2)

$$QM = QC + QS + QV + QG + QX + QY - \bar{Q}$$

where all variables in the equation are standard IDIOM names.

Domestic output by commodity is fixed. Imports make up the difference between this and total demand. This function is essentially for non-competitive imports, where domestic output is fixed (often at zero).

b) Specification LLIN (switch JSWQM = 1)

This is a log-linear model expressing the import ratio as a function of apparent consumption, relative prices and time.

$$\log ZMS = \beta_1 + \beta_2 \log ZAC + \beta_3(\log \; PQM * ZQMT\Phi \; /PQ) + \beta_4 \log \; (PQM * ZQMT\Phi \; /PQ)_{-1} + \beta_5 t + \rho^{NTD} U_o$$

where

ZMS is the ratio of imports to domestic sales of domestic goods i.e.

$$ZMS = QM/(Q-QX)$$

ZAC is apparent consumption, i.e. ZAC = Q + QM - QX

PQ is the commodity price of gross output

ZQMTϕ is the extent to which tariffs etc. raise the import price PQM in the solution year relative to the base year:

$$ZQMT\phi = (1. + QMT\phi/QM\ )/(1. + QMTZ)$$

(remember QMTϕ is current <u>tax-levies</u> on imports, QMTZ is the overall tax <u>rate</u> on imports in the base period)

This function is really suited for competitive imports, i.e., imports, for which there is a corresponding domestic output which is capable of supplying some relevant part of the market.

c) Specification QMQ (switch JSWQM = 4)

$$QM = \beta_1 + \beta_2\ QMQ + \beta_3 QMQ_{-1} \times \rho^{NTD} Uo$$

where QMQ is the quota. This is an exogenous policy variable.

This function determines imports largely by 'quota variables'. For simple, binding quotas one could use this function with $\beta_i = 0$ except for $\beta_2 = 1$. This function, however, allows for a flexibile usage, and since QMQ is not used elsewhere in IDIOM, it might be filled with any import determining variable. (I.e. it must not necessarily be used for quotas, but can refer to any exogenous variables.)

Direct imports are dealt with in IDIOM as fixed shares of industrial output, consumption, government current expenditure and investment, as described in section 3.2 by the converters RYB, RCB, RGB and RVB.

The corresponding parameter matrix BQM has the dimension (NQ, 6) for specification QMQ, (NQ, 1) for specification FIXQ and the dimension (NQ, 8) for specification LLIN and contains the parameters in the following sequence:

Parameter	FIXQ	LLIN	QMQ
1	$\bar{Q}$	β(const.)	β(const.)
2		β(ZAC)	β(QMQ)
3		β(prices)	$\beta(QMQ)_{-1}$
4		β(prices lagged)	ρ
5		β(t)	U_o
6		ρ	w.c.
7		U_o	
8		w.c.	

If available data series are short, it is proposed to set β_4 at zero in option LLIN.

2. Import prices, function PQM

Import prices (as imports) are determined directly by commodity (Q classification) and converted to the import classification by the converter MQC. Only the foreign prices of import goods (PFM) appear directly in the import classification:

a) Specification LLIN (switch: JSWPQM = 1)

$$\log PQM = \beta_1 + \beta_2 \log(\widetilde{PFM}/EX) + (1 - \beta_2)\log PO + \beta_3 t + \rho^{NTD} U_o$$

i.e., the import prices are determined by foreign prices (in domestic currency): $\widetilde{PFM}$/EX, by local prices of the goods concerned, and time.

Notes:

(i) PFM has to be converted to $\widetilde{PFM}$ before use, i.e., $\widetilde{PFM} = [MQC]' * PFM$ where $[MQC]'$ is the transpose of the commodity-to-imports converter.

(ii) The function is necessarily homogenous of degree one in prices (in domestic currency terms)

(iii) These prices are prior to the imposition of tariffs. The economic logic behind this function is that local import prices will reflect both the world price (the opportunity cost of selling in this market) and the domestic price (the price of competing goods), with higher weight given to the latter, the larger the domestic market and the more highly differentiated the goods. The trend might represent product changes, the different weights of particular goods in the price indices, etc.

b) Specification PFM (switch: JSWPQM = 4)

$$PQM = \tilde{PFM} * EX$$

i.e., import prices are fixed equal to world prices (converted to the commodity classification by (MQC)', as in the specification LLIN), and converted to domestic currency using EX, the index of exchange rate.

Note that to use the LLIN formulation you need to distinguish the world price of the import good from the import price facing your country. If this is not possible (even crudely) it is probably best to use the PFM option. In fact for most countries the difference between PFM and PQM is likely to be small most of the time (i.e., most countries have little market power over their imports), so the PFM option will probably be the most useful.

The above refers to commodity imports. There are also certain direct imports by industry, government and consumers, that count as part of value-added. These are described under value-added below, but here we note that the prices of these imports have to be set exogenously in local currency terms. There is a single price for all imports by industry (PSYM), by government (PSGM) and consumers (PSCM), and these need to be defined at the beginning of an IDIOM run and then redefined whenever the user wishes them to change.

The corresponding parameter matrix BPQM has dimension (NQ, 6) for specification LLIN and (NQ, 1) for specification PFM. However, since one doesn't need any parameters for specifying PFM for this option, (IDIOM will only store working constants in it)no parameter matrix should be read in. The sequence of parameters for specification LLIN:

Parameter	LLIN
1	β(const.)
2	β(PFM)
3	β(t)
4	ρ
5	U_o
6	w.c.

3. Domestic prices, function PY

These functions describe the formation of domestic prices on a commodity and industry basis. Prices are formed basically on a commodity basis, but using, in part, industry - based data. The proposed option:

Specification LMAT (switch : JSWPY = 2)

- which are linear functions of all material costs and labour costs and of time. This is essentially the 'dual' price, although the profit mark-up, assumed not to change as a proportion of costs since the base year of the index numbers has to cover all rents, non-labour taxes and profits. It is also not necessary that the weights on the various elements of costs equal their shares in total input costs. For commodity I, the 'principal producer' of which is industry J:

$$PQHH(I) = \beta_1 + \beta_2 t + \beta_3 ULC(J) + \beta_4 ZMAT(J) + \rho^{NTD} U_o$$

where ZMAT(J) is material costs per unit output for industry J, i.e.

$$\underline{ZMAT} = \lceil QYC \rfloor ' * \underline{PQH}$$

This is straight-forward cost-plus pricing with a constant mark-up. It may be hypothesized to arise from oligopolistic market structures which often show stability. The ULC variable is endogenous to

IDIOM, and may represent either actual unit labour costs or normalized unit labour costs.

From PQHH certain other prices and variables can be built up. IDIOM does this automatically;

(i) PQ - the price of gross output by commodity is built up using both export and domestic data:

$$PQ = ZA * PQX + (1 - ZA) * PQHH$$

where ZA is the share of exports in gross output

$$ZA = QX/Q$$

(ii) PQH - the price of domestic absorption is built up using data on imports and PQHH

$$PQH = ZM * PQM + (1 - ZM) * PQHH$$

where ZM is the import share in domestic absorptions

$$ZM = QM/(Q + QM - QX)$$

(iii) PY - the price of gross output of industry. Current price output by industry (ZYP) is calculated from current price output by commodity (ZQP) using converter YQC , the make matrix:

$$\underline{ZPY} = \left[YQC\right] * \underline{ZQP}$$

and industry prices as:

$$PY = ZPY/Y$$

(iv) profits - calculated as total value of output less material costs and all other elements of value-added.

$$YP = ZPY - ZMAT * Y - ZYR\phi$$

where ZMAT is unit material costs (hence ZMAT * Y is total material costs)

ZYRϕ is YRϕ - the industry's value added payments in total - excluding profits.

Also prices of government current expenditure, investment, consumption are calculated automatically by IDIOM as accounting operations. Having specified the function PY, all the user needs to do is to fill in the corresponding parameter matrix, BPQ, which has the dimension (NY, 7) for our proposed option LMAT.

The sequence of parameters is:

Parameters	
1	β(const)
2	β(t)
3	β(ULC)
4	β(ZMAT)
5	ρ
6	U_O
7	w.c.

4. Industrial investment, function YV

Industries' investment is determined by both industry and asset, so that the industrial investment variable is an (NY, NV) matrix. For foreign trade analysis we only consider fixed capital investments, and thus NV = 1.
The proposed form is:
Specification ACC: (switch: JSWYV = 3)

$$YV = \beta_1 + \beta_2 t + \beta_3 Y + \beta_4 Y_{-1} + \rho^{NTD} U_O,$$

i.e., YV, the investment by any industry is the linear function of (gross) output Y, output lagged (Y_{-1}) and time.

If $\beta_4 = -\beta_3$ this is a simple accelerator with no replacement and if $\beta_4 = \delta - \beta_3$ it is an accelerator with replacement at δY per annum. (Although depreciation is here related to output rather than capital stocks, this makes little difference. If depreciation is at the rate γK, where K is the capital stock, this is equivalent to γMK, where M is the average capital-output ratio ($M = K/Y$), hence $\delta = \gamma M$)

The corresponding parameter matrix, BYV has dimension (NY, NV, 7) for this specification, but having NV = 1 for foreign trade analysis we only have to deal with a two-dimensional matrix of size (NY, 7). The sequence of the parameter is:

Parameters

1	β(Const)
2	$\beta(t)$
3	$\beta(Y)$
4	$\beta(Y_{-1})$
5	ρ
6	U_0
7	w.c.

Technical note: It is strongly advised to estimate this function in the given form, and not to set $\beta_1 = \beta_2 = 0$ (although this would ease the economic interpretation). But if both β_1 and β_2 are set to zero, during the iteration procedure within a simulation year, it might happen, that YV becomes non-positive, i.e., for any 'new' calculated Y the expression

$$\beta_3 Y + \beta_4 Y_{-1} \leq 0.$$

5. Industrial employment, function YE

For each industry this function determines a single, aggregate level of employment. Disaggregation into types of labour is carried out later by means of the employment-industry converter EYEC.

The proposed form:

Specification PFIX (switch: JSWYE = 5)

$$YE = \beta_1 Y$$

i.e., productivity is exogenously fixed at β_1 level, hence employment is endogenous. (Y is the gross output). The value of β_1 might be changed during the run, according to the procedure described in section 4.2.

The corresponding parameter matrix, BYEØ has dimension (NY, 1) for this specification containing only the fixed productivity for each industry.

6. Stock-building by industry, function YS

This function determines stock-building by the industry undertaking it. For models analyzing foreign trade, we propose the

Specification NULL (switch: JSWYS = 4)

i.e., no stock-building activities should be accounted for. With this specification the corresponding parameter matrix BYS is not needed. The user only has to specify the function in the directive file, but there is no need to read in the parameter matrix (which would anyhow be filled with zeros).

7. Consumers expenditure, function DC

Given total consumption by each income group, as computed according to the function DSC, this function splits it among the various consumer demand categories. The proposed form is:

Specification FIX (switch = JSWDC = 3)

$$DC = \beta_1 * DPOP$$

Here expenditure is fixed in per capita terms, i.e,

$$\beta_1 = \overline{DC}/DPOP$$

The parameter matrix BDC is of size

(ND, NC, 1) for the form FIX, containing the fixed β_1 value

Technical note: As every threedimensional matrix in IDIOM, BDC has to be read in as NC matrices of size (ND, 1).

8. Aggregate consumption, function DSC

This function determines total consumer expenditure of goods and services by income group as defined by the tax brackets. It uses income and wealth as its main explanatory variables and operates in per capita terms. The proposed form is:

a) Specification LNMW (switch: JWDSC = 2)

$$ZDSCH = \beta_1 + \beta_2 + \beta_3 ZRPH + \beta_4 ZZWH + \rho^{NTD} Uo$$

where ZDSCH is the aggregate consumption per capita in income group i (at constant prices)
ZRPH is the group's real personal income per capita, and
ZZWH is the group's real wealth per capita.

Wealth is accumulated in nominal terms according to the formula, and stored in the parameters matrix as β_5.

ZZWH = DPWPH/DPCE and

$$DPWPH = DPWPH_{-1} + ((DPDI-DSPC)/DPOP)_{-1}$$

where DPWPH is the group's per capita wealth at current prices
DPDI is the group's personal disposable income
DSPC is the group's aggregate consumption at current prices, and
DPOP is the population in the tax bracket.
DPCE is the group's consumer price deflator.

The corresponding parameter matrix, BDSC has the dimension (ND, 8) and contains the parameters in the following sequence

Parameter	
1	β (constant)
2	β (t)
3	β (ZRPH)
4	β (ZZWH)
5	β (wealth)
6	ρ
7	U_O
8	w.c.

9. Receipts and payments, function R

These are pseudo-functions rather than functions proper. They offer the user no functional control over the calculation of receipts and payment flows, but rather allow him to specify which type of flow appears where in the matrix of flows. The disaggregation of flows is defined by the R-classification and these functions merely define whether, for example, profits appear in the 1st, 2nd or 3rd column of the payments and receipts matrices. Profits themselves are defined by the model with the help of other variables and parameter matrices.

From the "pseudo-function" definitions it is clear that the bulk of the flows considered are payments to value-added. They are labelled as such in the IDIOM programmes, and they are calculated in the various price routines. Value-added arises from several activities in the economy, so the value-added calculations are correspondingly widespread. Obviously, however, if profits are the first element of the payments matrix for industry, so must they be for households, government etc. Therefore only one set of pseudo-functions is necessary.

The user has to specify this function as

FUNCTION R WAGE 1 PROF 2 ITAX 3 IMP 4 GOOD 5

according to the proposed disaggregation, as discussed in section 3.1, and fill in the converters RYB, RCB, RGB, RVB as discussed in section 3.2

10. Exports by area and group, function XA

Exports are determined according to the disaggregation by area of destination (A-classification) and by export commodity (X-classification). The basic model is recursive (determining price prior to and independently of current quantities) and is better suited to trade in differentiated products under imperfect competition than to other market situations. Two forms are available:

a) specification LIN (switch JSWXA = 1)

$$X_{ij} = \beta_2 + \beta_8 t + \beta_3 AD1_i + \beta_4 AD2_i + \beta_5 DI1_i + \beta_6 DI2_j + \beta_{10} EX + \beta_{14} PXT_j + \beta_{22} PCL_j + \beta_{30} PQX_j$$

where X_{ij} is the export of commodity j to area i

$AD1_i$ is an aggregate demand variable relating to area i

$AD2_i$ is also an aggregate demand variable relating to area i

$DI1_i$ is an institutional variable (dummy, with values 0 or 1) affecting trade with area i

$DI2_2$ is an institutional variable (dummy, with values 0 or 1) affecting trade of commodity j

EX is the exchange rate index

PXT_j is the price of exports of commodity j (in local currency), inclusive of tax

$PCLO_j$ is the competitors' price of exports of j (in foreign currency), or, if competitors' price is not known, world price

PQX_j is home price of commodity j (in local currency, converted from Q-classification to X-classification by QXC ', the transpose of the converter)

1) In its original form IDIOM allows for even more explanatory variables. Altogether 32 parameters can be estimated. Since we believe that data needed to estimate such a function will usually not be available for developing countries, we propose to use the function in the above simplified form. In any concrete modelling exercise this might be simplified even further by setting some of the parameters zero.

2) Care should be taken however, to correctly fill up the parameter matrix BXA, which has dimension (NX, NA, 33). The parameter-subscripts in the above function refer to the place in which the parameter should be stored in the matrix. Note that in this function no allowance is made for serial correlation and tnat the working constant is stored in the first row, (and not in the last, as in other functions). The estimated constant must be stored in the second row, and not as usual, in the first.

b) Specification LLIN (switch: JSWXA = 2)

The same function as above, in log-linear form, i.e., all terms are logged, except β_2 and $\beta_8 t$.

Note: IDIOM computes this function by area, and commodity, i.e., the specification of the function form in the directive file should be given according to this sequence. Example: if we have n commodities and m areas, and we choose the LLIN specification for commodity i to area j, and for all other export flows we select option LIN, the corresponding command is:
FUNCTION XA LLIN NR LIN ?

where NR = (j-1) * n + i

The two aggregate demand variables AD1 and AD2 can be used flexibly to describe demand situations in different world areas. It is proposed to define $AD1_i$ as the share in world trade of processed goods between area i and the area the country to be modelled belonging to $AD2_i$ should be defined similarly for unprocessed goods. For these variables data are available in the regional world trade matrices. Either AD1 or AD2 should be used depending on, which one is relevant for the given export commoditiy.

The institutional variables DI1 and DI2 can be used to introduce effects of trade-agreements (such as export quotas at agreed prices for specific commodities and countries). To ease interpretation of parameters, one should use either DI1, which refers to the area, or DI2, which refers to the commodity, but not both. Then the corresponding parameter expresses the quantity agreed upon.

The export-price variable, PXT_j allows one to introduce effects of export-taxing policies (which are determined in the coefficients of the converter TQXB); the competitors' (or world market) price variable $PCLO_j$ can introduce "competitiveness" effect, and, by using the domestic price variable, PQX_j, the relative profitability of exports to home sales can be modelled.

The parameter matrix has to be filled up as described in Note 2 of the above LIN specification.

11. Export prices, function PX

Export prices are determined according to the export classification and are measured in domestic currency.

The proposed form is:

Specification LUM (switch: JSWPX = 2)

$PX = \beta_{16} + \beta_2 PCLO + \beta_6 EX + \beta_8 ULC + \beta_{10} ZMAT$

PCLO and EX are variables, as defined before in the export function; ULC is the unit labour cost-variable computed as ULC = ZLC/Y, i.e., total labour cost divided by gross output, and converted to the export-classification by the transpose of the converter QXC; ZMAT is the material input costs, computed as $ZMAT_Q$ = [QYC]' * PQH, where [QYC]' is th transpose of the absorption matrix, PQH is the vector of absorption prices, and $ZMAT$ = [QXC]' * $ZMAT_Q$ converts the material costs to the export classification.

This proposed form is a simplified version of the function, allowed by IDIOM, where altogether 15 parameters can be estimated. Similarly to the export function, no allowance is made for autocorrelation. The corresponding parameter matrix BPX has dimension (NX, 16), and the sequence of parameter-store is given by the subscripts show in the above equation. Note that, as in the export-function, the working constant is stored in the first place, and the estimated constant has to be given in the last, 16th position.

12. Earnings, function PE

This function determines the average renumeration of each NE types of labour.

The proposed option is

Specification EXGW (switch: JSWPE = 2)

$$PE = \beta_1$$

i.e., the wage rate (PE) is exogenous

In most applications of IDIOM this specification is appropriatre, given the appaling history of forecasting wage movement.

Given the disaggregated wages from these functions, IDIOM then calculates the average wages of all employees', (AW) all employees in industry (AWY), all in government (AWG) and all employment directly by consumers (AWC). This is done by weighting the values in PE by the shares in the total employment in each of these categories. The corresponding parameter matrix BPE has dimension (NE, 1), containing the constant β_1 terms.

Technical note: 1) The β_1 exogeneous wage rate has to be given in terms of per worker per year. 2) The exogeneous wage rate can be updated and modified, whenever necessary.

13. Indirect taxes, function T

This is also a pseudo-function - like functions R and H. It controls not the functional specification of tax collection but rather the particular entries in the tax matrix. We propose specification ADVA for all indirect taxes, i.e.,

$$ZT_j = \beta_j * PY_j * Y_j$$

where ZT_j is the payment of these taxes by industry j
PY_j is the price index corresponding to industry j
Y_j is the gross output (at constant prices) of industry j.

Exactly the same functions are used for indirect taxes on consumption, government's expenditure, imports, exports and investments.

All the user needs to do is to specify the function according to the proposed form and fill in the corresponding converters TQMB, TYB, TCB, TGB, TVB and TQXB with the β-parameters as described in section 3.2.

14. Overall investment, function V

This function could be used to determine non-industrial investment excluding for social capital formation. Since we only deal with industrial investment and social capital formation, when IDIOM is being used for foreign trade analysis (which is exogenous to IDIOM) the proposed form is

Specification INDL (switch: JSWV = 1)

i.e., industrial investment should be calculated only as determined by function YV, with no further addition at this stage.

Social capital formation has to be defined by the user for each year of the simulation according to the K-classification. IDIOM converts this to the V-classification using the converter VKC, adds it to this, and finally converts V to QV by means of QVC.

The corresponding parameter matrix VB has dimension (NV, 0) for this specification, i.e., it is empty and does not need to be read in.

15. Industrial labour costs, function YULC

Unit labour costs are determined for each of the NY industries. The proposed form is:

Specification ACTU (switch: JSWYU = 1)

$$YULC = ZLC/Y$$

i.e., total labour costs are divided by output. With this specification, IDIOM calculates it in money terms per unit of (constant price) output, and not as an index number. As this function does not include any parameters, no corresponding parameter matrix exists.

16. Commodities and industries, function Q

As we don't differentiate between industries and commodities, IDIOM must be informed using the

specification IDEN (switch: JSWQ = 1)

Thus corresponding industries and commodities will have the same position in their respective vectors.

No parameter matrix exists for this function-specification.

17. Unemployment, function UE

Unemployment can be computed for each for the NE types of labour. Labour force is exogeneous in IDIOM (variable LF) and has to be determined for each type of labour. The function to be used is

Specification SIMP (switch: JSWUE = 1)

$$UE = LF - E$$

where E is the total employment of the type of labour considered. This equation accounts for 'real' unemployment and calculates it as the difference between the labour force and employment.

Since no parameter is needed for this function, the corresponding parameter matrix BUE is empty, and need not be read in.

18. The Input-output table, function A

For the sake of simplicity we want to keep our input-output matrix constant for the simulation period, therefore we have to include the

Specification NULL

i.e., IDIOM will do nothing to the A-matrix.

19. Institutional sectors, function H

This is another set of 'pseudo-functions'. The institutional (H) classification defines the number of sectors and the H-functions allocate a type to each one. Hence the specification

FUNCTION H HOUS 1 CORP 2 CGOV 3 ROW 4 NATI 5

tells IDIOM that of the five institutional sectors (NH = 5) the first is households, the second corporations, the third the central government, the fourth the rest of the world and the fifth is the nationalized industries sector. Knowing this, IDIOM is then able to calculate the payments and receipts of these sectors using the function HRP (which will be described next) and number of accounting identities, as well as write the results into the correct element of the payment matrices.

20. Payments and receipts, function HRP

This set of functions builds up the flow of funds matrices necessary to close IDIOM. Payments and receipts are disaggregated by type of payment (receipt) - the R-classification and functions - and the institutional sector involved - the H-classification and functions. The payments are constructed in various ways using either accounting identities or behavioural equations, the parameters of the latter being held in matrix BHR. The results of the calculations are written on to two (NH, NR) matrices HRR and HRP, which record respectively receipts and payments disaggregated by institution and type of payment.

It is important to distinguish the receipts and payments under consideration here (HRP) and those calculated under the R functions. With the exception of the goods column, the R-functions are basically value-added flows disaggregated by the originating activity and the nature of the value-added. They are part of the production side of the "real" economy. The present flows, while largely built up from those production flows, concern transfers and the distribution of income and expenditure flows. They have little significance for the "real" economy, except in the determination of personal disposable income. Note that there is no separate classification corresponding to the HRP functions: receipts and payments are built up on the R-classification, the HRP functions merely determining how.

To ease the exposition of this sub-section, we describe now the dimensions and classifications of various matrices.

HRR (NH, NR)

receipts by sector I of type J, I=1,..NH; J=1..NR

HRP (NH, NR)

payments by sector I of type J

HRB (NH, NR) a converter (parameter matrix) translating total payments by type (R = RCØ + RGØ + RYØ + RVØ) into receipts by sector and by type. Hence:

$$ZHRR = HRB * R$$

where ZHRR is that part of HRR which stems from R. This, in fact, is the majority of HRR. Additional flows can be introduced by the HRP function for which two forms are proposed:

a) Specification NULL (switch: JSWHR = 6)

This option should be chosen if no additional financial flows are introduced than defined by the converter HRC.

b) Specification GRAN (switch: JSWHR = 3)

$$\log ZA = \log PUP + \log \beta_1 + \beta_2 t + \beta^{NTD} U_O$$

where ZA is the value of grants

PUP is the GDP (factor cost) deflator, presently set equal to the GDP (market cost) deflator for the purpose of this subroutine

β_1 the base year value of the grant at constant prices

$\beta_2 t + \rho^{NTD} u_o$ is the modifying term for year t.

The corresponding parameter matrix, BHR has dimension (NH, NR, 6) for specification in GRAN

where the sequence of parameters is:

Parameters

1	β (base value)
2	β (t)
3	index of receiving sector (as integer)
4	ρ
5	U_O
6	w.c.

Notes: 1) The usage of this matrix we demonstrate though the example of emigrant workers remittances, which can be regarded as a wage-type income, received by households from the sector 'rest of the world'. If the fourth institutional sector is the rest of world, and wages are the first income type, the row BHR (4, 1, i) will contain the parameters of this function, and the value BHR (4, 1, 3) = 1 will show that the receiving sector is the first one, namely the households.

2) If no additional income flows are to be introduced for any of the sectors, i.e, the specification

FUNCTION HRP NULL ?

is used in the directive file. The BHR matrix need not need to be read in.

The Personal Tax System

This is incorporated in IDIOM as an accounting relationship, hence there is no option but to use it. If data are not available for it, the user should set the various rates to zero.

The system is based on the system of British personal taxation. It treats self-employment income (which is treated in the national accounts as profits) equivalently to wages. It allows different marginal rates of tax on different sources of income, but defines the tax brackets according to total taxable income. Obviously IDIOM cannot tax individuals so the tax system works on per capita income.

IDIOM requires the following data for the personal tax system; it treats the matrices as parameter matrices rather than converters.

There are ND income brackets:

DBT (ND) records the lower limit of each bracket in terms of taxable income.

DDB (ND, NR) contains the marginal rates of tax on each kind of income (NR) for tax-payers whose total taxable income puts them in any particular tax bracket (ND).

DAB (ND, NR) contains the personal allowances per capita for income J, J=1...NR, in tax-bracket I, I=1...ND.

DRB (ND, NR) gives the proportion of total income of type J, J=1...NR, accruing to individuals in tax bracket I, I=1...ND. This is an IDIOM converter. (It is also noted in some parts of the programme as DRC).

and DN (ND) gives the distribution of the labour force over tax-brackets. It gives the share of WPOP whose total taxable income lies in each bracket, that is the proportion of WPOP whose top marginal rate of tax is that of this bracket.

IDIOM builds up the following variables:

D (ND) total tax paid by people in each tax bracket

and total tax paid by the personal sector and received by the central government.

The system operates on each tax bracket in turn. At first it calculates average taxable income by type of income for the bracket under consideration (K):

$$ZT\ (J) = (1000 * HRR\ (\text{"HOUS"}, J) * DRB\ (K,J)/ZWP) - DAB\ (K,J)$$

where:

ZT(J) is the average per capital taxable income of type J accruing to persons belonging to bracket K[1/].

HRR("HOUS",J) is households' total receipts of income of type J.

DRB(K,J) is the share of the total of income J accruing to workers in bracket K.

ZWP is the number of workers in bracket K

DAB(K,J) is per capita allowances against income type J to persons in bracket K.

and the factor of 1000 converts the per capita incomes to more convenient units. (10^{-3} times the units used for aggregate flows).

IDIOM also defines average total per capita taxable income :

$$ZTT = \Sigma_j\ ZT\ (J)$$

The tax system operates by levying the highest of the marginal rates in bracket K on income of the relevant kind, until either that income is exhausted or the part of income remaining untaxed has fallen below the lower limit of bracket K. If the former occurs the next highest marginal rate within bracket K is levied on its respective income until one of these limits are met, while if the latter occurs the tax rates of bracket K-1 are applied to any income that has not been taxed in bracket K. This continues until all

---

1/ People are allocated to bracket K if their taxable income exceeds K's lower limit but falls short of (K+1)'s lower limit.

taxable income has been taxed. The two guiding principles are; that no unit of income is taxed more than once, and tax is always levied at the highest available rate.

Example:

Suppose ZTT is high enough to warrant starting with bracket K. Let DDB(K, MAX) be the highest marginal rate in bracket K; it is, obviously enough, levied on income of type MAX. It is levied on the minimum of :

(i) ZT(MAX)
(ii) ZTT - DBT(K)

That is, when income MAX has been taxed and the remaining untaxed income still lies in bracket K tax is levied on all of ZT(MAX). If, however, taxing all of ZT(MAX) would leave remaining income below the limit for bracket K, tax is levied on ZT(MAX) until remaining income just falls below DBT(K). i.e. on ZTT - DBT(K).

If step (i) applies, i.e. ZT(MAX) ZTT - DBT(K), IDIOM then searches for the next highest marginal rate in bracket K and repeats the above exercise, except that the income already taxed, ZT(MAT), is removed from ZTT. That is ZTT should be interpreted as the total of taxable income not yet taxed.

If step (ii) applies, the tax system now has to consider tax rates in bracket (K-1). Tax has been levied on the amount (ZTT - DBT(K)) of income type MAX; hence ZT(MAX) - (ZTT - DBT (K)) of MAX remains to be taxed, and total taxable income not yet taxed is equal to DBT(K). With these values substituted for ZT(MAX) and ZTT respectively, the tax system applies the above procedure again, but using the rates from bracket (K-1). Operationally the basic rule is that once a unit of income has been taxed, that unit is removed from (i) the relevant total of that type of income, and (ii) total income for defining the tax brackets.

Finally, the per capita taxes for people in this income bracket are summed up by numbers in the bracket to get total tax take.

This process is repeated on each tax bracket. It is clear that people in tax-bracket K potentially pay taxes at the marginal rates of all brackets from 1 to K; nevertheless, their tax and their presence is credited to tax bracket K in the vectors D and DN. i.e. DN(K) refers to all people who pay some tax at rates DDB(K,.) but not at rates DDB(K+1,.), and D(K) refers to all personal tax paid by such people.

Inflation Neutrality

It is possible to update the tax brackets and allowances to keep pace with inflation, or to do so partially. In any year:

$$DBT_t = DBT_{t-1} * (1 + TXPD * (PCE/PCE_{-1} - 1))$$

where TXPD is the exogenously set index of inflation.

The Final Accounting

Once calculated, total personal tax paid (ZD) is added to the accounts:

HRR ("CGOV", "ITAX") = HRR ("CGOV", "ITAX") + ZD
HRP ("HOUS", "ITAX") = HRP ("HOUS", "ITAX") + ZD

Savings by institutional sectors are then calculated as total receipts less total payments. The negative of Central Government savings is also written to PSFD and the negative of Rest of the World savings to BP.

Personal disposable income (by tax bracket and in total) is calculated as income less tax, and real personal disposable income (in aggregate only) is found by deflating by PCE. Expected RPDI is also set, at present, to RPDI.

3.3.2. PROPOSED SPECIFICATION OF FUNCTIONS FOR SIMULATION OF INVESTMENT POLICIES

1. Industrial investments, function YV

Industries' investment is determined by both industry and asset, therefore the industrial investment variable is an (NY, NV) matrix. Two forms are proposed:

a) Specification NCL (switch JSWYV = 1)

a neo-classical investment function, based on Jorgenson (1963). Investment is derived from a model of long-run cost minimization as a function of the price of investment relative to that of output (this approximates relative factor prices), the change in output, depreciation, and time.

$$\log YV = \beta_1 + \beta_2 t + \rho^{NTD} U_o + \beta_{12} \log \beta_8 ZPV + \beta_9 ZPV_{-1} + \beta_{10} ZPV_{-2} + \beta_{11} ZPV_{-3} + \beta_7 \log \beta_3 ZY + \beta_4 ZY_{-1} + \beta_5 ZY_{-2} + \beta_6 ZY_{-3}$$

where ZPV is the "effective" price ratio of investment to output

$$ZPV = PVA * PV/PY$$[1]

where PVA is the rate of effective investment allowances for industry i's investment in asset j. PVA is (NY, NV)

and ZY is the effective change in output as measured at time

$$ZY_t = Y_t - \beta_{13} Y_{t-1}$$

Hence β_{13} is a depreciation parameter reflecting the fact that without further investment the capital that produced Y_{t-1} at time t-1, would produce only $\beta_{13} Y_{t-1}$ at time t.

The estimation of this function in full is complex since it is non-linear in parameters and the data likely to be highly collinear.[2] If facilities do not exist for non-linear estimation probably the best procedure is to fix the lag weights and the depreciation rate a priori. Both will vary according to the industry concerned, and both will affect the dynamics of the system. Hence care should be exercised.

b) Specification FIX (switch JSWYV = 4)

$$YV = \beta_1$$

i.e., investment is fixed to an exogenous value. This specification might be of importance when effects of direct allocation of industrial investments to the sectors is to be investigated. The parameters might be updated whenever required.

1/ ZVP is calculated for years 0 and -1 from the basic data, but for years -2 and -3, it is stored directly as PYVL1 and PYVL2 respectively. Hence in the updating for, say, 1977, PYVL1 contains data for 1975; if 1977 were the first projection year, PV, PY, PVA etc. would be initialized to 1976 values and PYVL1 to 1975 values etc.

2/ There are also likely to be identification problems between β_{12} and β_8 to β_{11} and β_7 and β_3 to β_6.

The corresponding parameter matrix BYV has dimension (NY, NV, 19) for the specification NCL and (NY, NV, 1) for the specification FIX, and have to be read in as NV matrices of order (NY, 19) and (NY, 1), respectively.

The sequence of the parameters:

Parameters	NCL	FIX
1	β(const.)	β(const.)
2	$\beta(t)$	
3	$\beta(ZY)$	
4	$\beta(ZY_{-1})$	
5	$\beta(ZY_{-2})$	
6	$\beta(ZY_{-3})$	
7	$\beta(\log(\ \ ZY))$	
8	$\beta(ZPV)$	
9	$\beta(ZPV_{-1})$	
10	$\beta(ZPV_{-2})$	
11	$\beta(ZPV_{-3})$	
12	$\beta(\log(\ \ ZPV))$	
13	(depreciation)	
14	-	
15	wc 1/	
16	wc 2/	
17	ρ	
18	U_0	
19	w.c.	

Technical note: The industrial investment functions are computed in the following sequence: to the first asset, for all industrial sectors, the second asset for all industrial sectors, etc. This means, if for instance we choose option FIX for investment in the ith industry kth asset, and the NCL option for all others, we have to specify our functions as

FUNCTION YV FIX NR NCL ?

where NR = i * (k-1) + i

1/ This w.c. accumulates the exogenous component of the output term within the UPDATE phase; i.e., all elements referring to lagged variables.

2/ This w.c. accumulates the exogenous component of the price term within UPDATE.

2. Overall investment, function V

These functions determine all non-industrial investment except for social capital formation. The routines concerned also carry out certain house-keeping operations concerning total investment. Two forms are proposed:

a) Specification INDL (switch JSWV = 1)

Industrial investment - determined by functions YV with no further additions are necessary at this stage.

b) Specification DWEL (switch JSWV = 3)

Investment in dwellings. Assuming an institutional framework similar to the U.K.'s, where mortgage payments attract tax relief, and dwelling investment is carried out by the government and personal sectors, this explains personal investment in dwellings by means of income, the "effective" rate of interest, a relative price term, and time. Hence:

$$\log ZVD = \beta_1 + \beta_2\ RPDI + \beta_3\ RMORG * (1-SRT) + \beta_4\ ZPVD/PCE + \beta_5 t + \rho^{NTD} U_Q$$

where ZVD is investment in dwellings, and
ZPVD the price of dwellings (an element of PV).

RPDI is real personal disposable income
RMOR is the rate of interest on mortgage
SRT standard rate of income tax
PCE consumers' expenditure deflator

The semi-log formulation allows for a strong luxury effect. Care must be exercised over the units of RMORG and SRT: SRT is a proportion, $0 \leq SRT \leq 1$; RMORG may be either a percentage or a proportion as long as it is used consistently. (we strongly recommend always working with proportions.)

The corresponding parameter matrix BV is empty for the specification INDL and does not need to be read in. For the specification DWEL the BV matrix has dimension (NV, 8) where the sequence of the parameters is:

Parameters	DWEL
1	β (const.)
2	β (RPDI)
3	β (interest rate)
4	β (ZPV/PCE)
5	β (t)
6	ρ
7	U_O
8	w.c.

i) It is perfectly possible to define non-industrial investment assets other than dwelling. However, they would need to be explained by the function discussed here.

ii) For historical reasons, function V does not have an explicit FIX or EXOGENOUS option. However, this effect may be achieved by using option DWEL, setting all parameters except β_1 equal to zero and $\beta_1 = \log \overline{ZVD}$.

iii) It is perfectly acceptable for industry to invest in dwellings. This should be done through the YV-functions (remember YV has dimension NV, and thus covers all assets). IDIOM adds industrial and non-industrial investment by asset. The resulting totals are converted into commodity demands by the converter QVC. Hence, all buildings - factories, roads and houses - are assumed to require the same commodity inputs.

iv) When investments by asset have been calculated, IDIOM adds to them social capital formation (which is converted by VKC to this classification) and finally converts to QV by means of QVC to get commodity demands. (See also the discussion about disaggregation of classifications V and K) If V is disaggregated such that any asset included in it is used exclusively for social capital formation (e.g., infrastructure: bridges, roads, etc.) the function INDL should be used for this asset , where the corresponding YV function should be specified as FIX, and the corresponding coefficient in the BYV matrix should be set to zero.

3. Stock-building by industry, function YS

This function determines stock-building by the industry undertaking it. Stock-building is not disaggregated, and so includes raw materials, work in progress and final output. Two forms are proposed:

a) Specification ACC (Switch: JSWYS = 2)

$$YS = \beta_1 + \beta_2 t + (\beta_3 + \beta_4 (YEAR-1))(Y-Y_{-1})$$

i.e., a simple accelerator model, a function of changing output $(Y-Y_1)$ but with a time variable parameter. (YEAR is an IDIOM-time variable, and means the year being solved, relative to START, i.e., is equal 1 for the first simulation period, 2 for the second, etc.). The β_4 parameter is the rate of change of the accelerator. It is used to update the value stored in β_3 every year. The updating occurs after the function is formed so β_3 should be initialized to the value required for the first year of projection.

b) Specification NULL (Switch: JSWYS = 4)

$YS = 0$

no stock-building is to be considered.

The corresponding parameter-matrix BYS is empty for specification NULL (and thus it does not need to be read in) and has dimension (NY, 7) for specification ACC. The sequence of parameters:

Parameter	ACC
1	β(const.)
2	$\beta(t)$
3	$\beta(Y-Y_{-1})$
4	increment for β_3
5	-
6	-
7	w.c.

4. Import functions, QM

For import functions we propose the same options as in section 3.3.1 (see page 47).

5. Import price function, PQM

Import prices, similarly to imports, are determined by commodity (Q clasification) and converted to the import (M) classification by the converter MQC. The proposed option:

Specification PFM: (switch: JSWPQM = 4)

In this specification import prices are fixed equal to world prices and converted to domestic currency using the exchange rate index EX. The corresponding parameter matrix BPQM has dimension (NQ, 1)

This matrix does not need to be read in since world prices are stored in the variable PFM. Thus this parameter matrix is empty for the proposed option, and is not used. It is enough to specify the function in the directive file and read in the (exogenous) values of PFM, (which are given according to the import classification) and redefine them whenever necessary.

Prices of direct imports have to be set exogenously in local currency terms. There is a single price for all direct imports by industries: PSYM, for government: PSGM; for consumers: PSCM; and for investments: PSVM, and these need to be defined at the beginning of an IDIOM run and then redefined whenever the user wishes them to change.

6. Domestic prices, function PY

For domestic prices we propose the same option as in Section 3.3.1 (see page 51).

7. Industrial employment function, YE

For each industry this function determines a single, aggregate level of employment. Disaggregation into types of labour is carried out later by means of the employment-industry converter EYEC.

The proposed form is:

Specification LLIN: (switch: JSWYE = 2)

$$\log YE = \beta_1 + \beta_2 t + \beta_3 \log Y + \beta_4 \log Y_{-1} + \beta_5 \log YE_{-1} + \rho^{NTD} Uo$$

where YE is the number of employees in industry i

Y is the gross output of industry i

YE_{-1}, Y_{-1} are the corresponding lagged values.

This specification allows moderately sophisticated dynamics. This equation endogenizes productivity. The corresponding parameter matrix BYE has dimension (NY, 8) and contains the parameters in the following sequence:

Parameter	
1	β (constant)
2	β (t)
3	β (Y)
4	β (Y_{-1})
5	β (YE_{-1})
6	ρ
7	U_O
8	w.c.

As long as industrial employment is calculated according to the function above, direct employment by government and by consumers (e.g., personnel servants, charity workers, and possible subsistence agriculture) will be computed as being a fixed proportion of the level of the corresponding expenditures, i.e., if such employment is considered, two vectors of multipliers must to be initialized:

CEOB and GEOB

where any $CEOB_i$ and $GEOB_i$ element expresses how much employment is created by a unit of consumption of category i and government expenditure category i, respectively. (Of course the CEOB vector will have mostly zero elements.) The aggregate employment by consumers and government will then be calculated as

$$CEO_i = CEOB_i * C_i; \; GEO_i = GEOB_i * G_i$$

and these will be then converted to employment by labour type by the converters ECEC and EGEC.

8. Aggregate consumption function, DSC

For aggregate consumption we propose the same option as in section 3.3.1 (see page 56).

9. Consumer expenditure function (disaggregated), DC

For consumer expenditure we propose the same option as in section 3.3.1 (see page 55).

10. Receipts and payments function R

For receipts and payments we propose the same specification as in section 3.3.1 (see page 67).

11. Export by area and group, function XA

As in the case of investment simulation we do not disaggregate the A classification (world areas, i.e. NA = 1) but determine exports of commodities, (as disaggregated in the X classification) to the whole world.

The proposed form is:

Specification LIN (switch: JSWXA = 1)

$$XA = \beta_2 + \beta_8 t + \beta_{10} EX + \beta_{11} EX_{-1} + \beta_{22} PC + \beta_{23} PC_{-1}$$

Where XA is the total export of export commodity i

EX is the index of exchange rate

PC is the competitors' price of export good i (in foreign currency)

Although IDIOM allows for several other explanatory variables we propose this simple form for the moment. Usually competitors' prices will not be available. If this is the case, the PC variable should contain the world price of export commodities. The corresponding parameter matrix BXA has dimension (NX, 33) and contains the parameters in the following sequence:

Parameters	
2	β (const.)
8	β (t)
10	β (EX)
11	β (EX_{-1})
22	β (PC)
23	β (PC_{-1})

Technical note: 1) This parameter matrix is defined in IDIOM so that there is storage place for 33 parameters, even if we actually use only six (the second, eighth, tenth, etc). Thus, the matrix is to be read in with zeroes for parameters not used (i.e., first, third, fourth, etc. thirty-third). 2) This function does not allow for serial correlation.

12. Export price function PX

Export prices are determined on the export classification, and are measured in local currency.

The proposed form is:

Specification PC: (switch JSWPX = 8).

The country is regarded as a pure price-taker one, the export price equals the competitors' (or world) price.

If this option is used the corresponding parameters matrix BPX is empty and need not to be read in. Only the values of world prices have to be initialized and updated, whenever necessary.

13. Earnings, function PE

For earnings we propose the same option as in section 3.3.1 (see page 60).

14. Indirect taxes, function T

For indirect taxes we propose the same option as in section 3.3.1 (see page 61).

15. Commodities and industries, function Q

For commodities and industries we propose the same option as in section 3.3.1 (see page 62).

16. Unemployment, function UE

For unemployment we propose the same option as in section 3.3.1 (see page 63).

17. The input-output table, function A

For the input-output table we propose the same option as in section 3.3.1 (see page 63).

18. Institutional sectors, function H

For institutional sectors we propose the same specification as in section 3.3.1 (see page 63).

19. Industrial labour costs, function YULC

For industrial labour costs we propose the same option as in section 3.3.1 (see page 62).

20. Payments and receipts, function HRP

For payments and receipts we propose the same options as in section 3.3.1 (see page 64).

3.3.3 PROPOSED SPECIFICATION OF FUNCTIONS FOR ANALYSIS OF CONSUMER DEMAND

1. Aggregate consumption function, DSC

This function determines total consumer expenditure on goods and services by income group as defined by the tax brackets. It uses income and wealth as its main explanatory variables and operates in per capita terms. Two forms are proposed:

a) Specification LNMW (switch: JWDSC = 2)

$$ZDSCH = \beta_1 + \beta_2 + \beta_3 ZRPH + \beta_4 ZZWH + \rho^{NTD}Uo$$

where ZDSCH is the aggregate consumption per capita in income group i (at constant prices)
ZRPH is the group's real personal income per capita, and
ZZWH is the group's real wealth per capita.

b) Specification LLNW (switch: SWDSC = 5)

$$\log ZDSCH = \beta_1 + \beta_2 t + \beta_3 \log ZRPH + \beta_4 \log ZZWH + \rho^{NTD}Uo$$

where the explanatory variables are the same as in form LNMW.

In both forms wealth is accumulated in nominal terms according to the formula, and stored in the parameter matrix as β_5.

$$ZZWH = DPWPH/DPCE$$

$$DPWPH = DPWPH_{-1} + ((DPDI-DSPC)/DPOP)_{-1}$$

where DPWPH is the group's per capita wealth at current prices
DPDI is the group's personal disposable income

DSPC is the group's aggregate consumption at current prices, and
DPOP is the population in the tax bracket.
DPCE is the group's consumer price deflator.

The corresponding parameter matrix, BDSC has for both proposed forms the dimension (ND, 8) and contains the parameters in the following sequence

Parameter	
1	β(constant)
2	β(t)
3	β(ZRPH)
4	β(ZZWH)
5	β(wealth)
6	ρ
7	U_O
8	w.c.

Technical note: If the log-linear form LLNW has been chosen, care has to be taken that β_5 (in which personal wealth per capta is stored) does not become zero or a negative number. Even if β_4 is set to zero, i.e., wealth effects are not considered, IDIOM automatically calculates wealth according to the given formula. If this becomes a non-positive value (which in fact might happen in developing countries for the poorest income class), the model run will be stopped, as the logarithmic function only exists for positive values. If this is be the case, the user is advised to set β_4 to zero for the poorest income class, and give β_5 any (large enough) positive value to ensure that no computational problems arise.

2. Consumers' expenditure function (disaggregated), DC

The function DSC splits total consumption by each income group into the various consumer demand categories. Two forms are proposed:

a) Specification LLIN (switch: JSWDC = 2)

$$\log DC = \beta_1 + \beta_2 + \beta_3 \log ZDSCH + \beta_4 \log(PC/DPCE) + \log DPOP + \rho^{NTD} U_O$$

where the explanatory variables are:

DC is the total consumption of consumer category k in the tax bracket i,

ZDSCH is the aggregate consumption per capita in tax bracket i,

PC is the price of consumer expenditure category k,

DPCE is the consumer price index of population in tax bracket i, and

DPOP is the number of population in tax bracket i.

Obviously this function cannot be used for commodities which are not consumed at all. E.g., if GDP by end use is computed at market prices, the private consumer demand for the production sector trade will be zero. In this case the

b) Specification FIX (switch : JSWDC = 3)

$$DC = \beta_1 * DPOP$$

has to be used.

Here expenditure is fixed in per capita terms, i.e,

$$\beta_1 = \overline{DC}/DPOP$$

The parameter matrix BDC is of size
(ND, NC, 7) for the form LLIN and
(ND, NC, 1) for the form FIX

The parameters have to be stored in the following sequence:

parameter	LLIN	FIX
1	β (const)	$\overline{DC}/DPOP$
2	β (t)	
3	β (ZDSCH)	
4	β (PC/DPCE)	
5	ρ	
6	U_o	
7	w.c.	

Technical notes: 1) As any threedimensional matrix in IDIOM, BDC has to be read in as NC matrices of size (ND, 7) and (ND, 1), respectively.

2) If several income classes are considered, and the option LLIN is used for some commodities and the option FIX should be used for others, the definition of the DC functions in the directive file should be as follows; since IDIOM computes the DC functions in a sequence such that at first the demand for commodity i is computed for all income classes and afterward the demand for commodity i + 1 is computed, the functional options have to be determined also in this sequence.

Let us assume we choose the option FIX for the k-th commodity and i-th income class, and the option LLIN for all other DC-functions. Then the directive file has to contain the following statement:

FUNCTION DC FIX NR LLIN ?

where NR = ND * (k-1) + i

3. Import functions, QM

For import functions we propose the same options as in section 3.3.1 (see page 47).

4. Import price function, PQM

For import prices we propose the same option as in section 3.3.2 (see page 75).

5. Domestic prices, function PY

For domestic prices we propose the same option as in section 3.3.1 (see page 51).

6. Industrial investment, function YV

For industrial investment we propose the same option as in section 3.3.1 (see page 53).

7. Industrial employment function, YE

For industrial employment we propose the same option as in section 3.3.2 (see page 76).

8. Stock-building by industry, function YS

For stock-building we propose the same option as in section 3.3.1 (see page 55).

9. Export by area and group, function XA

For export by area and group we propose the same specification as in section 3.3.2 (see page 77).

10. Export price function PX

For export prices we propose the same specification as in section 3.3.2 (see page 78).

11. Earnings, function PE

For earnings we propose the same option as in section 3.3.1 (see page 60).

12. Indirect taxes, function T

For indirect taxes we propose the same option as in section 3.3.1 (see page 61).

13. Overall investment, function V

For overall investment we propose the same option as in section 3.3.1 (see page 61).

14. Unit labour costs, function YULC

For unit labour costs we propose the same option as in section 3.3.1 (see page 62).

15. Commodities and industries, function Q

For commodities and industries we propose the same option as in section 3.3.1 (see page 62).

16. Unemployment, function UE

For unemployment we propose the same option as in section 3.3.1 (see page 63).

17. The input-output table, function A

For the input-output table we propose the same option as in section 3.3.1 (see page 63).

18. Receipts and payments function R

For receipts and payments we propose the same specifications as in section 3.3.1 (see page 57).

19. Institutional sectors, function H

For institutional sectors we propose the same specification as in section 3.3.1 (see page 63).

20. Payments and receipts, function HRP

For payments and receipts we propose the same options as in section 3.3.1 (see page 74).

4. HOW TO RUN AN IDIOM-MODEL

4.1 READING AND STORING PARAMETER MATRICES

If for any function, more than one specification has been chosen, the user has to tell IDIOM which option should be used for which commodity (or for which income class and commodity, which export area and commodity, etc.) used. This is straightforward for variables which are one-dimensional (e.g., imports, stocks, etc.) but not for two-dimensional ones (like exports by area, consumption by income class, etc.). In this case one has to consider in which sequence IDIOM calculates the functions, and the specification command has to conform to this sequence. This has been already described when discussing the functions in Chapter 3.3. Here we only deal with how parameter matrices have to be read in and how they are stored in IDIOM. The latter is of interest if parameters have to be changed during the simulation period. (Most probably the exogenous wage-parameter will be such, for instance.)

If more than one specification has been chosen, a full parameter matrix has to be read in for each one, according to the size required by the specification.

Example: let us assume we chose import function FIXQ for the first commodity, QMQ for the second and LLIN for all other commodities. Then the specification command is

FUNCTION QM FIXQ 1 QMQ 2 LLIN ? 1/

and the corresponding read command is

READ PARS QM FIXQ 2 QMQ 2 LLIN 2

which tells IDIOM that parameters for function QM should be read from input channel 2, and that three matrices follow in this sequence, the first of size (NQ, 1), the second (NQ, 6) and the third (NQ, 8). If the matrix is to be stored in non-compressed form, IDIOM will reserve place for a (NQ, 8) matrix (the largest of the three) and store the parameters columnwise. If the matrix is stored in compressed form, i.e., the command

COMPRESS PARS QM

is used during the initialization phase, place will be reserved for only as much as actually needed (i.e., not according to the largest matrix but the sum of parameters in each matrix, in our example NQ * (1+6+(NQ-2)*8) - and the parameters are stored rowwise.

However, three-dimensional parameter matrices should not be compressed if more than one option has been chosen for the corresponding function. IDIOM will consider only the first one and set function values for the second specification to zero. (I.e., a specification like

1/ Even if we had only three commodities, the same command has to be used. An explicit form as

FUNCTION QM FIXQ 1 QMQ 2 LLIN 3

would not be understood by IDIOM.

FUNCTION YV NCL 1 FIX ? or NCL 1 FIX ?
FUNCTION HRP GRAN 1 FIX ?
does not work if the parameter matrices BYV and BHR are stored compressed)

4.2 MODIFYING VALUES OF VARIABLES OR PARAMETERS DURING THE SIMULATION RUN

If values of exogenous variables or parameters have to be modified, the command

MODIFY⟨idf⟩⟨arref⟩⟨op⟩⟨real⟩

can be used during the SOLVE phase. This command will be executed immediately and will change the value of variables referenced by ⟨idf⟩ and the array-reference ⟨arref⟩ . The permitted operation ⟨op⟩ are

- \+ add the real to the value computed by IDIOM
- \- subtract the real from the value computed by IDIOM
- * multiply the value computed by IDIOM by the real
- / divide the value computed by IDIOM by the real (which must be positive)
- = replace the value computed by IDIOM by the real value supplied.

Note that the array-reference has to be in correspondence with the stored matrix, as discussed in the previous chapter, i.e., the a_{ik} element of any matrix of size (n, m) must be referred to as (i-1)*m+k if the matrix is stored rowwise and as (k-1)*n+i, if it is stored columnwise.

This modification command can be combined with the conditional command
IF ⟨var⟩⟨relation⟩⟨integer⟩⟨directive⟩ ELSE directive
UNLESS
where var is one of YEAR, ITER, DATE
relation is one of =, ≤ , ≥, ≠, ⟩ , ⟨
YEAR is period of solution, starting at 1 and therefore in 'model' rather than 'real' time.
DATE is calendar year of solution (defined as START + YEAR -1, where START has been set by the INTEGER directive).

If the directive is IF and ⟨var⟩⟨relation⟩⟨integer⟩ is TRUE, the first directive will be executed; otherwise the second one. Neither of the two subsidiary directives may themselves contain conditional directives. If no second directive is present, the 'ELSE SKIP' is assumed.

Example: The command
IF YEAR = 1 MODIFY BQM 1 * 1.1

will modify the first element of the parameter matrix BQM for the first year of simulation by multiplying it by 1.1, and will remain unchanged for all other years.

Values of exogenous variables or parameter matrices may be changed during the simulation period also by using the READ, READ PARS commands during the SOLVE phase, after the command UPDATE. In this case the corresponding values have to be placed at the end of the input-data file. Macro-variables (if they are exogenous) can be changed also during the SOLVE phase, e.g.,

IF YEAR = 1 REAL EX = 1.05

will change the exchange rate index for the first simulation year to 1.05 and remain unchanged for other years. With these methods, future time paths of exogenous variables can also be supplied.

Examples of using the commands discussed above are given in the Appendix, in file UWM.IDIOM.INVEST.DIRECT.

4.3 IDIOM's INPUT FILES

Once the concrete model has been specified and the parameters of chosen functions estimated, the user has to create two input-files to run IDIOM. One of them, which we call directive file, contains all information about the specification (dimensions of classifications, functions chosen etc.) and all necessary commands for the run.

For all three proposed structures, discussed in Chapters 3.3.1, 3.3.2, and 3.3.3, prototype directive files are supplied in the Appendix. They are named as

UWM.IDIOM.TRADE.DIRECT
UWM.IDIOM.INVEST.DIRECT and
UWM.IDIOM.CONSUMP.DIRECT

They are designed in such a way, that only changes in the dimensioning commands and some of the function specifications are necessary. All other commands might be let unchanged. If, however, the user whishes to change them, he can find a full description of commands in the users' manual.

A prototype directive file is analysed in the chapter 4.3.1.

The other input file to be created called the rundata-file, has to contain all data needed by IDIOM according to the reading sequence specified in the corresponding directive file. An example is attached as well (with test-data for Bangladesh), named as UWM.IDIOM.INVEST.RUNDATA. As one can see, different blocks of data have to be separated by the delimiter-symbol ℘. No comment on data is allowed in this file. A file completed with comments UWM.IDIOM.INVEST.FULLDAT, is attached as well to ease understanding. This, however, cannot be used as an input file.

Special care has to be taken on line-numbering, which is supplied by the present editor-system. These numbers have to be removed at the end of all lines, otherwise IDIOM reads them in as data.

FORTRAN formats, in which variables, parameters, and converters have to be read in, are given in the file UWM.IDIOM.VARIABLS in the Appendix. In general, one can say that variables and converters have to be given in format F8.3, while parameters have to have format F8.4.

If for any command GEM format input is specified, arrays must be preceded by their dimensions and written by rows. It is essential to remember that GEM-input format must be used for READ operation on sparse matrices, but cannot be used for three-dimensional blocks.

4.3.1 A PROTOTYPE DIRECTIVE FILE

An example called UWM.IDIOM.INVEST.DIRECT is to be found in the Appendix, the description below.

Note: Many lines contain several instructions; they are separated by ";".

Lines 1 and 2 Global switches:

TRACE: provide run-time trade facilities

PRINT: provide iteration detail print-outs

ABCHECK: checks array overflows. This is essential when new jobs are being set up since it traps at least certain common dimensionary errors.

NO ECHO: does not reflect subsequent commands. It is probably best to set ECHO at first, but subsequently NO ECHO economizes on output. Note: NO ECHO is, in fact, the default setting.

ABORT -1: continues execution after any non-fatal error. This allows the job to proceed as far as possible; it will stop only if the operating system finds an error. A consequence of this is that if an error occurs, control is not handed back to IDIOM, and so, IDIOM diagnostic dumps will not be provided.

DUMP: provides a dump if IDIOM detects any error. Redundant if ABORT -1 is set, but essential in the early stages if ABORT N(n -1) is set.

Other switches are set to default values.

Line 3:
Identifying Notes - obvious.

Line 4:
SETUP TABLES: an essential command instructing IDIOM to set up internal tables necessary for data. The key words DUMP and TITLE set up additional auxiliary files (not in IDIOM work-space) for dumping results and storing titles.

0/11: the first of the commands that set up dimensions. The value for 0 has to be 11 for IDIOM version 3.

Lines 5 - 6:
Further commands: for example, there are seven industries, seven commodities, six export groups etc. Note that there must be one command for each IDIOM classification.

Line 7:

Import FUNCTIONS are defined. Imports of commodities 1 and 2 are described by functions LLIN. All other commodities have exogenous imports. (Note: the order of these functions does not matter.) Import price FUNCTIONS are also defined, with option PFM (i.e., world prices equal to import prices.)

Lines 8-16:

Further functional definitions - one for each of the functions defined in the handbook. Features to note include:

FUNCTION YV (line 8): YV is a two dimensional array, (NY, NV). For the first six industries asset 1 is determined by a neo-classical function, and the seventh industry asset 1 and asset 2 as a fixed value.

FUNCTION T (line 9): defines the order of the indirect taxes in the tax vectors: only ad valorem taxes are considered.

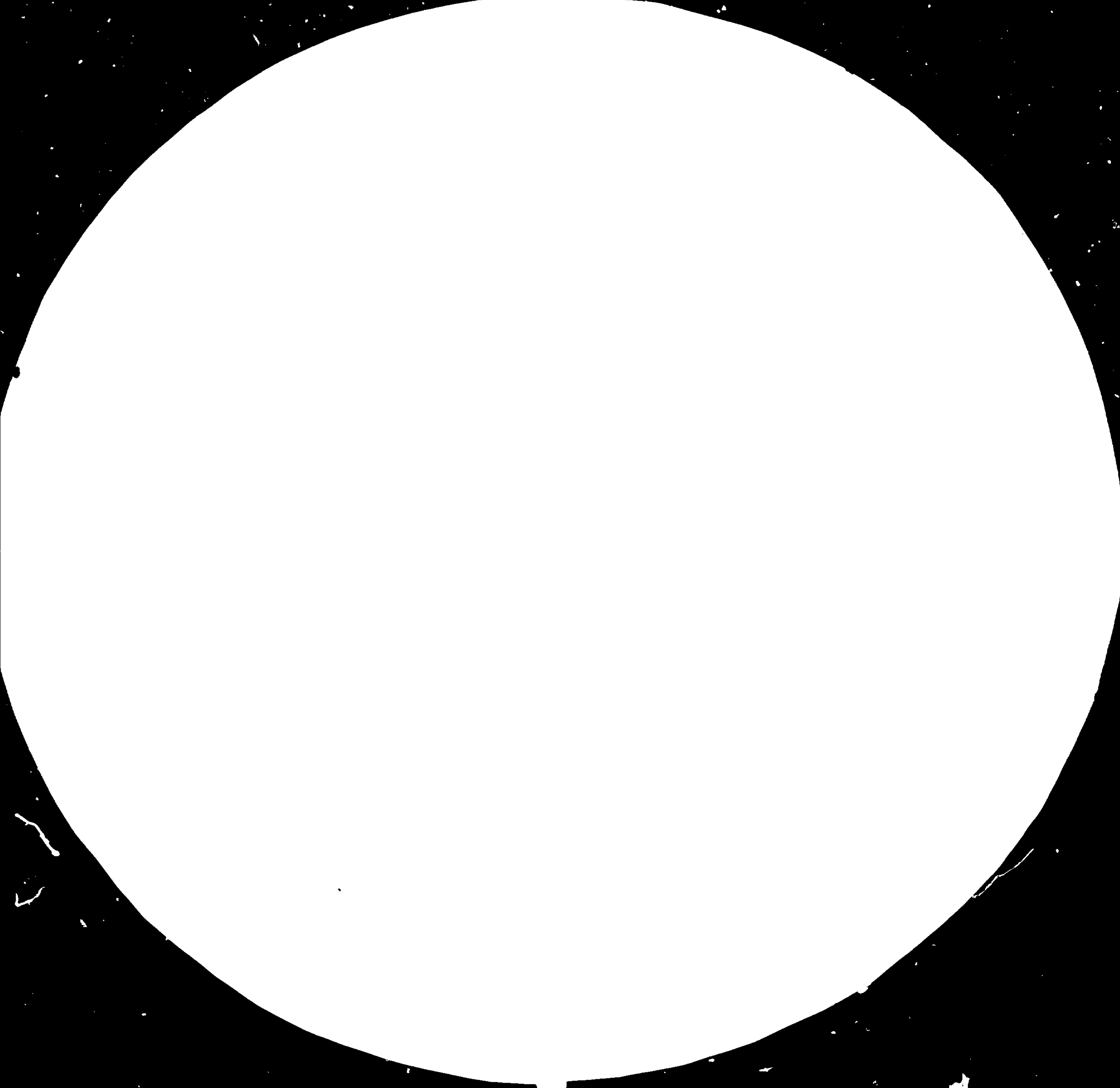
FUNCTION DC (line 11): all commodity consumption is taken as fixed in per capita terms.

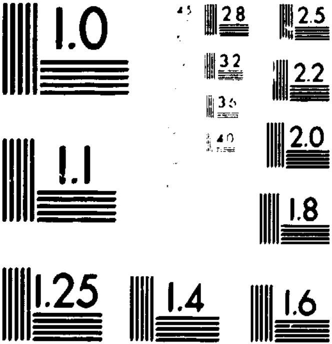
Lines 17-26:

CONVERT commands defining the storage method to be used for each converter. E.g., converter from Y to R, RYB, is to be stored full. Any matrix having fewer than one third of its elements non-zero may be stored in less space in SPARSE form than in FULL, although the packing and unpacking of sparse matrices involves a small increase in execution time. In lines 20 and 21, certain converter matrices are defined as either summation vectors (ADD) or identity matrices (IDENTITY). These require no store within IDIOM or data input, their operations being entirely defined by the nature of the matrix.

Line 27:

This COMPRESS-es the parameter matrix QMO. This is of no consequence to the user, but economizes on IDIOM's use of storage space. Note that no store is made saved if only one matrix is compressed. (We have now two BQMO matrices, one for specification LLIN and one for specification FIX.)





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS
STANDARD REFERENCE MATERIAL 1010a
(ANSI and ISO TEST CHART No. 2)

Line 28:

INPUT indicates the close of the INITIALIZE phase and the start of the INPUT phase. It could be followed by SWITCH instructions if different switches were required in the INPUT phase from those defined earlier.

Lines 29-39:

These initialize various scalar macrovariables. Each REAL instruction comprises a list of n names followed by n real numbers, although where freeformat directed input is available the decimal point in the latter is optional.

Line 40:

This initializes the integer scalars YA72 and YA70 and then, after ";", some further real variables. Setting both variables to the value 1 means, that the value of trend variables in functions and the exponent of the autocorrelation term will be taken as one for the year START, given in line 86.

Line 41:

This is the first of the SELECT statements which open data-streams for input or output. In this case stream 2 is opened for input in card image form (80 characters per line, max.). Matrices read under this instruction are read according to FORTRAN conventions; thus matrix X of dimension (NX,NA), for instance, would be filed up in the order X(1,1), X(2,1), X(3,1)... X(NX,1), X(1,2), X(2,2)... X(1,3)... X(NX,NA). There is no need to start each new column on a new card, although doing so may improve the legibility of the input stream.

Line 42-43:

Read instructions for data in card image.

Line 44:

Stream 2 is selected again, but the argument GEM changes the nature of the reading. Under GEM format matrices must be preceded by their dimensions and are read by rows: i.e. X(1,1), X(1,2), X(1,3)... X(1,NA), X(2,1)... etc.

Line 45-58:

Various SELECT and READ instructions for variables and converters.

Lines 59-60:

Input from stream 2 under card image is selected again, but now titles are read. The "2" at the end of the line is not required here because stream 2 is the current stream, but it would be possible if required to have stream 2 open for data above and yet to take title from, say, stream M. This would be done by replacing the "2" in line 59 and "M".

Lines 61-71:

These lines read parameter matrices from stream 2. Again the "2"s are redundant since stream 2 is current. Each instruction involves several key words: first the name of the function then the names of the various functional forms to be read under that function. Note that, for each functional form specified, a complete parameter matrix is required (i.e., parameters for each flow). IDIOM reads these, discarding those rows which are already not required according to the FUNCTION definitions. For example, line 61 tells IDIOM to read two complete matrices of import parameters.

Lines 72-80:

Further data reading. Note that the SELECT instruction on line 74 is redundant because it is identical to the previous SELECT. As is clear from these lines, the various read options may be intermingled.

Lines 81-82

Some macro-scalars are initialized.

Lines 83:

This command causes a dump of the IDIOM internal symbol tables and their contents be written to unit 6. It is useful for diagnostic purposes (see chapter 4.4. Interpreting a dump).

Line 84:

Initializes PBAS, QBAS (i.e., in our case base year of index variables is 1973).

Line 85:
SWITCH commands for the SOLUTION phase: PRINT instructs IDIOM to output details of each iteration and PAGE instructs IDIOM to move to the top of tne next page of the currently selected output stream.

Line 86:
Initialize the start year of the run.

Line 87:
SOLVE denotes the end of INITIALIZE phase and the beginning of the SOLUTION phase. It could, without harm, be inserted before the SWITCH commands on line 85.

Line 88:
This defines the convergence criterion. In this case only Y is used and convergence is said to have occurred when:

$$1.-Y_i/Y_{i-1} \le 3$$

i.e., when industrial output computed in the i-th iteration does not diverge more than 3 per cent from the value computed in the preceding iteration. This has to be fulfilled for all industries. Note, that more variables could have been considered.

Line 89:
The years for solution are defined here. IDIOM is solved for five years, 1 to 5, where 1 refers to the START year 1978.

Lines 90-91:
These are examples for using the MODIFY command for some simulation years. At first the seventh element of the BYV parameter matrix is set to the given value for the fifth year, and afterwards the exogenous value of the world price of first commodity is changed for the second year of run.

Line 92:

UPDATE ALL instructs IDIOM to update all functions and to do so in its default order. Note that this is done before year 1978 is solved. Hence the initialization process should leave the store looking as though IDIOM had just solved 1977.

Line 93:

The DUMP command is repeated.

Lines 94-96:

Certain exogenous variables vary from year to year. IDIOM is instructed to read these from stream 2 in card image. In principle any variable could be reset here. Of course, stream 2 must contain the required information for all the years of the run. As an example we included here some exogenous variables and a parameter matrix.

Lines 97-101:

These are examples to change values of scalar variables.

Line 102:

The start of the iteration loop. Up to 40 iterations are to be allowed for convergence.

Line 103:

COMPUTE ALL tells IDIOM to execute all the SOLUTION routines once in the default order.

Line 104:

This denotes the end of the iteration loop. Note that it has the name used in the FOR statement to which it refers; in this case ITER.

Lines 105-106:

This selects an output stream as current. This is stream 15 which has been setup as a binary dump file in line 3 above; the option DUMP instructs IDIOM that output must be in binary form. The actual dumping is initiated by PUT ALL on line 106.

Line 107:

This defines a comment which may be up to 80 characters long and which is output to stream 6 wherever the command is encountered.

Line 108:

This defines the end of the YEAR loop.

Line 109:

This SWITCHES off the dump on stream 6 on the detection of an IDIOM error.

Line 110:

ANALYSE ends the SOLUTION phase and commences the ANALYSE phase.

Line 111:

The SELECTS the binary dump on stream 15 for OUTPUT. The results dumped there, year-by-year, are now to be read in for analysis as required.

Line 112:

This SELECTS output to stream 3 and defines it as a PRINTER stream.

Lines 113-114:

GET ALL 1978 instructs the analysis programmes to read into the core the whole of the dump for 1978 and TABULATE ALL requests a full set of cross-section tables possible. Lines 115-116 replicate this process for 1979. One could use TABULATE to print results on any particular set of functions or just to produce a table of macro results.

Line 123-131:

VALUE is a time-series command. For the variables mentioned it produces a time-series of their values for the whole of the period covered by the dump being used. Tables appear with headings, and with titles as defined in the "read titles" instruction. If none have been defined for a variable that is to be printed, the title space is left blank.

Line 132-134:

This produces rough line-printer graphs of variables included.

Line 135:

This command requests growth rates of macro-variables.

Line 144:

FINISH. The end.

4.4. INTERPRETING A DUMP

The dump contains information on:

TABLS which stores information on the location of variables in store. Each quartet of information contains:

xx n1 n2 n3

where:
- xx is the variable name (including converters and parameter matrices)
- n1 is its base address in the store ZZ
- n2 the number of elements it contains
- n3 the first dimension of xx

TABLE dimensioning information. Each quartet contains:

cc Ncc n1 n2

where:
- cc is the identifier of a classification
- Ncc is the name of its associated dimension
- n1 is the value of that dimension
- n2 is address of corresponding titles

TABLF which gives information on functions. Each line of information contains:

ff n1 n2 n3 a1 a2 b1 b2 ...... h1 h2

where:
- ff is the function name
- n1 the dimensions of the function packed into one figure as (1000 x first dimension + second dimension), or first dimension if there is only one. e.g. 4002 indicates a function for a variable (4 x 2).

n2	the number of parameter spaces reserved for each flow in the parameter matrix for this function. Negative of this if the parameter matrix has been compressed.
n3	the base address in JSW of the vector of switches for this function.

a1, b1,...h1 key words denoting function options

a2, b2,...h2 the size of parameter matrix that each key word requires.

TABLG information on converters. Each quintet of information contains:

xx n1 n2 n3 n4

where:	xx	is the name of the converter	
	n1	its form of storage	1 for sparse 2 for full 3 for identity 4 for add
	n2	its first dimension	
	n3	its second dimension	
and	n4	the number of elements	

JSW the store for switches interpreted according to TABLF. These are the values of JSWH, JSWQM etc. referred to in the parameter tables earlier in this handbook.

ZZ the main store, interpreted by information in TABLS. Hence for instance if TABLS gives the following line:

DAB 446 10 2

it means that the 10 elements of ZZ starting with element 446 refer to DAB.

<u>Note</u>: (i) the first number in each row is merely a line number to help read the dump.

(ii) between each pair of vectors/matrices in ZZ, is a delimiting element, set to .927E - 76. It may be used by the user to ensure that no vector has over-run its store.

TABLO gives the values of each macro variable.

4.5 DATA OUTPUT

The TABULATE ALL command results in the printing of the following information:

DATA OUTPUT BY TABULATE COMMAND

TABULATE	variables output	
QMO	import volume	QMO
	duties at base rates	QMTZ*QMO
	output volume	Q
	import ratio	QMO/Q
	quota rates	QMQ
	import values	QMO*PQM
	import price	PQM
	production price	PQ
PM	world price	PFM
	impor price	PQM
	production price	PQ
	absorption price	PQH
	tariff rate	QMTO/QMO
	import volume	QMO

PY	production price	PQ
	home prices	PQHH
	import prices	PQM
	export prices	PQX
	absorption prices	PQH
YV	output volume	Y
	price PY	
	output value	Y*PY
	profits YP	
	disaggregate investment (up to 3 asset groups)	YV
	total investment volume	YVO
	total investment value	YV*PV
	average price ratio of value/volume	PV
YEO	output volume	Y
	investment	YVO
	employment	YEO
	hours YH	
	wage rate	PYE
	% growth of men	% YEO
	hours	% (YEO*YH)
	productivity	% (Y/YEO*YH)
YS	output	Y
	growth of output	Y-YL1
	stock-building volume (disaggregated)	YS
	stock-building value (by stock)	YS*PYS

DC (a) summed over income groups

commodities	i QCC *C
imports (direct)	RCB(,"IMP")*C
other value added	C - rows 1,2 and 4
tax (base year rates)	CTZ*C
(at constant prices)	
total volume	C
imports (direct)	RCB(,"IMP")*C*PSCM
value-added	RCB(,"WAGE")*CEO*AWC
taxes in total (value)	CTO
taxes disaggregated by tax type	CT(i)
total value of consumption	PC*C
price	PC

(b) consumption by each income bracket DC

DSC (a) by income class

volume of consumption	DSC
value of consumption	DSPC
price	DPCE
volume p.c.	DSC/DPOP
value p.c.	DSPC/DPOP
no. of consumers	DPOP*1000.
PDI p.c.	DPDI/DPOP
RPDI p.c.	DPDI/(DPOP*DPCE)
total wealth	DPW
wealth p.c.	DPWPH

(b) all consumers

volume of consumption	SC
value of consumption	SPC
price	PCE
PDI	PDI
RPDI	RPDI
expected RPDI	EPDI/PCE

		% PDI
		% RPDI
		% consumption
	wealth	PW
R	NO PRINT OUT	
X	exports by group and area	X
	export prices by group	PX
PX	export prices (current, lagged 1 and 2)	PX,PXL1,PXL2
	export taxes	XTO
	competitors' prices (current, lagged 1,2,3)	PCLO,PCL1,PCL2,PCL3
	export vomume	X
PE	average wage (current, lagged)	PE,PEL1
	total employment	E
	total unemployment	UE
	%	% PCE
	% retentions	% RET
T	taxes by expenditure category (O classification)	TO
V	social investment, volume	VKC *K
	industrial investment, volume	V - row 1
	total	V
	social investment, value	row (I-3)*PV
	industrial investment value	
	total	
	asset price	PV
	total tax	VTO
	tax rate	VTO/row 6
YULC	output, value	Y*PY
	material inputs, value	QYC *PQH
	wage bill	RYB(,"WAGE")*YEO*AWY*0.001
	profit	YP+YSA
	direct imports	RYB(,"IMP")*Y*PSYM

	other inputs	YRO - YTO - rows 3,4,5
	taxes on labour	TYB(,"EMPW")* row 3 + TYB(,"EMPE")*YEO
	taxes on output	YTO - rows 7,9
	taxes on input	TYB(,"ADVI")*Y*(QYC *PQH)
	total taxes	YTO
	unit labour costs	(row 3 and 7)/Y
	average wage	1000.*row 3/YEO
	industrial price	PY
Q	(a) commodity balances	
	consumption	QCO
	government	QGO
	investment	QVO
	stock-building	QSO
	final demand (home)	above
	intermediate demand	QYO
	home demand	rows 5 + 6
	exports	QXO
	total demand	row 7 + 8
	import supply	QMO
	import duties	QMO*QMTZ
	total output	Q
	total supply	rows 10 + 11 + 12
	(b) non-commodity demands and supplies	
	direct imports	disaggregated by the classes of
	indirect taxes	supply and demand used in part (a)
	other value-added	of the table
	foreign tourist expenditure	
UE	industrial employment	EYO
	government employment	EGO
	household employment	ECO
	total employment	E
	registered unemployment	UE
	unregistered unemployment	LF - E - UE
	total unemployment	LF - E
	labour force	LF
	registered unemployment rate	UE/(UE+E)
	total unemployment rate	row 7/LF
HRP	reciepts by type and sector	HRR
	payments by type and sector	HRP
H	NO PRINT OUT	
QYC	input-output flows at constant prices	QYC * Y

Just to illustrate an output, we attach results for one year of a test-run in the Appendix. All tables, created by the command TABULATE ALL are supplied. IDIOM prepares the same output for every year of run.

Appendix I.

List of IDIOM-variables, their dimension and unit and their FORTRAN-format

```
      DATASET: UWM.IDIOM.VARIABLS                                        DATE: 85/01/21
                                                                         TIME: 11:51
                                                                         PAGE: 1
START
 COL  ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
 19                 ** LIST OF IDIOM SYMBOLIC NAMES **                      00000010
                                                                            00000020
 19                 The following list contains the names of variables,     00000030
 19                 parameters and converters for IDIOM.                    00000040
 19                 The columns of the list are:                            00000050
 19                 First column  : symbolic name                           00000060
 19                 Second third and fourth columns:dimensions of item      00000070
 24                      All variables' dimension is given by a triplet o 00000080
 24                      numbers, i.e as a threedimensional block.A vector00000081
 24                      of n elements is characterized by (n,1,1)          00000082
 19                 Fifth column : units of measurement and format          00000090
 24                      1 million constant prices(base year:pbas)    f8.0  00000091
 24                      2 million current prices                     f8.0  00000092
 24                      3 unit-value index (pbase,qbase =1.00)       f8.3  00000093
 24                      4 thousands                                  f8.0  00000094
 24                      5 tax rates,ratios or allowances             f8.3  00000095
 24                      6 ratios                                     f8.3  00000096
 24                      7 titles                                     6a4   00000097
 24                      8 estimated parameters                       f8.4  00000098
                                                                            00000099
  5       xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx  00000100
  5       xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx  00000110
  1   Q      nq 1  1    1    commodity outputs                              00000160
  1   QC0    nq 1  1    1    commodities purchased by consumers             00000170
  1   QG0    nq 1  1    1    commodities purchased by government            00000180
  1   QM0    nq 1  1    1    commodity imports                              00000190
  1   QS0    nq 1  1    1    stockbuilding by commodity content             00000200
  1   QVC    nq 1  1    1    commodities investment by source               00000210
  1   QVAT   nq 1  1    5    value-added tax rates on commodity outputs     00000220
  1   QX0    nq 1  1    1    commodity exports                              00000230
  1   QY0    nq 1  1    1    commodities absorbed by industries             00000240
  1   PQ     nq 1  1    3    prices of commodities                          00000250
  1   PQH    nq 1  1    3    prices of home sales                           00000260
  1   PQHH   nq 1  1    3    prices of home sales by home producers         00000270
  1   PQH1   nq 1  1    3    PQHH lagged 1 year                             00000280
  1   PQH2   nq 1  1    3    PQHH lagged 2 years                            00000290
  1   PQM    nq 1  1    3    prices of imported commodities                 00000300
  1   PQX    nq 1  1    3    prices of export sales                         00000310
  1   QMT0   nq 1  1    2    tariffs on imported commodities                00000320
  1   QMTZ   nq 1  1    5    tariff rates on imported commodities base year 00000330
  1   QMQ    nq 1  1    6    quotas on commodity imports                    00000340
  1   QXT0   nq 1  1    2    indirect taxes on exported commodities         00000350
  1   QXTZ   nq 1  1    5    indirect tax rates exports base year           00000360
  1   Y      ny 1  1    1    industry outputs                               00000370
  1   YL1    ny 1  1    1    industry outputs lagged 1 year                 00000380
  1   YL2    ny 1  1    1    industry outputs lagged 2 years                00000390
  1   YL3    ny 1  1    1    industry outputs lagged 3 years                00000400
  1   YEXP   ny 1  1    1    expected level of industry output              00000410
  1   YE0    ny 1  1    4    industry employment                            00000420
  1   YEL1   ny 1  1    4    industry employment lagged 1 year              00000430
  1   YH     ny 1  1    2    average hours worked per week in industry      00000440
  1   YHL1   ny 1  1    2    average hours worked lagged 1 year             00000450
  1   YULC   ny 1  1    6    industrial unit labour costs (¢ / unit output) 000004 0
  1   YP     ny 1  1    2    industry profits                               00000470
```

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        DATASET: UWM.IDIOM.V.-RIABLS                                                                  DATE: 85/01/21
                                                                                                      TIME: 11:51
                                                                                                      PAGE: 2
  START
   COL  ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

     1  YV    ny nv 1     1   industrial investment by destination and asset      00000480
     1  PVA   ny nv 1     3   present value of investment incentives              00000490
     1  PYV1  ny nv 1     3   incentive inclusive asset prices lagged 1 year      00000500
     1  PYV2  ny nv 1     3   incentive inclusive asset prices lagged 2 years     00000510
     1  YS    ny 1  1     1  stockbuild. by industry of destination and asset     00000520
     1  PYS   ny 1  1     3   price indices for industry stocks                   00000530
     1  YSA   ny 1  1     2   industry stock appreciation                         00000540
     1  PY    ny 1  1     3   prices of industry outputs                          00000550
     1  PYE   ny 1  1     3   average earnings by industrial employment           00000560
     1  PYVP  ny 1  1     3   prices of equipment by destination                  00000570
     1  YRO   ny 1  1     2   value-added in industries                           00000580
     1  YTO   ny 1  1     2   indirect taxes on industry                          00000590
     1  YTZ   ny 1  1     5   indirect tax rates industries base year             00000600
     1  C     nc 1  1     1   consumers' expenditures                             00000610
     1  PC    nc 1  1     3   prices of consumers' expenditures                   00000620
     1  CEO   nc 1  1     4   employment by consumers                             00000630
     1  CEOB  nc 1  1     8   labour required per £ mn consumers' expenditure     00000640
     1  CRO   nc 1  1     2   value-added in consumers' expenditures              00000650
     1  CTO   nc 1  1     2   indirect taxes on consumers' expenditure            00000660
     1  CTZ   nc 1  1     5   indirect tax rates consumers' exp. base year        00000670
     1  HPD   nc 1  1     5   hire purchase deposits as proportion of cost        00000680
     1  G     ng 1  1     1   government current expenditure                      00000690
     1  PG    ng 1  1     3   prices of gov. cur. exp.                            00000700
     1  GEO   ng 1  1     2   employment by government                            00000710
     1  GEOB  ng 1  1     8   labour required per £ mn government expenditure     00000720
     1  GRO   ng 1  1     2   value-added in government current exp.              00000730
     1  GTO   ng 1  1     2   indirect taxes on gov. cur. exp.                    00000740
     1  GTZ   ng 1  1     5   indirect tax rates government exp. base year        00000750
     1  R     nr 1  1     2   receipts and payments in aggregate                  00000760
     1  RYO   nr 1  1     2   vector of factor and tax payments by industry       00000770
     1  RCO   nr 1  1     2   vector of factor and tax paym.in cons.s' exp.       00000780
     1  RGO   nr 1  1     2   vector of factor and tax payments in gov.exp.       00000790
     1  RVO   nr 1  1     2   vector of factor payments investment goods          00000800
     1  H     nh 1  1     2   vector of institutional financial surpluses         00000810
     1  HRR   nh nr 1     2   matrix of receipts by institutions                  00000820
     1  HRP   nh nr 1     2   matrix of payments by institutions                  00000830
     1  S     ns 1  1     1   stockbuilding by asset                              00000840
     1  V     nv 1  1     1   investment by asset                                 00000850
     1  VKO   nv nk 1     1   government capital expenditure by asset             00000860
     1  PV    nv 1  1     3   price of investment by asset                        00000870
     1  VRO   nv 1  1     2   factor payments for investment by asset             00000880
     1  VTO   nv 1  1     2   indirect taxes on investment by asset               00000890
     1  VTZ   nv 1  1     5   indirect tax rates investment exp. base year        00000900
     1  XA    nx na 1     1   export matrix export group by area                  00000910
     1  PX    nx 1  1     3   prices of export groups                             00000920
     1  PXL1  nx 1  1     3   export price lagged 1 year                          00000930
     1  PXL2  nx 1  1     3   export price lagged 2 years                         00000940
     1  PCLO  nx 1  1     3   competitors export price $                          00000950
     1  PCL1  nx 1  1     3   competitors export prices lagged 1 year             00000960
     1  PCL2  nx 1  1     3   competitors export prices lagged 2 years            00000970
     1  PCL3  nx 1  1     3   competitors export prices lagged 3 years            00000980
     1  DI2   nx 1  1     3   institutional dummy for exports by export           00000990
     1  XTO   nx 1  1     5   tax rates on exports by export                      00001000
     1  XTO1  nx 1  1     5   tax rates on exports lagged 1 year                  00001010
```

```
          DATASET: UWM.IDIOM.VARIABLS                                                   DATE: 85/01/21
                                                                                        TIME: 11.51
                                                                                        PAGE: 3
 START
  COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

     1  XT02  nx  1    1     5     tax rates on exports lagged 2 years                 00001020
     1  M     nm  1    1     1     imports by import group                             00001030
     1  PFM   nm  1    1     3     prices of import groups in foreign currencies       00001040
     1  PM    nm  1    1     3     prices of import groups in domestic curr            00001050
     1  E     ne  1    1     4     employment by type in total                         00001060
     1  UE    ne  1    1     4     unemployment by type of labour                      00001070
     1  LF    ne  1    1     4     labour force by type of labour                      00001080
     1  PE    ne  1    1     2     wage rates by type of labour                        00001090
     1  PEL1  ne  1    1     2     wage rates lagged 1 year                            00001100
     1  EY0   ne  1    1     4     industrial employment by type                       00001110
     1  EC0   ne  1    1     4     personal employment by type                         00001120
     1  EG0   ne  1    1     4     government employment by type                       00001130
     1  D     nd  1    1     5     tax receipts for direct tax brackets                00001140
     1  DN    nd  1    1     6     proportion of labour force by tax bracket           00001150
     1  DBT   nd  1    1     6     income limits by tax brackets                       00001160
     1  DAB   nd  nr   1     6     matrix of household tax allowances by income type00001170
     1  DDB   nd  nr   1     6     matrix of marginal tax rates by income type         00001180
     1  DC    nd  nc   1     1     consump. by tax bracket and functional category     00001190
     1  DPOP  nd  1    1     4     population by tax bracket of household              00001200
     1  DPDI  nd  1    1     2     disposable income by tax bracket                    00001210
     1  DSC   nd  1    1     1     aggregate consumption by tax bracket                00001220
     1  DSPC  nd  1    1     2     value of consumption by tax bracket                 00001230
     1  DPCE  nd  1    1     3     price index of consumption by tax bracket           00001240
     1  DPW   nd  1    1     2     aggregate wealth by tax bracket                     00001250
     1  DPWH  nd  1    1     2     per capita wealth by tax bracket                    00001260
     1  T     nt  1    1     2     indirect tax revenues by type                       00001270
     1  TO    nt  11   1     2     indirect tax revenues for each SAM group            00001280
     1  TQM0  nt  1    1     2     indirect tax revenues imports                       00001290
     1  TQX0  nt  1    1     2     indirect tax revenues exports                       00001300
     1  TY0   nt  1    1     2     indirect tax revenues industries                    00001310
     1  TC0   nt  1    1     2     indirect tax revenues consumers' exp.               00001320
     1  TG0   nt  1    1     2     indirect tax revenues government exp.               00001330
     1  TV0   nt  1    1     2     indirect tax revenues investment                    00001340
     1  PWL0  na  1    1     3     domestic prices by export area $                    00001350
     1  PWL1  na  1    1     3     domestic prices by export area lagged 1 year        00001360
     1  PWL2  na  1    1     3     domestic prices by export area lagged 2 years       00001370
     1  PWL3  na  1    1     3     domestic prices by export area lagged 3 years       00001380
     1  AD1   na  1    1     3     aggregate demand measure I                          00001390
     1  AD2   na  1    1     3     aggregate demand measure II                         00001400
     1  DI1   na  1    1     3     institutional dummy for exports by area             00001410
     1  K     nk  1    1     1     government capital expenditures                     00001420
     1  BQM   nq  nbqm    1  8     import-output ratio functions                       00001430
     1  BPQM  nq  nbpqm   1  8     import price functions                              00001440
     1  BPQ   nq  nbpq    1  8     domestic price functions for commodities            00001450
     1  BYV   ny  nv nbyv    8     investment functions for industries and asset       00001460
     1  BYE   ny  nbye    1  8     employment functions for industries                 00001470
     1  BYS   ny  nbys    1  8     function for stockbuilding by industry              00001480
     1  BDC   nd  nc nbdc    8     consumers' expenditure functions by tax bracket     00001490
     1  BDSC  nd  nbdsc   1  8     aggregate consumption function by tax bracket       00001500
     1  BR    nr  1       1  8     receipts and payments definitions                   00001510
     1  BXA   nx  na     33  8     export functions by export groups and areas         00001520
     1  BPX   nx  nbpx    1  8     export price functions by export commodity          00001530
     1  BPE   ne  nbpe    1  8     wage function for each employment groups            00001540
     1  BT    nt  1       1  8     indirect tax definitions                            00001550
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

   1   BV    nv nbv   1  8   investment functions for non-industrial assets   00001560
   1   BQ    nq q     1  8   functions relating commodity prices to industries00001580
   1   BUE   ne nbue  1  8   unemployment/participation functions             00001590
   1   BHR   nh nr nbhr  8   functions for receipts and payments by sector    00001600
   1   BH    nh 1     1  8   institutional sector definitions                 00001610
   1   BQYC  nq ny nbqy  8   input-output coefficient functions               00001620
   1   TQMB  nt nq    1  5   indirect tax rates on imports                    00001830
   1   TYB   nt ny    1  5   indirect tax rates on industries                 00001850
   1   TCB   nt nc    1  5   indirect tax rates on consumers' exp.            00001870
   1   TGB   nt ng    1  5   indirect tax rates on government curr. exp.      00001890
   1   TVB   nt nv    1  5   indirect rax rates on investment                 00001910
   1   TQXB  nt nq    1  5   indirect tax rates on exports                    00001930
   1   RYB   nr nb    1  8   parameters for industry payments                 00001950
   1   RCB   nr nc    1  8   parameters for consumer payments                 00001970
   1   RGB   nr ng    1  8   parameters for government current payments      00001990
   1   RVB   nr nv    1  6   parameters for payments on investment goods      00002010
   1   QYC   nq ny    1  6   input-output matrix                              00002030
   1   MQC   nm nq    1  6   classific.converter commodities to imports       00002050
   1   YQC   ny nq    1  6   classific.converter commodity to industrial outpu00002070
   1   QCC   nq nc    1  6   classific.converter consumers' exp. to commoditie00002090
   1   QGC   nq ng    1  6   classific.converter gov. cur. exp. to commodities00002110
   1   QSC   nq ns    1  6   classific.converter stockbuilding to commodities 00002130
   1   QVC   nq nv    1  6   classific.converter fixed investment to commoditi00002150
   1   QXC   nq nx    1  6   classific.converter exports to commodities       00002170
   1   VKC   nv nv    1  6   classific.converter gov. capital exp. to assets  00002190
   1   QYPC  nq nyp   1  6   classific.converter industrial plant to commoditi00002210
   1   EYEC  ne ny    1  6   classific.converter industrial employment to type00002230
   1   ECEC  ne nc    1  6   classific.converter consumer employment to type  00002250
   1   EGEC  ne ng    1  6   classific.converter government employment to type00002270
   1   HRC   nh nr    1  6   classific.converter receipts to institutions     00002290
   1   DRC   nd nr    1  6   classific.converter households to tax brackets   00002310
   1   QYSC  nq ns    1  6   classific.converter industry stocks to commoditie00002330
   1   QTI   nq 6     1  7   titles of commodities                            00002350
   1   YTI   ny 6     1  7   titles of industries                             00002360
   1   CTI   nc 6     1  7   titles of consumers' expenditures                00002370
   1   GTI   ng 6     1  7   titles of government current expenditures        00002380
   1   RTI   nr 6     1  7   titles of receipts and payments                  00002390
   1   HTI   nh 6     1  7   titles of institutions                           00002400
   1   STI   ns 6     1  7   titles of stockbuilding assets                   00002410
   1   VTI   nv 6     1  7   titles of fixed investment assets                00002420
   1   FTI   nf 6     1  7   titles of financial investment assets            00002430
   1   XTI   nx 6     1  7   titles of export groups                          00002440
   1   MTI   nm 6     1  7   titles of import groups                          00002450
   1   ETI   ne 6     1  7   titles of employment                             00002460
   1   BTI   nd 6     1  7   titles of tax brackets for income tax            00002470
   1   TTI   nt 6     1  7   titles of indirect taxes                         00002480
   1   ATI   na 6     1  7   titles of areas                                  00002490
   1   OTI   11 6     1  7   titles of overall SAM classification             00002491
                                                                              00002492
                                                                              00002493
   4      xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx 00002494
   4      xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx 00002495
                                                                              00002496
                                                                              00002497
```

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         DATASET: UWM.IDIOM.VARIABLS                                DATE: 85/01/21
                                                                    TIME: 11:51
                                                                    PAGE: 5
 START
  COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

  19                      ** CONTENTS OF 'O' STORE **                       00002500
  19                      The store with symbolic name O contains macrovariables00002510
  19                      arranged as follows:-                             00002520
  25                            Q    Y    C    G    X    R    H    S    V    F  00002530
  25                            1    2    3    4    5    6    7    8    9   10  00002540
  21                          1 DFE  SYVA SCVA SGVA SYM  SCM  SGM  SPYM SPCM SPGM 00002550
  20                         11 SM   GDP  SC   SG   SX   SR   RPDI SS   SV   WVOL 00002560
  20                         21 SPM  GDPC SPC  SPG  SPX  SQM  PDI  SPS  SPV  WPRI 00002570
  20                         31 PSM  HUC  PCE  PSG  PSX  SPQM  37  PSS  PSV  SSA  00002580
  20                         41 PSQM PSYM PSCM PSGM PSXM POP  WPOP SYS  POPL SGS  00002590
  20                         51 AW   AWY  AWC  AWG   55  EMPL UNEM EMPY EMPC EMPG 00002600
  20                         61 RVAT  62  SRT  RET  EX   RINT RMOR SPYS GDPT SPGS 00002610
  20                         71 BT   BP   PSBR PSFD EXL1 PWPH SRAT SYSA RETL SGSA 00002620
  20                         81 SY   SVVA SPVM SVM  EXL2 XFT  EPDI XPFT SYV  PUP  00002630
  20                         91 SPY  WAGY WAGC WAGG WAGE TXPD TXPI PCET RESE PW   00002640
  19                        101 101  102  103  104  105  106  107  108  109  110  00002650
  19                        111 GDPL SCL  SGL  SVL  SSL  SXL  SML  EML1 UNL1 PDIL 00002660
  19                        121 HUCL PCEL PSGL PSVL PSSL PSXL PSML AWL  RDI1 RDI2 00002670
  19                        131 GDPB SCB  SGB  SVB  SSB  SXB  SMB  EMB  139  140  00002680
  19                        141 141  142  143  144  145  STAR FINI YEAR DATE 150  00002690
  19                        151 PBAS QBAS YA70 YA72 155  156  157  158  159  160  00002700
                                                                            00002800
                                                                            00002900
                                                                            00003000
   6           xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx 00003100
```

Appendix II.

Prototype input files

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

    1  SWITCH TRACE ; SWITCH PRINT
    1  SWITCH ABCHECK ; SWITCH NO ECHO ; SWITCH ABORT -1 ; SWITCH DUMP
    1  NAME USER EDFG RUN 1 TITLE 'FOREIGN TRADE SIMULATION'
    1  SETUP DUMP TABLES TITLES ; # O 11
    1  # Q 7 : # Y 7 : # C 7 : # G 1 : # R 5 : # H 4 : # S 1 : # V 1
    1  # F 1 : # X 6 : # M 7 : # E 1 : # D 1 : # T 1 : # A 4 : # K 1
    1  FUNCTION QMO LLIN 1,2 QMQ 7 FIXM ? ; FUNCTION PQM LLIN ?
    1  FUNCTION PY LMAT ? ; FUNCTION YV ACC ?
    1  FUNCTION V INDL ? ; FUNCTION T ADVA ? ; FUNCTION YE0 PFIX ?
    1  FUNCTION YS NULL ?
    1  FUNCTION DC FIX ? ; FUNCTION DSC LNMW ?
    1  FUNCTION R WAGE 1 ITAX 3 PROF 2 IMP 4 GOOD 5
    1  FUNCTION XA LLIN 9,21 LIN ?
    1  FUNCTION PX LUM ? ; FUNCTION PE EXGW ? ; FUNCTION QYC NULL ?
    1  FUNCTION YULC ACTU ? ; FUNCTION Q IDEN ?
    1  FUNCTION UE SIMP ? ; FUNCTION HRP GRAN ?
    1  FUNCTION H HOUS 1 CORP 2 CGOV 3 ROW 4
    1  CONVERT R Y FULL ; CONVERT R C FULL ; CONVERT R G FULL
    1  CONVERT Q Y FULL ; CONVERT Q C FULL ; CONVERT M Q FULL
    1  CONVERT Q G FULL ; CONVERT Q X FULL ; CONVERT Q S FULL
    1  CONVERT Q V FULL ; CONVERT V K FULL ; CONVERT Q YP FULL
    1  CONVERT E YE ADD ; CONVERT E CE ADD ; CONVERT E GE ADD
    1  CONVERT H R FULL ; CONVERT D R FULL ; CONVERT Q YS IDEN
    1  CONVERT T QM FULL ; CONVERT T Y FULL ; CONVERT T C FULL
    1  CONVERT T G FULL ; CONVERT T V FULL ; CONVERT T QX FULL
    1  CONVERT Y Q FULL ; CONVERT R V FULL
    1  COMPRESS PARS QMO,XA
    1  INPUT
    1  REAL SPX,DFE,WPOP,SPC 8650,86637,29445,90397
    1  REAL SPYM,SPCM,SPGM 0,15005,0 ; REAL WPRI 1.07
    1  REAL EMPY,EMPC,EMPG,EMPL,UNEM,EMB 21346.4,0,0,21346.4,8098.6,0
    1  REAL WAGY,WAGC,WAGG,WAGE 65127,0,0,65127
    1  REAL GDP,SC,SG,SV,SS,SX,SM 58819,54786,1109,3571,0,3345,3992
    1  REAL GDPB,SCB,SGB,SVB,SSB,SXB,SMB 58819,54786,1109,3571,0,3345,3395
    1  REAL HUC,PCE,PSG,PSV,PSS,PSX,PSM 1.62,1.65,1.73,2.63,1.62,2.58,3.76
    1  REAL HUCL,PCEL,PSGL,PSVL,PSSL,PSXL 1.62,1.65,1.73,2.63,1.62,2.58
    1  REAL PSYM,PSCM,PSGM 3.76,3.76,3.75 SYM,SCM,SGM  0,3992,0
    1  REAL PSML 3.76 ; REAL AWG 0
    1  REAL EX,EXL1,EXL2 1.988,1.909,1.141 ;REAL AW,AWY,AWC 2496,2496,0
    1  REAL PDI,RPDI 91111,55219
    1  INTEGER YA72,YA70 1,1 ; REAL SPM,SM 15005.,3992. PUP 1.64
    1  SELECT INPUT 2 CARDS
    1  READ Q,QC0,QG0,QM0,QS0,QV0,QX0,QY0,PQ,PQH,PQM,PQX,QMT0,QMTZ,QMQ
    1  READ QXT0,QXTZ,Y,YL1,YL2,YL3,YE0,YEL1,YP
    1  SELECT INPUT 2 GEM ; READ YV
    1  SELECT INPUT 2 CARDS
    1  READ YS,PY,PYVP,PVA,PYV1,PYV2,PYE,YR0,YT0,YTZ,C,PC,CR0,CT0
    1  READ CTZ,G,PG,GR0,GT0,GTZ
    1  READ G,K,PV,VT0,VTZ
    1  SELECT INPUT 2 GEM ; READ XA
    1  SELECT INPUT 2 CARDS
    1  READ PX,M,PFM,E,EY0,EC0,EG0,D,TQM0,TY0,TC0,TG0,TV0,K
    1  SELECT INPUT 2 GEM ;
    1  READ TQMB,TYB,TCB,TGB,TVB,TQXB
```

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DATASET: UWM.IDIOM.TRADE.DIRECT                                          DATE: 85/01/21
                                                                         TIME: 11:49
                                                                         PAGE: 2
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

   1   READ RYB,RCB,RGB,QYC,MQC
   1   READ YQC
   1   READ QCC,QGC,QSC,QVC,QXC
   1   SELECT INPUT 2 CARDS ; READ VKC
   1   SELECT INPUT 2 GEM ; READ QYPC
   1   SELECT INPUT 2 CARDS
   1   READ TITLES Q,Y,C,G,R,H,S,V,F,X,M,E,D,T,A,K 2
   1   READ PARS QMO LLIN 2 FIXM 2 QMQ 2
   1   READ PARS PQM LLIN 2
   1   READ PARS PY LMAT 2
   1   READ PARS YV ACC 2
   1   READ PARS YEO PFIX 2
   1   READ PARS YS NULL 2
   1   READ PARS DC FIX 2
   1   READ PARS DSC LNMW 2
   1   READ PARS XA LIN 2 LLIN 2
   1   READ PARS PE EXGW 2
   1   READ PARS HRP GRAN 2
   1   READ PARS PX LUM 2
   1   READ PM,T,YULC,YEXP,CE0,CE0B,GE0,GE0B,HPD,VR0,RV0,UE
   1   READ LF,PE,PEL1
   1   SELECT INPUT 2 GEM ; READ RVB
   1   SELECT INPUT 2 CARDS ; READ DN,DBT
   1   SELECT INPUT 2 GEM ; READ DAB,DDB,DRC,HRC
   1   SELECT INPUT 2 CARDS ; READ TQX0,PQHH,PYS,YSA
   1   READ AD1,AD2,DI1,DI2
   1   READ PCL0,PCL1,PCL2,PCL3,PWL0,PWL1,PWL2,PWL3
   1   READ XT0,XT01,XT02,PXL1,PXL2
   1   READ DC,DPOP,DPDI,DSC,DSPC,DPCE,DPW,DPWH
   1   REAL TXPD,TXPI,PCET 1.,1.,1.65
   1   REAL RET,RETL 1.,1. POP 82.7 RINT,RMOR .08,1.
   1   DUMP
   1   INTEGER PBAS 1973 QBAS 1973
   1   SWITCH PRINT ; SWITCH PAGE
   1   INTEGER START 1978
   1   SOLVE
   1   CRITERION Y 3.
   1   FOR YEAR = 1 TO 5
   1   UPDATE ALL
   1   DUMP
   1   SELECT INPUT 2 CARDS
   1   READ AD1,AD2,DI1,DI2,G,K,DPOP,LF,PWL0,PCL0,QG0
   1   FOR ITER = 1 TO 40
   1   COMPUTE ALL
   1   LOOP ITER
   1   SELECT OUTPUT 15 DUMP
   1   PUT ALL
   1   COMMENT ITERATIONS DONE AND RESULTS DUMPED
   1   LOOP YEAR
   1   SWITCH NO DUMP
   1   ANALYSE
   1   SELECT INPUT 15 DUMP
   1   SELECT OUTPUT 3 PRINTER
   1   GET ALL 1978
```

DATASET: UWM.IDIOM.INVEST.DIRECT

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```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

   1   ANALYSE
   1   SELECT INPUT 15 DUMP
   1   SELECT OUTPUT 3 PRINTER
   1   GET ALL 1978
   1   TABULATE ALL
   1   GET ALL 1979
   1   TABULATE ALL
   1   GET ALL 1980
   1   TABULATE ALL
   1   GET ALL 1981
   1   TABULATE ALL
   1   GET ALL 1982
   1   TABULATE ALL
   1   VALUE EX
   1   VALUE Y,C,M
   1   VALUE QXO,QYO,QVO
   1   VALUE PQH,PX,PM
   1   VALUE RYO,R,EYO
   1   VALUE TYO,TCO,TQMO
   1   VALUE GDP,SC,SV,SM,SX,SG,RPDI
   1   VALUE EMPL,UNEM
   1   VALUE HUC,PCE
   1   PLOT GDP,SC,RPDI
   1   PLOT SM,SX
   1   PLOT HUC,PCE
   1   GROWTH GDP,SC,SV
   1   PLOT SC,SM,SV
   1   PLOT SG,SX,GDP
   1   PLOT EMPL,UNEM,HUC
   1   PLOT PCE,RPDI
   1   PLOT SC AGAINST GDP
   1   PLOT SC,SPC
   1   PLOT SPC AGAINST PDI
   1   FINISH
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

    1  SWITCH TRACE ; SWITCH PRINT
    1  SWITCH ABCHECK ; SWITCH NO ECHO ; SWITCH ABORT -1 ; SWITCH DUMP
    1  NAME USER EOFG RUN 1 TITLE 'INVESTMENT SIMULATION'
    1  SETUP DUMP TABLES TITLES ; # O 11
    1  # Q 7 ; # Y 7 ; # C 7 ; # G 1 ; # R 5 ; # H 4 ; # S 1 ; # V 2
    1  # F 1 ; # X 6 ; # M 7 ; # E 1 ; # D 1 ; # T 1 ; # A 1 ; # K 1
    1  FUNCTION QMO LLIN 1,2 FIXM ? ; FUNCTION PQM PFM ?
    1  FUNCTION PY LMAT ? ; FUNCTION YV NCL 1,2,3,4,5,6 FIX ?
    1  FUNCTION V INOL ? ; FUNCTION T ADVA ? ; FUNCTION YEO LLIN ?
    1  FUNCTION YS ACC ?
    1  FUNCTION DC FIX ? ; FUNCTION DSC LNMW ?
    1  FUNCTION R WAGE 1 ITAX 3 PROF 2 IMP 4 GOOD 5 ; FUNCTION XA LIN ?
    1  FUNCTION PX PC ? ; FUNCTION PE EXGW ? ; FUNCTION QYC NULL ?
    1  FUNCTION YULC ACTU ? ; FUNCTION Q IDEN ?
    1  FUNCTION UE SIMP ? ; FUNCTION HRP FIX 1 GRAN ?
    1  FUNCTION H HOUS 1 CORP 2 CGOV 3 ROW 4
    1  CONVERT R Y FULL ; CONVERT R C FULL ; CONVERT R G FULL
    1  CONVERT Q Y FULL ; CONVERT Q C FULL ; CONVERT M Q FULL
    1  CONVERT Q G FULL ; CONVERT Q X FULL ; CONVERT Q S FULL
    1  CONVERT Q V FULL ; CONVERT V K FULL ; CONVERT Q YP FULL
    1  CONVERT E YE ADD ; CONVERT E CE ADD ; CONVERT E GE ADD
    1  CONVERT H R FULL ; CONVERT D R FULL ; CONVERT Q YS IDEN
    1  CONVERT T QM FULL ; CONVERT T Y FULL ; CONVERT T C FULL
    1  CONVERT T G FULL ; CONVERT T V FULL ; CONVERT T QX FULL
    1  CONVERT Y Q FULL ; CONVERT R V FULL
    1  COMPRESS PARS QMO
    1  INPUT
    1  REAL SPX,DFE,WPOP,SPC 8650,86637,29445,90397
    1  REAL SPYM,SPCM,SPGM 0,15005,0 ; REAL WPRI 1.07
    1  REAL EMPY,EMPC,EMPG,EMPL,UNEM,EMB 21346.4,0,0,21346.4,8098.6,0
    1  REAL WAGY,WAGC,WAGG,WAGE 65127,0,0,65127
    1  REAL GDP,SC,SG,SV,SS,SX,SM 58819,54786,1109,3571,0,3345,3992
    1  REAL GDPB,SCB,SGB,SVB,SSB,SXB,SMB 58819,54786,1109,3571,0,3345,3395
    1  REAL HUC,PCE,PSG,PSV,PSS,PSX,PSM 1.62,1.65,1.73,2.63,1.62,2.58,3.76
    1  REAL PSYM,PSCM,PSGM 3.76,3.76,3.76 SYM,SCM,SGM  0,3992,0
    1  REAL PSML 3.76 ; REAL AWG 0
    1  REAL EX,EXL1,EXL2 1.988,1.909,1.141 ;REAL AW,AWY,AWC 2496,2496,0
    1  REAL PDI,RPDI 91111,55219
    1  INTEGER YA72,YA70 1,1 ; REAL SPM,SM 15005.,3992. PUP 1.64
    1  SELECT INPUT 2 CARDS
    1  READ Q,QC0,QG0,QM0,QS0,QV0,QX0,QY0,PQ,PQH,PQM,PQX,QMT0,QMTZ,QMQ
    1  READ QXT0,QXTZ,Y,YL1,YL2,YL3,YE0,YEL1,YP
    1  SELECT INPUT 2 GEM ; READ YV
    1  SELECT INPUT 2 CARDS
    1  READ YS,PY,PYVP,PVA,PYV1,PYV2,PYE,YR0,YT0,YTZ,C,PC,CR0,CT0
    1  READ CTZ,G,PG,GR0,GT0,GTZ
    1  READ S,V,VK0,PV,VT0,VTZ
    1  SELECT INPUT 2 GEM ; READ XA
    1  SELECT INPUT 2 CARDS
    1  READ PX,M,PFM,E,EY0,EC0,EG0,D,TQM0,TY0,TC0,TG0,TV0,K
    1  SELECT INPUT 2 GEM ;
    1  READ TQMB,TYB,TCB,TGB,TVB,TQXB
    1  READ RYB,RCB,RGB,QYC,MQC
    1  READ YQC
```

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```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

   1   READ QCC,QGC,OSC,QVC,QXC
   1   SELECT INPUT 2 CARDS ; READ VKC
   1   SELECT INPUT 2 GEM ; READ QYPC
   1   SELECT INPUT 2 CARDS
   1   READ TITLES Q,Y,C,G,R,H,S,V,F,X,M,E,D,T,A,K 2
   1   READ PARS QMO LLIN 2 FIXM 2
   1   READ PARS PQM PFM 2
   1   READ PARS PY LMAT 2
   1   READ PARS YV NCL 2 FIX 2
   1   READ PARS YEO LLIN 2
   1   READ PARS YS ACC 2
   1   READ PARS DC FIX 2
   1   READ PARS DSC LNMW 2
   1   READ PARS XA LIN 2
   1   READ PARS PE EXGW 2
   1   READ PARS HRP GRAN 2 FIX 2
   1   READ PM,T,YULC,YEXP,CEO,CEOB,GEO,GEOB,HPD,VRO,RVO,UE
   1   READ LF,PE,PEL1
   1   SELECT INPUT 2 GEM ; READ RVB
   1   SELECT INPUT 2 CARDS ; READ DN,DBT
   1   SELECT INPUT 2 GEM ; READ DAB,DDB,DRC,HRC
   1   SELECT INPUT 2 CARDS ; READ QXO,PQHH,PYS,YSA
   1   READ PCLO,PCL1,PCL2,PCL3,PWLO,PWL1,PWL2,PWL3
   1   READ XTO
   1   READ DC,DPOP,DPDI,DSC,DSPC,DPCE,DPW,DPWH
   1   REAL TXPD,TXPI,PCET 1.,1.,1.65
   1   REAL RET,RETL 1.,1. POP 82.7 RINT,RMOR .08,1.
   1   DUMP
   1   INTEGER PBAS 1973 QBAS 1973
   1   SWITCH PRINT ; SWITCH PAGE
   1   INTEGER START 1978
   1   SOLVE
   1   CRITERION Y 3.
   1   FOR YEAR = 1 TO 5
   1   IF YEAR = 5 MODIFY BYV 7 = 151.
   1   IF YEAR = 2 MODIFY PFM 1 = 3.00
   1   UPDATE ALL
   1   DUMP
   1   SELECT INPUT 2 CARDS
   1   READ G,K,DPOP,LF,PWLO,PCLO,QGO
   1   READ PARS PE EXGW 2
   1   IF YEAR = 1 REAL EX 1.944
   1   IF YEAR = 2 REAL EX 1.999
   1   IF YEAR = 3 REAL EX 2.111
   1   IF YEAR = 4 REAL EX 2.333
   1   IF YEAR = 5 REAL EX 2.555
   1   FOR ITER = 1 TO 40
   1   COMPUTE ALL
   1   LOOP ITER
   1   SELECT OUTPUT 15 DUMP
   1   PUT ALL
   1   COMMENT ITERATIONS DONE AND RESULTS DUMPED
   1   LOOP YEAR
   1   SWITCH NO DUMP
```

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```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

   1   TABULATE ALL
   1   GET ALL 1979
   1   TABULATE ALL
   1   GET ALL 1980
   1   TABULATE ALL
   1   GET ALL 1981
   1   TABULATE ALL
   1   GET ALL 1982
   1   TABULATE ALL
   1   VALUE EX
   1   VALUE Y,C,M
   1   VALUE QXO,QYO,QVO
   1   VALUE PQH,PX,PM
   1   VALUE RYO,R,EYO
   1   VALUE TYO,TCO,TQMO
   1   VALUE GDP,SC,SV,SM,SX,SG,RPDI
   1   VALUE EMPL,UNEM
   1   VALUE HUC,PCE
   1   PLOT GDP,SC,RPDI
   1   PLOT SM,SX
   1   PLOT HUC,PCE
   1   GROWTH GDP,SC,SV
   1   PLOT SC,SM,SV
   1   PLOT SG,SX,GDP
   1   PLOT EMPL,UNEM,HUC
   1   PLOT PCE,RPDI
   1   PLOT SC AGAINST GDP
   1   PLOT SC,SPC
   1   PLOT SPC AGAINST PDI
   1   FINISH
```

```
DATASET: UWM.IDIOM.CONSUMP.DIRECT                                    DATE: 85/01/21
                                                                     TIME: 11:50
                                                                     PAGE: 1
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

  1    SWITCH TRACE ; SWITCH PRINT
  1    SWITCH ABCHECK : SWITCH NO ECHO ; SWITCH ABORT -1 ; SWITCH DUMP
  1    NAME USER EDFG RUN 1 TITLE 'CONSUMPTION ANALYSIS'
  1    SETUP DUMP TABLES TITLES ; # O 11
  1    # Q 7 : # Y 7 : # C 7 : # G 1 : # R 5 : # H 4 ; # S 1 : # V 1
  1    # F 1 ; # X 6 ; # M 7 ; # E 1 ; # D 2 : # T 1 ; # A 1 ; # K 1
  1    FUNCTION QMO LLIN 1,2 FIXM ? ; FUNCTIC. PQM PFM ?
  1    FUNCTION PY LMAT ? ; FUNCTION YV ACC ? ; FUNCTION YEO LLIN ?
  1    FUNCTION V INDL ? ; FUNCTION T ADVA ?
  1    FUNCTION YS NULL ?
  1    FUNCTION DC FIX 5,6,11,12 LLIN ?
  1    FUNCTION DSC LLNW ?
  1    FUNCTION R WAGE 1 ITAX 3 PROF 2 IMP 4 GOOD 5 ; FUNCTION XA LIN ?
  1    FUNCTION PX PC ? ; FUNCTION PE EXGW ? ; FUNCTION QYC NULL ?
  1    FUNCTION YULC ACTU ? ; FUNCTION Q IDEN ?
  1    FUNCTION UE SIMP ? ; FUNCTION HRP GRAN ?
  1    FUNCTION H HOUS 1 CORP 2 CGOV 3 ROW 4
  1    CONVERT R Y FULL ; CONVERT R C FULL ; CONVERT R G FULL
  1    CONVERT Q Y FULL ; CONVERT Q C FULL ; CONVERT M Q FULL
  1    CONVERT Q G FULL ; CONVERT Q X FULL ; CONVERT Q S FULL
  1    CONVERT Q V FULL ; CONVERT V K FULL ; CONVERT Q YP FULL
  1    CONVERT E YE ADD ; CONVERT E CE ADD ; CONVERT E GE ADD
  1    CONVERT H R FULL ; CONVERT D R FULL ; CONVERT Q YS IDEN
  1    CONVERT T QM FULL ; CONVERT T Y FULL ; CONVERT T C FULL
  1    CONVERT T G FULL ; CONVERT T V FULL ; CONVERT T QX FULL
  1    CONVERT Y Q FULL ; CONVERT R V FULL
  1    COMPRESS PARS YV,HRP
  1    INPUT
  1    REAL GDP,SC,SG,SV,SS,SX,SM 58819,54786,1109,3571,0,3345,3992
  1    REAL GDPB,SCB,SGB,SVB,SSB,SXB,SMB 53000,48000,1000,3000,0,2900,3000
  1    REAL WPRI,EMPL,UNEM 1.07,21346.4,8098.6
  1    REAL HUC,PSG,PSV,PSS,PSX,PSM 1.62,1.73,2.63,1.62,2.58,3.76
  1    REAL PSYM,PSCM,PSGM 3.76,3.76,3.76 SYM,SCM,SGM  0,0,0
  1    REAL PDI,RPDI 91111,55219
  1    REAL EX,EXL1,EXL2 1.988,1.909,1.141
  1    REAL PCE,PUP, 1.65,1.64
  1    INTEGER YA72,YA70 1,1
  1    SELECT INPUT 2 CARDS
  1    READ Q,QC0,QG0,QM0,QS0,QV0,QX0,QY0,PQ,PQH,PQM,PQX,QMT0,QMTZ,QMQ
  1    READ QXT0,QXTZ,Y,YL1,YL2,YL3,YE0,YEL1,YP
  1    SELECT INPUT 2 GEM ; READ YV
  1    SELECT INPUT 2 CARDS
  1    READ PY,PYE,YR0,YT0,YTZ,C,PC,CR0,CT0
  1    READ CTZ,G,PG,GR0,GT0,GTZ
  1    READ RC0,RG0,V,VK0,VT0,VTZ
  1    SELECT INPUT 2 GEM : READ XA
  1    SELECT INPUT 2 CARDS
  1    READ PX,M,PFM,E,EY0,EC0,EG0,D,TQM0,TY0,TC0,TG0,TV0,K
  1    SELECT INPUT 2 GEM ;
  1    READ TQMB,TYB,TCB,TGB,TVB,TQXB
  1    READ RYB,RCB,RGB,QYC,MQC
  1    READ YQC
  1    READ QCC,QGC,QSC,QVC,QXC
  1    SELECT INPUT 2 CARDS : READ VKC
```

DATASET: UWM.IDIOM.CONSUMP.DIRECT

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```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

   1   SELECT INPUT 2 GEM ; READ QYPC
   1   SELECT INPUT 2 CARDS
   1   READ TITLES Q,Y,C,G,R,H,S,V,F,X,M,E,D,T,A,K 2
   1   READ PARS QM0 LLIN 2 FIXM 2
   1   READ PARS PY LMAT 2
   1   READ PARS YV ACC 2
   1   READ PARS YE0 LLIN 2
   1   READ PARS DC FIX 2 LLIN 2
   1   READ PARS DSC LLNW 2
   1   READ PARS XA LIN 2
   1   READ PARS PE EXGW 2
   1   READ PARS HRP GRAN 2
   1   READ PM,T,YULC,YEXP,CE0,CE0B,GE0,GE0B,HPD,VR0,RV0,UE
   1   READ LF
   1   SELECT INPUT 2 GEM ; READ RVB
   1   SELECT INPUT 2 CARDS ; READ DN,DBT
   1   SELECT INPUT 2 GEM ; READ DAB,DDB,DRC,HRC
   1   SELECT INPUT 2 CARDS ; READ TQX0,PQHH,PYS,YSA
   1   READ PCL0,PCL1,PWL0,PWL1
   1   READ XT0,PXL1
   1   READ DC,DPOP,DPDI,DSC,DSPC,DPCE,DPW,DPWH
   1   REAL POP 82.7
   1   DUMP
   1   INTEGER PBAS 1973 QBAS 1973
   1   SWITCH PRINT ; SWITCH PAGE
   1   INTEGER START 1978
   1   SOLVE
   1   CRITERION Y 3.
   1   FOR YEAR = 1 TO 5
   1   UPDATE ALL
   1   MODIFY BQM 7 = 500.
   1   MODIFY YV 1 * 1.01
   1   DUMP
   1   SELECT INPUT 2 CARDS
   1   READ G,K,DPOP,LF,PWL0,PCL0,QG0
   1   READ PARS PE EXGW 2
   1   IF YEAR = 1 REAL EX 1.944
   1   IF YEAR = 2 REAL EX 1.944
   1   IF YEAR = 3 REAL EX 1.944
   1   IF YEAR = 4 REAL EX 1.944
   1   IF YEAR = 5 REAL EX 1.944
   1   FOR ITER = 1 TO 40
   1   COMPUTE ALL
   1   LOOP ITER
   1   SELECT OUTPUT 15 DUMP
   1   PUT ALL
   1   COMMENT ITERATIONS DONE AND RESULTS DUMPED
   1   LOOP YEAR
   1   SWITCH NO DUMP
   1   ANALYSE
   1   SELECT INPUT 15 DUMP
   1   SELECT OUTPUT 3 PRINTER
   1   GET ALL 1978
   1   TABULATE ALL
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

   1   GET ALL 1979
   1   TABULATE ALL
   1   GET ALL 1980
   1   TABULATE ALL
   1   GET ALL 1981
   1   TABULATE ALL
   1   GET ALL 1982
   1   TABULATE ALL
   1   VALUE Y,C,M
   1   VALUE QX0,QY0,QV0
   1   VALUE PQH,PX,PM
   1   VALUE RY0,R,EY0
   1   VALUE TY0,TC0,TQM0
   1   VALUE GDP,SC,SV,SM,SX,SG,RPDI
   1   VALUE EMPL,UNEM
   1   VALUE HUC,PCE
   1   VALUE C
   1   PLOT GDP,SC,RPDI
   1   PLOT SM,SX
   1   PLOT HUC,PCE
   1   GROWTH GDP,SC,SV
   1   PLOT SC,SM,SV
   1   PLOT SG,SX,GDP
   1   PLOT EMPL,UNEM,HUC
   1   PLOT PCE,RPDI
   1   PLOT SC AGAINST GDP
   1   PLOT SC,SPC
   1   PLOT SPC AGAINST PDI
   1   FINISH
```

```
        DATASET: UWM.IDIOM.INVEST.RUNDATA                                DATE: 85/01/21
                                                                         TIME: 11:50
                                                                         PAGE: 1
   START
    COL ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

      1 43596.
      1 14191.
      2  4659.
      3   679.
      2  3510.
      2  4552.
      1 11753.
      1 ●
      1 35063.
      2  8765.
      5     0.
      2  1644.
      2  1644.
      5     0.
      2  7670.
      1 ●
      5     0.
      5     0.
      5     0.
      5     0.
      5     0.
      5     0.
      2  1109.
      1 ●
      3   970.
      2  2907.
      5     0.
      3   494.
      3   146.
      3   146.
      3   146.
      1 ●
      5     0.
      5     0.
      5     0.
      5     0.
      5     0.
      5     0.
      5     0.
      1 ●
      5     0.
      3   857.
      2  2714.
      5     0.
      5     0.
      5     0.
      5     0.
      1 ●
      2  1192.
      2  2107.
      5     9.
      4    10.
      5     9.
      5     9.
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
   5       9
   1   ●
   2    8311.
   2    5369.
   2    1936.
   3     342.
   2    2003.
   2    4689.
   2    3111.
   1   ●
   5        1.57
   5        1.60
   5        1.60
   5        1.60
   5        1.73
   5        1.73
   5        1.73
   1   ●
   5        1.57
   5        1.60
   5        1.60
   5        1.60
   5        1.73
   5        1.73
   5        1.73
   1   ●
   5        3.57
   5        3.60
   5        3.76
   5        4.41
   5        3.73
   5        3.73
   5        3.73
   1   ●
   5        3.121
   5        2.284
   5        2.555
   5        2.400
   5        2.555
   5        2.666
   5        2.555
   1   ●
   3      500.
   2     1908.
   5        0.
   3      441.
   4       35.
   5        0.
   5        6.
   1   ●
   1   0.14
   1   0.25
   1   0.
   1   0.20
```

```
     DATASET: UWM.IDIOM.INVEST.RUNDATA                                   DATE: 85/01/21
                                                                          TIME: 11:50
START                                                                     PAGE: 3
 COL ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
   1 0.06
   1 0.
   1 0.01
   1 ●
   3   0.018
   3   0.210
   5     0.
   5     0.
   5     0.
   5     0.
   5     0.
   1 ●
   5     0.
   5     0.
   5     0.
   5     0.
   5     0.
   5     0.
   5     0.
   1 ●
   5     0.
   5     0.
   5     0.
   5     0.
   5     0.
   5     0.
   5     0.
   1 ●
   1 43596.
   1 14191.
   2  4659.
   3   679.
   2  3510.
   2  4552.
   1 11753.
   1 ●
   1 43160.
   1 13609.
   2  4533.
   3   597.
   2  3331.
   2  4415.
   1 10154.
   1 ●
   1 42728.
   1 13051.
   2  4411.
   3   465.
   2  3161.
   2  4283.
   2  8773.
   1 ●
   1 42300.
   1 12516.
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

  2     4292.
  3      362.
  2     3000.
  2     4154.
  2     7580.
  1    ●
  1    15880.
  2     2120.6
  3      240.0
  3      118.6
  3      337.9
  3      297.4
  2     2351.9
  1    ●
  1    15400.
  2     2060.
  3      233.
  3      115.
  3      328.
  3      288.
  2     2280.
  1    ●
  1    13512.4
  2     1692.9
  2     3121.4
  3      267.9
  2     3999.5
  2     5803.3
  2     9737.6
  1    ●
  2     7  2
  3      139.    0.
  3      859.    0.
  2     1621.    0.
  5        0.    0.
  5        9.    0.
  3      599.    0.
  4       94.    0.
  1    ●
  5        0.
  5        0.
  5        0.
  5        0.
  5        0.
  5        0.
  5        0.
  1    ●
  5        1.57
  5        1.60
  5        1.60
  5        1.60
  5        1.73
  5        1.73
  5        1.73
```

```
        DATASET: UWM.IDIOM.INVEST.RUNDATA                                  DATE: 85/01/21
                                                                           TIME: 11:50
                                                                           PAGE: 5
 START
  COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

    1   ●
    5       1.
    5       1.
    5       1.
    5       1.
    5       1.
    5       1.
    5       1.
    1   ●
    5       0.2   1.
    5       0.2   1.
    5       0.2   1.
    5       0.2   1.
    5       0.2   1.
    5       0.2   1.
    5       0.2   1.
    1   ●
    5       1.    1.
    5       1.    1.
    5       1.    1.
    5       1.    1.
    5       1.    1.
    5       1.    1.
    5       1.    1.
    1   ●
    5       1.   1.
    5       1.   1.
    5       1.   1.
    5       1.   1.
    5       1.   1.
    5       1.   1.
    5       1.   1.
    1   ●
    5       1.62
    5       1.62
    5       1.62
    5       1.62
    5       1.62
    5       1.62
    5       1.62
    1   ●
    1   50211.
    2    9265.
    2    3603.
    2    1017.
    2    5012.
    2    7028.
    1   17256.
    1   ●
    2    -698.
    3     -90.
    3     -90.
    5       0.
    2    -246.
```

```
        DATASET: UWM.IDIOM.INVEST.RUNDATA                                      DATE: 85/01/21
                                                                                TIME: 11:50
                                                                                PAGE: 6
 START
  COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

    5       0.
    3     196.
    1   ●
    1   -0.01
    1   -0.004
    1   -0.012
    1   0.
    1   -0.04
    1   0.
    1   0.01
    1   ●
    1   35063.
    2    8765.
    5       0.
    2    1644.
    2    1644.
    5       0.
    2    7670.
    1   ●
    5       1.65
    5       1.65
    5       1.65
    5       1.65
    5       1.65
    5       1.65
    5       1.65
    1   ●
    5       0.
    2    3260.
    5       0.
    5       0.
    5       0.
    5       0.
    1   -1365.
    1   ●
    5       0.
    2    3260.
    5       0.
    5       0.
    5       0.
    5       0.
    1   -1365.
    1   ●
    1   0.
    1   0.23
    1   0.
    1   0.
    1   0.
    1   -0.11
    1   ●
    2    1109.
    1   ●
    5       1.65
```

```
      DATASET: UWM.IDIOM.INVEST.RUNDATA                                    DATE: 85/01/21
                                                                           TIME: 11:50
                                                                           PAGE: 7
START
 COL  ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
   1  ●
   5      0.
   1  ●
   5      0.
   1  ●
   5      0.
   1  ●
   2   0.
   1  ●
   2   3071.  250.
   1  ●
   1  0.
   1  250.
   1  ●
   2   2.63    2.63
   1  ●
   2   0.      0.
   1  ●
   2   0.      0.
   1  ●
   2   6  1
   3    914.
   2   1838.
   3    132.
   3    158.
   4     78.
   3    225.
   1  ●
   5      2.586
   5      2.586
   5      2.586
   5      2.586
   5      2.586
   5      2.586
   1  ●
   3    970.
   2   2907.
   5      0.
   3    494.
   3    146.
   3    146.
   3    146.
   1  ●
   5      1.35
   5      0.987
   5      1.095
   5      1.095
   5      1.095
   5      1.095
   5      1.095
   1  ●
   1  21346.4
   1  ●
   1  21346.4
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
   1   ●
   2    0.
   1   ●
   2    0.
   1   ●
   4      0.011
   1   ●
   2    2890.
   1   ●
   2    -928.
   1   ●
   2    1895.
   1   ●
   5       0.
   1   ●
   5       0.
   1   ●
   3     250.
   1   ●
   2     1  7
   1   0.14 0.25 0.0 0.20 0.06 0.0 0.01
   1   ●
   2     1  7
   1   -0.01 -0.004 -0.012 0.0 -0.04 0.0 0.01
   1   ●
   2     1  7
   1   0.0 0.23 0.0 0.0 0.0 0.0 -0.11
   1   ●
   2     1  1
   2    0.0
   1   ●
   2     1  2
   2    0.0     0.0
   1   ●
   2     1  7
   2    0. 0. 0. 0. 0. 0. 0.
   1   ●
   2     5  7
   1   0.967 1.093 1.057 1.057 1.057 1.057 1.057
   1   7*0
   1   7*0
   1   7*0
   1   7*0
   1   ●
   2     5  7
   2    7*0.
   2    7*0.
   2    0. 0.23 4*0. -0.11
   2    7*0.
   2    7*0.
   1   ●
   2     5  1
   2    0.
   2    0.
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

  2     0.
  2     0.
  2     0.
  1    ●
  2     7  7
  1    0.111   0.091   0.091   0.000   0.005   0.000   0.000
  1    0.010   0.199   0.365   0.040   0.087   0.008   0.006
  1    0.      0.      0.      0.      0.      0.      0.017
  1    0.      0.013   0.      0.018   0.004   0.005   0.007
  1    0.043   0.023   0.      0.      0.      0.      0.019
  1    0.094   0.087   0.      0.      0.      0.      0.
  1    0.006   0.035   0.061   0.007   0.077   0.092   0.168
  1    ●
  2     7  7
  2     1.  0.  0.  0.  0.  0.  0.
  2     0.  1.  0.  0.  0.  0.  0.
  2     0.  0.  1.  0.  0.  0.  0.
  2     0.  0.  0.  1.  0.  0.  0.
  2     0.  0.  0.  0.  1.  0.  0.
  2     0.  0.  0.  0.  0.  1.  0.
  2     0.  0.  0.  0.  0.  0.  1.
  1    ●
  2     7  7
  2     1.  0.  0.  0.  0.  0.  0.
  2     0.  1.  0.  0.  0.  0.  0.
  2     0.  0.  1.  0.  0.  0.  0.
  2     0.  0.  0.  1.  0.  0.  0.
  2     0.  0.  0.  0.  1.  0.  0.
  2     0.  0.  0.  0.  0.  1.  0.
  2     0.  0.  0.  0.  0.  0.  1.
  1    ●
  2     7  7
  2     1.  0.  0.  0.  0.  0.  0.
  2     0.  1.  0.  0.  0.  0.  0.
  2     0.  0.  1.  0.  0.  0.  0.
  2     0.  0.  0.  1.  0.  0.  0.
  2     0.  0.  0.  0.  1.  0.  0.
  2     0.  0.  0.  0.  0.  1.  0.
  2     0.  0.  0.  0.  0.  0.  1.
  1    ●
  2     7  1
  2     0.
  2     0.
  2     0.
  2     0.
  2     0.
  2     0.
  2     1.
  1    ●
  2     7  1
  2     0.149
  2     0.149
  2     0.149
  2     0.149
```

```
START
 COL  ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
   2   0.149
   2   0.149
   2   0.149
   1  ●
   2   7  2
   2   0.      0.
   2   0.24    0.
   2   0.76    1.
   2   0.      0.
   2   0.      0.
   2   0.      0.
   2   0.      0.
   1  ●
   2   7  6
   2   0.95  0.  1.  0.5  0.  0.5
   2   0.    1.  0.  0.5  1.  0.5
   2   0.01  0.  0.  0.   0.  0.
   2   0.01  0.  0.  0.   0.  0.
   2   0.01  0.  0.  0.   0.  0.
   2   0.01  0.  0.  0.   0.  0.
   2   0.01  0.  0.  0.   0.  0.
   1  ●
   2   0.
   2   1.
   1  ●
   2   7  7
   2   1.  0.  0.  0.  0.  0.  0.
   2   0.  1.  0.  0.  0.  0.  0.
   2   0.  0.  1.  0.  0.  0.  0.
   2   0.  0.  0.  1.  0.  0.  0.
   2   0.  0.  0.  0.  1.  0.  0.
   2   0.  0.  0.  0.  0.  1.  0.
   2   0.  0.  0.  0.  0.  0.  1.
   1  ●
   1  1.   AGRICULTURE
   1  2.   INDUSTRY
   1  3.   CONSTRUCTION
   1  4.   ELECTRICITY, GAS
   1  5.   TRANSPORT
   1  6.   TRADE
   1  7.   GOVERNMENT, SERVICES
   1  ●
   1  1.   AGRICULTURE
   1  2.   INDUSTRY
   1  3.   CONSTRUCTION
   1  4.   ELECTRICITY, GAS
   1  5.   TRANSPORT
   1  6.   TRADE
   1  7.   GOVERNMENT, SERVICES
   1  ●
   1  1.   AGRICULTURE
   1  2.   INDUSTRY
   1  3.   CONSTRUCTION
   1  4.   ELECTRICITY, GAS
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
   1   5.  TRANSPORT
   1   6.  TRADE
   1   7   GOVERNMENT, SERVICES
   1   ●
   1   1.  GOV. CURRENT EXP.
   1   ●
   1   1.  WAGES
   1   2.  PROFITS
   1   3.  TAXES
   1   4.  IMPORTS
   1   5.  GOODS, SERVICES
   1   ●
   1   1.  HOUSHOLDS
   1   2.  COMPANIES
   1   3.  GOVERNMENT
   1   4.  R.C.W
   1   ●
   1   1. TOTAL STOCKS
   1   ●
   1   1.  FIXED CAPITAL INVEST
   1   2.  DWELLING INVESTM
   1   ●
   1   1. TOTAL F
   1   ●
   1   1. RAW JUTE
   1   2. JUTE GOODS
   1   3. TEA
   1   4. LEATHER, HIDES, SKINS
   1   5. FISH AND SHRIMPS
   1   6. REST
   1   ●
   1   1. AGRICULTURE
   1   2. IDUSTRY
   1   3. CONSTRUCTION
   1   4. ELECTRICITY, GAS
   1   5. TRANSPORT
   1   6. TRADE
   1   7. GOVERNMENT, SERVICES
   1   ●
   1   1. TOTAL EMPLOYMENT
   1   ●
   1   1.  ALL CONSUMERS
   1   ●
   1   1.  TOT.IND.TAXES
   1   ●
   1   1.  WORLD TOTAL
   1   ●
   1   1.  SOC.CAPITAL FORMATION
   1   ●
   1   -3.778 0. -0.2 5*0.
   1   -1.425 0. -0.2 5*0.
   1   8*0.
   1   8*0.
   1   8*0.
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
    1  8*0.
    1  8*0.
    1  ●
    1  0.
    1  0.
    1  0.
    1  494.
    1  146.
    1  146.
    1  146.
    1  ●
    1  0.
    1  0.
    1  0.
    1  0.
    1  0.
    1  0.
    1  0.
    1  ●
    1  0.60   0.008  1.   1.   3*0
    1  0.98   0.004  1.   1.   3*0.
    1  1.50   0.002  1.   1.   3*0.
    1  1.29   0.002  1.   1.   3*0.
    1  1.39   0.002  1.   1.   3*0.
    1  1.24   0.006  1.   1.   3*0.
    1  1.12   0.003  1.   1.   3*0.
    1  ●
    1  4.     0.     1.     3*0.    0.258  1.   3*0.    0.9    0.97  6*0.
    1  6.     0.     1.     3*0.    0.201  1.   3*0.    0.9    0.97  6*0.
    1  7.     0.     1.     3*0.    0.251  1.   3*0.    0.9    0.97  6*0.
    1  0.     0.     1.     3*0.    0.201  1.   3*0.    0.9    0.97  6*0.
    1  2.     0.     1.     3*0.    0.227  1.   3*0.    0.9    0.97  6*0.
    1  6.     0.     1.     3*0.    0.245  1.   3*0.    0.9    0.97  6*0.
    1  19*0.
    1  19*0.
    1  19*0.
    1  19*0.
    1  19*0.
    1  19*0.
    1  19*0.
    1  19*0.
    1  ●
    1  101.
    1  102.
    1  103.
    1  104.
    1  105.
    1  106.
    1  107.
    1  201.
    1  202.
    1  203.
    1  204.
    1  205.
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
   1  5.  TRANSPORT
   1  6.  TRADE
   1  7.  GOVERNMENT, SERVICES
   1  ●
   1  1.  GOV. CURRENT EXP.
   1  ●
   1  1.  WAGES
   1  2.  PROFITS
   1  3.  TAXES
   1  4.  IMPORTS
   1  5.  GOODS, SERVICES
   1  ●
   1  1.  HOUSHOLDS
   1  2.  COMPANIES
   1  3.  GOVERNMENT
   1  4.  R.O.W
   1  ●
   1  1. TOTAL STOCKS
   1  ●
   1  1.  FIXED CAPITAL INVEST
   1  2.  DWELLING INVESTM
   1  ●
   1  1. TOTAL F
   1  ●
   1  1. RAW JUTE
   1  2. JUTE GOODS
   1  3. TEA
   1  4. LEATHER  HIDES, SKINS
   1  5. FISH AND SHRIMPS
   1  6. REST
   1  ●
   1  1. AGRICULTURE
   1  2. IDUSTRY
   1  3. CONSTRUCTION
   1  4. ELECTRICITY, GAS
   1  5. TRANSPORT
   1  6. TRADE
   1  7. GOVERNMENT, SERVICES
   1  ●
   1  1. TOTAL EMPLOYMENT
   1  ●
   1  1.  ALL CONSUMERS
   1  ●
   1  1.  TOT.IND.TAXES
   1  ●
   1  1.  WORLD TOTAL
   1  ●
   1  1.  SOC.CAPITAL FORMATION
   1  ●
   1  -3.778 0. -0.2 5*0.
   1  -1.425 0. -0.2 5*0.
   1  8*0.
   1  8*0.
   1  8*0.
```

```
          DATASET: UWM.IDIOM.INVEST.RUNDATA                                              DATE: 85/01/21
                                                                                         TIME: 11:50
                                                                                         PAGE: 13
   START
    COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

       1  206.
       1  207.
       1  ●
       1  -1.    0.    1.  5*0.
       1  -1.860 0.    1.  5*0.
       1  -2.938 0.    1.  5*0.
       1  -1.616 0.    1.  5*0.
       1  -2.288 0.    1.  5*0.
       1  -2.698 0.    1.  5*0.
       1  -1.463 0.    1.  5*0.
       1  ●
       1  0.  0.  0.005  0.0005 3*0.
       1  0.  0.  0.005  0.0005 3*0.
       1  0.  0.  0.005  0.0005 3*0.
       1  0.  0.  0.005  0.0005 3*0.
       1  0.  0.  0.005  0.0005 3*0.
       1  0.  0.  0.005  0.0005 3*0.
       1  0.  0.  0.005  0.0005 3*0.
       1  ●
       1  0.424 0.106 0.0 0.02 0.02 0.0 0.093
       1  ●
       1  0.21 0.005 0.80 0.0 1.0  3*0.
       1  ●
       1  0. 914.  10.0  19*0.  3.4 10*0.
       1  0. 1838. 10.0  19*0. -0.8 10*0.
       1  0. 132.  10.0  19*0. -0.5 10*0.
       1  0. 158.  10.0  19*0.  5.5 10*0.
       1  0. 78.0  10.0  19*0.  0.3 10*0.
       1  0. 225.  10.0  19*0. -0.5 10*0.
       1  ●
       1  2496.
       1  ●
       1  6*0.
       1  6*0.
       1  6*0.
       1  6*0.
       1  6*0.
       1  6*0.
       1  6395. 0.189 2 3*0.
       1  6*0.
       1  6*0.
       1  6*0.
       1  6*0.
       1  6*0.
       1  6*0.
       1  6*0.
       1  6*0.
       1  6*0.
       1  6*0.
       1  6*0.
       1  5402. 0.043 3 3*0.
       1  ●
       1  6*0.
```

```
       DATASET: UWM.IDIOM.INVEST.RUNDATA                                  DATE: 85/01/21
                                                                          TIME: 11:50
                                                                          PAGE: 14
 START
  COL  ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
    1  6*0.
    1  6*0.
    1  262.   0.502  1  3*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  ●
    1  3.75
    1  3.60
    1  3.76
    1  4.41
    1  3.73
    1  3.73
    1  3.73
    1  ●
    1  3857.
    1  ●
    1  0.546
    1  0.254
    1  0.084
    1  0.286
    1  0.158
    1  0.107
    1  0.328
    1  ●
    1  43596.
    1  14773.
    2   4785.
    3    829.
    2   3689.
    2   4688.
    1  11351.
    1  ●
    1  0.
    1  0.
    1  0.
    1  0.
    1  0.
    1  0.
    1  0.
    1  ●
```

```
        DATASET: UWM.IDIOM.INVEST.RUNDATA                                     DATE: 85/01/21
                                                                              TIME: 11:50
                                                                              PAGE: 15
START
 COL    ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
    1   0.
    1   0.
    1   0.
    1   0.
    1   0.
    1   0.
    1   0.
    1   ●
    1   0.
    1   ●
    1   0.
    1   ●
    1   0.
    1   0.
    1   0.
    1   0.
    1   0.
    1   0.
    1   0.
    1   ●
    1   0.    0.
    1   ●
    1   0.
    1   0.
    1   0.
    1   0.
    1   0
    1   ●
    2    8098.6
    1   ●
    1   29445.
    1   ●
    1   1.100
    1   ●
    1   0.890
    1   ●
    2    5  2
    1   0.    0.
    1   0.    0.
    1   0.    0.
    1   0.    0.
    1   0.    0.
    1   ●
    1   1.
    1   ●
    1   0.
    1   ●
    2    1   5
    1   0.   0.   0.   0.   0.
    1   ●
    2    1   5
    1   5*0.011
    1   ●
    2    1   5
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

   1   1. 1. 1. 1. 1.
   1   ●
   2    4  5
   1   1.  0.70 3*0
   1   0.  0.239  3*0.
   1   0.  0.061  1.  2*0.
   1   0. 0. 0. 1. 0.
   1   ●
   1   0.
   1   ●
   1   1.57
   1   1.60
   1   1.60
   1   1.60
   1   1.73
   1   1.73
   1   1.73
   1   ●
   1   1.
   1   1.
   1   1.
   1   1.
   1   1.
   1   1.
   1   ●
   1   0.
   1   0.
   1   0.
   1   0.
   1   0.
   1   0.
   1   0.
   1   ●
   1   1.12
   1   0.877
   1   2.61
   1   2.61
   1   2.61
   1   1.14
   1   ●
   1   1.
   1   1.
   1   1.
   1   1.
   1   1.
   1   1.
   1   ●
   1   1.
   1   1.
   1   1.
   1   1.
   1   1.
   1   1.
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
    1  ●
    1  1.
    1  1.
    1  1.
    1  1.
    1  1.
    1  1.
    1  ●
    1  1.07
    1  ●
    1  1.
    1  ●
    1  1.
    1  ●
    1  1.
    1  ●
    1  0.
    1  0.
    1  0.
    1  0.
    1  0.
    1  0.
    1  ●
    1  35063.
    2   8765.
    5      0.
    2   1644.
    2   1644.
    5      0.
    2   7670.
    1  ●
    1  82700.
    1  ●
    1  91111.
    1  ●
    1  54786.
    1  ●
    1  90397.
    1  ●
    1  1.65
    1  ●
    1  1000.
    1  ●
    1  12.
    1  ●
    1  1331.
    1  ●
    1  300.
    1  ●
    1  85000.
    1  ●
    1  29900.
    1  ●
    1  1.10
```

```
        DATASET: UWM.IDIOM.INVEST.RUNDATA                                  DATE: 85/01/21
                                                                           TIME: 11:50
                                                                           PAGE: 18
  START
   COL  ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

     1  ●
     1  1.15
     1  0.9
     1  2.65
     1  2.65
     1  2.65
     1  1.2
     1  ●
     1  0.
     1  0.
     1  0.
     1  0.
     1  0.
     1  0.
     1  1331.
     1  ●
     1  2800.
     1  ●
     1  1597.
     1  ●
     1  360.
     1  ●
     1  87300.
     1  ●
     1  30709.
     1  ●
     1  1.15
     1  ●
     1  1.18
     1  0.95
     1  2.7
     1  2.7
     1  2.7
     1  1.25
     1  ●
     1  0.
     1  0.
     1  0.
     1  0.
     1  0.
     1  0.
     1  1597.
     1  ●
     1  2900.
     1  ●
     1  1916.
     1  ●
     1  432.
     1  ●
     1  89600.
     1  ●
     1  31518.
     1  ●
     1  1.20
```

```
        DATASET: UWM.IDIOM.INVEST.RUNDATA
                                                         DATE: 85/01/21
                                                         TIME: 11:50
                                                         PAGE: 19
 START
  COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

    1   ●
    1   1.2
    1   0.98
    1   2.75
    1   2.75
    1   2.75
    1   1.3
    1   ●
    1   0.
    1   0.
    1   0.
    1   0.
    1   0.
    1   0.
    1   1916.
    1   ●
    1   3000.
    1   ●
    1   2100.
    1   ●
    1   490.
    1   ●
    1   91840.
    1   ●
    1   32306.
    1   ●
    1   1.25
    1   ●
    1   1.25
    1   1.00
    1   2.78
    1   2.78
    1   2.78
    1   1.35
    1   ●
    1   0.
    1   0.
    1   0.
    1   0.
    1   0.
    1   0.
    1   2100.
    1   ●
    1   3100.
    1   ●
    1   2300.
    1   ●
    1   550.
    1   ●
    1   94136.
    1   ●
    1   33114.
    1   ●
    1   1.30
```

DATASET: UWM.ID.OM.INVEST.RUNDATA

DATE: 85/01/21
TIME: 11:50
PAGE: 20

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

   1   ●
   1   1.28
   1   1.05
   1   2.8
   1   2.8
   1   2.8
   1   1.38
   1   ●
   1   0.
   1   0.
   1   0.
   1   0.
   1   0.
   1   0.
   1   2300.
   1   ●
   1   3200.
   1   ●.
```

```
DATASET: UWM.IDIOM.INVEST.FULLDAT                                          DATE: 85/01/21
                                                                           TIME: 11:51
                                                                           PAGE: 1
START
 COL  ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

   1  43596.
   1  14191.
   2   4659.
   3    679.
   2   3510.
   2   4552.
   1  11753.
   1  ●             THIS WAS Q
   1  35063.
   2   8765.
   5      0.
   2   1644.
   2   1644.
   5      0.
   2   7670.
   1  ●                THIS WAS QC0
   5      0.
   5      0.
   5      0.
   5      0.
   5      0.
   5      0.
   2   1109.
   1  ●            THIS WAS QG0
   3    970.
   2   2907.
   5      0.
   3    494.
   3    146.
   3    146.
   3    146.
   1  ●            QM0
   5      0.
   5      0.
   5      0.
   5      0.
   5      0.
   5      0.
   5      0.
   1  ●           QS0
   5      0.
   3    857.
   2   2714.
   5      0.
   5      0.
   5      0.
   5      0.
   1  ●           QV0
   2   1192.
   2   2107.
   5      9.
   4     10.
   5      9.
   5      9.
```

```
        DATASET: UWM.IDIOM.INVEST.FULLDAT                                           DATE: 85/01/21
                                                                                    TIME: 11:51
                                                                                    PAGE: 2
START
 COL    ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
   5        9
   1    ●           QX0
   2     8311.
   2     5369.
   2     1936.
   3      342.
   2     2003.
   2     4689.
   2     3111.
   1    ●           QY0
   5        1.57
   5        1.60
   5        1.60
   5        1.60
   5        1.73
   5        1.73
   5        1.73
   1    ●           PQ
   5        1.57
   5        1.60
   5        1.60
   5        1.60
   5        1.73
   5        1.73
   5        1.73
   1    ●           PQH
   5        3.57
   5        3.60
   5        3.76
   5        4.41
   5        3.73
   5        3.73
   5        3.73
   1    ●           PQM
   5        3.121
   5        2.284
   5        2.555
   5        2.400
   5        2.555
   5        2.666
   5        2.555
   1    ●           PQX
   3      500.
   2     1908.
   5        0.
   3      441.
   4       35.
   5        0.
   5        6.
   1    ●           QMT0
   1    0.14
   1    0.25
   1    0.
   1    0.20
```

```
        DATASET: UWM.IDIOM.INVEST.FULLDAT                            DATE: 85/01/21
                                                                     TIME: 11:51
                                                                     PAGE: 3
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

   1   0.06
   1   0.
   1   0.01
   1   ●           QMTZ
   3     1500.
   3     3200.
   5       0.
   5       0.
   5       0.
   5       0.
   5       0.
   1   ●           QMQ
   5       0.
   5       0.
   5       0.
   5       0.
   5       0.
   5       0.
   5       0.
   1   ●           QXTO
   5       0.
   5       0.
   5       0.
   5       0.
   5       0.
   5       0.
   5       0.
   1   ●          QXTZ
   1   43596.
   1   14191.
   2    4659.
   3     679.
   2    3510.
   2    4552.
   1   11753.
   1   ●          Y
   1   43160.
   1   13609.
   2    4533.
   3     597.
   2    3331.
   2    4415.
   1   10154.
   1   ●          YL1
   1   42728.
   1   13051.
   2    4411.
   3     465.
   2    3161.
   2    4283.
   2    8773.
   1   ●          YL2
   1   42300.
   1   12516.
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
   2    4292.
   3     362.
   2    3000.
   2    4154.
   2    7580.
   1   ●          YL3
   1   15880.
   2    2120.6
   3     240.0
   3     118.6
   3     337.9
   3     297.4
   2    2351.9
   1   ●          YE0
   1   15400.
   2    2060.
   3     233.
   3     115.
   3     328.
   3     288.
   2    2280.
   1   ●          YEL1
   1   13512.4
   2    1692.9
   2    3121.4
   3     267.9
   2    3999.5
   2    5803.3
   2    9737.6
   1   ●          YP
   2    7  2
   3     139.  0.
   3     859.  0.
   2    1621.  0.
   5       0.  0.
   5       9.  0.
   3     599.  0.
   4      94.  0.
   1   ●          YV
   5       0.
   5       0.
   5       0.
   5       0.
   5       0.
   5       0.
   1   ●          YS
   5       1.57
   5       1.60
   5       1.60
   5       1.60
   5       1.73
   5       1.73
   5       1.73
```

DATASET: UWM.IDIOM.INVEST.FULLDAT

DATE: 85/01/21
TIME: 11:51
PAGE: 5

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
   1   ●          PY
   5       1.
   5       1.
   5       1.
   5       1.
   5       1.
   5       1.
   5       1.
   1   ●          PYVP
   5       0.2    1.
   5       0.2    1.
   5       0.2    1.
   5       0.2    1.
   5       0.2    1.
   5       0.2    1.
   5       0.2    1.
   1   ●          PVA
   5       1.     1.
   5       1.     1.
   5       1.     1.
   5       1.     1.
   5       1.     1.
   5       1.     1.
   5       1.     1.
   1   ●          P'V1
   5       1.    1.
   5       1.    1.
   5       1.    1.
   5       1.    1.
   5       1.    1.
   5       1.    1.
   5       1.    1.
   1   ●          PYV2
   5       1.62
   5       1.62
   5       1.62
   5       1.62
   5       1.62
   5       1.62
   5       1.62
   1   ●          PYE
   1   50211.
   2    9265.
   2    3603.
   2    1017.
   2    5012.
   2    7028.
   1   17256.
   1   ●          YRO
   2    -698.
   3     -90.
   3     -90.
   5       0.
   2    -246.
```

```
        DATASET: UWM.IDIOM.INVEST.FULLDAT                                   DATE: 85/01/21
                                                                            TIME: 11:51
                                                                            PAGE: 6
 START
  COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
    5       0.
    3    196.
    1   ●          YTO
    1   -0.01
    1   -0.004
    1   -0.012
    1   0.
    1   -0.04
    1   0.
    1   0.01
    1   ●          YTZ
    1   35063.
    2    8765.
    5       0.
    2    1644.
    2    1644.
    5       0.
    2    7670.
    1   ●          C
    5       1.65
    5       1.65
    5       1.65
    5       1.65
    5       1.65
    5       1.65
    5       1.65
    1   ●          PC
    5       0.
    2    3260.
    5       0.
    5       0.
    5       0.
    5       0.
    1   -1365.
    1   ●          CRO
    5       0.
    2    3260.
    5       0.
    5       0.
    5       0.
    5       0.
    1   -1365.
    1   ●          CTO
    1   0.
    1   0.23
    1   0.
    1   0.
    1   0.
    1   0.
    1   -0.11
    1   ●          CTZ
    2    1109.
    1   ●          G
    5       1.65
```

```
DATASET: UWM.IDIOM.INVEST.FULLDAT                                   DATE: 85/01/21
                                                                    TIME: 11:51
                                                                    PAGE: 7
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

   1   ●         PG
   5       0.
   1   ●         GRO
   5       0.
   1   ●         GTO
   5       0.
   1   ●         GTZ
   2    0.
   1   ●         S
   2    3071. 250.
   1   ●         V
   1   0.
   1   250.
   1   ●         VKO
   2    2.63   2.63
   1   ●         PV
   2    0.     0.
   1   ●         VTO
   2    0.     0.
   1   ●         VTZ
   2    6  1
   3     914.
   2    1838.
   3     132.
   3     158.
   4      78.
   3     225.
   1   ●         XA
   5       2.586
   5       2.586
   5       2.586
   5       2.586
   5       2.586
   5       2.586
   1   ●         PX
   3     970.
   2    2907.
   5       0.
   3     494.
   3     146.
   3     146.
   3     146.
   1   ●         M
   5       1.35
   5       0.987
   5       1.095
   5       1.095
   5       1.095
   5       1.095
   5       1.095
   1   ●         PFM
   1   21346.4
   1   ●         E
   1   21346.4
```

```
START
 COL  ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
  1   ●           EY0
  2    0.
  1   ●           EC0
  2    0.
  1   ●           EG0
  4      0.011
  1   ●           D
  2    2890.
  1   ●           TQM0
  2    -928.
  1   ●           TY0
  2    1895.
  1   ●           TC0
  5       0.
  1   ●           TG0
  5       0.
  1   ●           TV0
  3     250.
  1   ●           K
  2    1  7
  1   0.14 0.25 0.0 0.20 0.06 0.0 0.01
  1   ●           TQMB                    READING OF CONVERTERS STARTS
  2    1  7
  1   -0.01 -0.004 -0.012 0.0 -0.04 0.0 0.01
  1   ●           TYB
  2    1  7
  1   0.0 0.23 0.0 0.0 0.0 0.0 -0.11
  1   ●           TCB
  2    1  1
  2    0.0
  1   ●           TGB
  2    1  2
  2    0.0     0.0
  1   ●           TVB
  2    1  7
  2    0. 0. 0. 0. 0. 0. 0.
  1   ●           TQXB
  2    5  7
  1   0.967 1.093 1.057 1.057 1.057 1.057 1.057
  1   7*0
  1   7*0
  1   7*0
  1   7*0
  1   ●           RYB
  2    5  7
  2    7*0.
  2    7*0.
  2    0. 0.23 4*0. -0.11
  2    7*0.
  2    7*0.
  1   ●           RCB
  2    5  1
  2    0.
  2    0.
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

  2   0.
  2   0.
  2   0.
  1   ●          RGB
  2    7  7
  1   0.111   0.091   0.091   0.000   0.005   0.000   0.000
  1   0.010   0.199   0.365   0.040   0.087   0.008   0.006
  1   0.      0.      0.      0.      0.      0.      0.017
  1   0.      0.013   0.      0.018   0.004   0.005   0.007
  1   0.043   0.023   0.      0.      0.      0.      0.019
  1   0.094   0.087   0.      0.      0.      0.      0.
  1   0.006   0.035   0.061   0.007   0.077   0.092   0.168
  1   ●          QYC
  2    7  7
  2   1.  0.  0.  0.  0.  0.  0.
  2   0.  1.  0.  0.  0.  0.  0.
  2   0.  0.  1.  0.  0.  0.  0.
  2   0.  0.  0.  1.  0.  0.  0.
  2   0.  0.  0.  0.  1.  [illegible]  0.
  2   0.  0.  0.  0.  0.  1.  0.
  2   0.  0.  0.  0.  0.  0.  1.
  1   ●          MQC
  2    7  7
  2   1.  0.  0.  0.  0.  0.  0.
  2   0.  1.  0.  0.  0.  0.  0.
  2   0.  0.  1.  0.  0.  0.  0.
  2   0.  0.  0.  1.  0.  0.  0.
  2   0.  0.  0.  0.  1.  0.  0.
  2   0.  0.  0.  0.  0.  1.  0.
  2   0.  0.  0.  0.  0.  0.  1.
  1   ●          YQC
  2    7  7
  2   1.  0.  0.  0.  0.  0.  0.
  2   0.  1.  0.  0.  0.  0.  0.
  2   0.  0.  1.  0.  0.  0.  0.
  2   0.  0.  0.  1.  0.  0.  0.
  2   0.  0.  0.  0.  1.  0.  0.
  2   0.  0.  0.  0.  0.  1.  0.
  2   0.  0.  0.  0.  0.  0.  1.
  1   ●          QCC
  2    7  1
  2   0.
  2   0.
  2   0.
  2   0.
  2   0.
  2   0.
  2   1.
  1   ●          QGC
  2    7  1
  2   0.149
  2   0.149
  2   0.149
  2   0.149
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
   2   0.149
   2   0.149
   2   0.149
   1   ●          QSC
   2   7  2
   2   0.     0.
   2   0.24   0.
   2   0.76   1.
   2   0.     0.
   2   0.     0.
   2   0.     0.
   2   0.     0.
   1   ●          QVC
   2   7  6
   2   0.95  0.   1.   0.5  0.   0.5
   2   0.    1.   0.   0.5  1.   0.5
   2   0.01  0.   0.   0.   0.   0.
   2   0.01  0.   0.   0.   0    0 .
   2   0.01  0.   0.   0.   0.   0.
   2   0.01  0.   0.   0.   0.   0.
   2   0.01  0.   0.   0.   0.   0.
   1   ●          QXC
   2   0.
   2   1.
   1   ●          VKC
   2   7   7
   2   1.   0.   0.   0.   0.   0.   0.
   2   0.   1.   0.   0.   0.   0.   0.
   2   0.   0.   1.   0.   0.   0.   0.
   2   0.   0.   0.   1.   0.   0.   0.
   2   0.   0.   0.   0.   1.   0.   0.
   2   0.   0.   0.   0.   0.   1.   0.
   2   0.   0.   0.   0.   0.   0.   1.
   1   ●          QYPC          LAST CONVERTER READ, STARTS READ TITLES
   1   1.   AGRICULTURE
   1   2.   INDUSTRY
   1   3.   CONSTRUCTION
   1   4.   ELECTRICITY, GAS
   1   5.   TRANSPORT
   1   6.   TRADE
   1   7.   GOVERNMENT, SERVICES
   1   ●                        TITLES FOR CLASSIFICATION Q
   1   1.   AGRICULTURE
   1   2.   INDUSTRY
   1   3.   CONSTRUCTION
   1   4.   ELECTRICITY, GAS
   1   5.   TRANSPORT
   1   6.   TRADE
   1   7.   GOVERNMENT, SERVICES
   1   ●                        TITLES FOR CLASSIFICATION Y
   1   1.   AGRICULTURE
   1   2.   INDUSTRY
   1   3.   CONSTRUCTION
   1   4.   ELECTRICITY, GAS
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
   1   5.  TRANSPORT
   1   6.  TRADE
   1   7.  GOVERNMENT, SERVICES
   1   *                         TITLES FOR CLASSIFICATION C
   1   1.  GOV. CURRENT EXP.
   1   *                         TITLE(S) FOR CLASSIFICATION G
   1   1.  WAGES
   1   2.  PROFITS
   1   3.  TAXES
   1   4.  IMPORTS
   1   5.  GOODS, SERVICES
   1   *                         TITLES FOR CLASSIFICATIN R
   1   1.  HOUSHOLDS
   1   2.  COMPANIES
   1   3.  GOVERNMENT
   1   4.  R.O.W
   1   *                         TITLES FOR CLASSIFICATION H
   1   1. TOTAL STOCKS
   1   *                         TITLE(S) FOR CLASSIFICATION S
   1   1.  FIXED CAPITAL INVEST
   1   2.  DWELLING INVESTM
   1   *                         TITLES FOR CLASSIFICATION V
   1   1. TOTAL F
   1   *                         TITLE(S) FOR CLASSIFICATION F
   1   1. RAW JUTE
   1   2. JUTE GOODS
   1   3. TEA
   1   4. LEATHER, HIDES, SKINS
   1   5. FISH AND SHRIMPS
   1   6. REST
   1   *                         TITLES FOR CLASSIFIFICATIN X
   1   1. AGRICULTURE
   1   2. IDUSTRY
   1   3. CONSTRUCTION
   1   4. ELECTRICITY, GAS
   1   5. TRANSPORT
   1   6. TRADE
   1   7. GOVERNMENT, SERVICES
   1   *                         TITLES FOR CLASSIFICATION M
   1   1. TOTAL EMPLOYMENT
   1   *                         TITLE(S) FOR CLASSIFICATION E
   1   1.  ALL CONSUMERS
   1   *                         TITLE(S) FOR CLASSIFICATION C
   1   1.  TOT.IND.TAXES
   1   *                         TITLE(S) FOR CLASSIFICATION T
   1   1.  WORLD TOTAL
   1   *                         TITLE(S) FOR CLASSIFICATION A
   1   1.  SOC.CAPITAL FORMATION
   1   *                         TITLE(S) FOR CLASSIFICATION K
   1   -3.778 0. -0.2 5*0.
   1   -1.425 0. -0.2 5*0.
   1   8*0.
   1   8*0.
   1   8*0.
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
    1  8*0.
    1  8*0.
    1  ●                               THIS WAS BQM FOR FUNCTION OPTION LLIN
    1  0.
    1  0.
    1  0.
    1  494.
    1  146.
    1  146.
    1  146.
    1  ●                                BQM FOR FUNCTION OPTION FIXM
    1  0.
    1  0.
    1  0.
    1  0.
    1  0.
    1  0.
    1  ●                                PQM FOR FUNCTION OPTION PFM
    1  0.60  0.008  1.  1.  3*0
    1  0.98  0.004  1.  1.  3*0.
    1  1.50  0.002  1.  1.  3*0.
    1  1.29  0.002  1.  1.  3*0.
    1  1.39  0.002  1.  1.  3*0.
    1  1.24  0.006  1.  1.  3*0.
    1  1.12  0.003  1.  1.  3*0.
    1  ●                                PY FOR FUNCTION OPTION LMAT
    1  4.    0.     1.    3*0.   0.258  1.   3*0.   0.9   0.97   6*0.
    1  6.    0.     1.    3*0.   0.201  1.   3*0.   0.9   0.97   6*0.
    1  7.    0.     1.    3*0.   0.251  1.   3*0.   0.9   0.97   6*0.
    1  0.    0.     1     3*0.   0.201  1.   3*0.   0.9   0.97   6*0.
    1  2.    0.     1.    3*0.   0.227  1.   3*0.   0.9   0.97   6*0.
    1  6.    0.     1.    3*0.   0.245  1.   3*0.   0.9   0.97   6*0.
    1   19*0.
    1   19*0.
    1   19*0.
    1   19*0.
    1   19*0.
    1   19*0.
    1   19*0.
    1   19*0.
    1   ●                                BYV FOR FUNCTION OPTION NCL
    2    0.
    1   0.
        0.
    1   0.
    1   0.
    1   0.
    1   107.
    1   201.
    1   202.
    1   203.
    1   204.
    1   205.
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

   1   206.
   1   207.
   1   ●                                    BYV FOR FUNCTION OPTION FIX
   1   -1.    0.    1.  5*0.
   1   -1.860 0.    1.  5*0.
   1   -2.938 0.    1.  5*0.
   1   -1.616 0.    1.  5*0.
   1   -2.288 0.    1.  5*0.
   1   -2.698 0.    1.  5*0.
   1   -1.463 0.    1.  5*0.
   1   ●                                    BYEO FOR FUNCTION OPTION LLIN
   1   0.  0.  0.005  0.0005 3*0.
   1   0.  0.  0.005  0.0005 3*0.
   1   0.  0.  0.005  0.0005 3*0.
   1   0.  0.  0.005  0.0005 3*0.
   1   0.  0.  0.005  0.0005 3*0.
   1   0.  0.  0.005  0.0005 3*0.
   1   0.  0.  0.005  0.0005 3*0.
   1   ●                                    BYS FOR FUNCTION OPTION ACC
   1   0.424 0.106 0.0 0.02 0.02 0.0 0.093
   1   ●                                    BDC FOR FUNCTION OPTION FIX
   1   0.21 0.005 0.80 0.0 1.0  3*0.
   1   ●                                    BDSC FOR FUNCTION OPTION LNMW
   1   0. 914.   10.0  19*0.  3.4 10*0.
   1   0. 1838.  10.0  19*0. -0.8 10*0.
   1   0. 132.   10.0  19*0. -0.5 10*0.
   1   0. 158.   10.0  19*0.  5.5 10*0.
   1   0. 78.0   10.0  19*0.  0.3 10*0.
   1   0. 225.   10.0  19*0. -0.5 10*0.
   1   ●                                    BXA FOR FUNCTION OPTION LIN
   1   2496.
   1   ●                                    BPE FOR FUNCTION OPTION EXGW
   1   6*0.
   1   6*0.
   1   6*0.
   1   6*0.
   1   6*0.
   1   6*0.
   1   6395. 0.189 2 3*0.
   1   6*0.
   1   6*0.
   1   6*0.
   1   6*0.
   1   6*0.
   1   6*0.
   1   6*0.
   1   6*0.
   1   6*0.
   1   6*0.
   1   6*0.
   1   5402. 0.043 3 3*0.
   1   ●                                    BHR FOR FUNCTION OPTION GRAN
   1   6*0.
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
    1  6*0.
    1  6*0.
    1  262.   0.502  1  3*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  6*0.
    1  ●                         BHR FOR FUNCTION OPTION FIX
    1  3.75
    1  3.60
    1  3.76
    1  4.41
    1  3.73
    1  3.73
    1  3.73
    1  ●               PM
    1  3857.
    1  ●               T
    1  0.546
    1  0.254
    1  0.084
    1  0.286
    1  0.158
    1  0.107
    1  0.328
    1  ●               YULC
    1  43596.
    1  14773.
    2   4785.
    3    829.
    2   3689.
    2   4688.
    1  11351.
    1  ●               YEXP
    1  0.
    1  0.
    1  0.
    1  0.
    1  0.
    1  0.
    1  ●               CEO
```

```
DATASET: UWM.IDIOM.INVEST.FULLDAT                                   DATE: 85/01/21
                                                                    TIME: 11:51
                                                                    PAGE: 15
 START
  COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
    1   0.
    1   0.
    1   0.
    1   0.
    1   0.
    1   0.
    1   0.
    1   ●               CE0B
    1   0.
    1   ●               GE0
    1   0.
    1   ©               GE0B
    1   0.
    1   0.
    1   0.
    1   0.
    1   0.
    1   0.
    1   0.
    1   ●               HPD
    1   0.    0.
    1   ●               VR0
    1   0.
    1   0.
    1   0.
    1   0.
    1   0
    1   ●               RV0
    2    8098.6
    1   ●               UE
    1   29445.
    1   ●               LF
    1   1.100
    1   ●               PE
    1   0.890
    1   ●               PEL1
    2    5   2
    1   0.    0.
    1   0.    0.
    1   0.    0.
    1   0.    0.
    1   ●               RVB
    1   1.
    1   ●               DN
    1   0.
    1   ●               DBT
    2    1   5
    1   0.    0.    0.    0.    0.
    1   ●               DAB
    2    1   5
    1   5*0.011
    1   ●               DDB
    2    1   5
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
    1  1. 1. 1. 1. 1.
    1  ●                    DRC
    2   4  5
    1  1.  0.70 3*0
    1  0.  0.239  3*0.
    1  0.  0.061  1.  2*0.
    1  0. 0. 0. 1. 0.
    1  ●                    HRC
    1  0.
    1  ●                    TQX0
    1  1.57
    1  1.60
    1  1.60
    1  1.60
    1  1.73
    1  1.73
    1  1.73
    1  ●                    PQHH
    1  1.
    1  1.
    1  1.
    1  1.
    1  1.
    1  1.
    1  1.
    1  ●                    PYS
    1  0.
    1  0.
    1  0.
    1  0.
    1  0.
    1  0.
    1  0.
    1  ●                    YSA
    1  1.12
    1  0.877
    1  2.61
    1  2.61
    1  2.61
    1  1.14
    1  ●                    PCL0
    1  1.
    1  1.
    1  1.
    1  1.
    1  1.
    1  1.
    1  ●                    PCL1
    1  1.
    1  1.
    1  1.
    1  1.
    1  1.
    1  1.
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
   1   ●                   PCL2
   1   1.
   1   1.
   1   1.
   1   1.
   1   1.
   1   1.
   1   ●                   PCL3
   1   1.07
   1   ●                   PWL0
   1   1.
   1   ●                   PWL1
   1   1.
   1   ●                   PWL2
   1   1.
   1   ●                   PWL3
   1   0.
   1   0.
   1   0.
   1   0.
   1   0.
   1   0.
   1   ●                   XT0
   1   35063.
   2    8765.
   5       0.
   2    1644.
   2    1644.
   5       0.
   2    7670.
   1   ●                   DC
   1   82700.
   1   ●                   DPOP
   1   91111.
   1   ●                   DPDI
   1   54786.
   1   ●                   DSC
   1   90397.
   1   ●                   DSPC
   1   1.65
   1   ●                   DPCE
   1   1000.
   1   ●                   DPW
   1   12.
   1   ●                   DPWH
   1   1331.
   1   ●                   G      FIRST EXOGENOUS VALUE READ IN THE SOLVE PHASE
   1   300.
   1   ●                   K
   1   85000.
   1   ●                   DPOP
   1   29900.
   1   ●                   LF
   1   1.10
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
   1   ●                   PWLO
   1   1.15
   1   0.9
   1   2.65
   1   2.65
   1   2.65
   1   1.2
   1   ●                   PCLO
   1   0.
   1   0.
   1   0.
   1   0.
   1   0.
   1   0.
   1   1331.
   1   ●                   QGO
   1   2800.
   1   ●                   BPE    UPDATE MATRIX OF EXOGENOUS WAGES FOR FIRST YEAR
   1   1597.
   1   ●                   G     EXOGENOUS VALUES FOR SECOND YEAR OF RUN
   1   360.
   1   ●                   K
   1   87300.
   1   ●                   DPOP
   1   30709.
   1   ●                   LF
   1   1.15
   1   ●                   PWLO
   1   1.18
   1   0.95
   1   2.7
   1   2.7
   1   2.7
   1   1.25
   1   ●                   PCLO
   1   0.
   1   0.
   1   0.
   1   0.
   1   0.
   1   0.
   1   1597.
   1   ●                   QGO
   1   2900.
   1   ●                   BPE  UPDATED PARAMETER MATRIX FOR SECOND YEAR
   1   1916.
   1   ●                   G    EXOGENOUS VALUES FOR THIRD YEAR OF RUN
   1   432.
   1   ●                   K
   1   89600.
   1   ●                   DPOP
   1   31518.
   1   ●                   LF
   1   1.20
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
    1  ●                 PWLO
    1  1.2
    1  0.98
    1  2.75
    1  2.75
    1  2.75
    1  1.3
    1  ●                 PCLO
    1  0.
    1  0.
    1  0.
    1  0.
    1  0.
    1  0.
    1  1916.
    1  ●                 QGO
    1  3000.
    1  ●                 BPE   UPDATED PARAMETER MATRIX  FOR THIRD YEAR
    1  2100.
    1  ●                 G     EXOGENOUS VALUES FOR FOURTH YEAR OF RUN
    1  490.
    1  ●                 K
    1  91840.
    1  ●                 DPOP
    1  32306.
    1  ●                 LF
    1  1.25
    1  ●                 PWLO
    1  1.25
    1  1.00
    1  2.78
    1  2.78
    1  2.78
    1  1.35
    1  ●                 PCLO
    1  0.
    1  0.
    1  0.
    1  0.
    1  0.
    1  0.
    1  2100.
    1  ●                 QGO
    1  3100.
    1  ●                 BPE  UPDATED PARAMETER MATRIX FOR FOURTH YEAR
    1  2300.
    1  ●                 G    EXOGENOUS VALUES FOR FIFTH YEAR OF RUN
    1  550.
    1  ●                 K
    1  94136.
    1  ●                 DPOP
    1  33114.
    1  ●                 LF
    1  1.30
```

```
START
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
   1   •                   PWLO
   1   1.28
   1   1.05
   1   2.8
   1   2.8
   1   2.8
   1   1.38                PCLO
   1   •
   1   0.
   1   0.
   1   0.
   1   0.
   1   0.
   1   0.
   1   2300.               QGO
   1   •
   1   3200.               BPE      UPDATED PARAMETER MATRIX FOR FIFTH YEAR
   1   •.
```

A sample output

1

0FOREIGN TRADE SIMULATION — Use of resources and condensed tables — EDFG 1 0 0: 0 0 51

+ 1978

0	GDP	C'EXP	GOV'T	INV'T	STKB'G	EXPORTS	IMPORTS
1973 prices	61566	5!725	1331	4270	0	4829	3590
Current prices	139262	1.3029	2805	12366	0	17297	16234
Price indices	2.262	2.248	2.108	2.896	-0.000	3.582	4.523
Inflation rates	39.63	36.25	21.83	10.10	-100.00	38.83	20.28
% growth volume	4.67	-0.11	20.02	19.59	0.00	44.37	-10.08
Growth from 1978	4.67	-0.11	20.02	19.59	0.00	44.37	5.73

TRADE		EMPLOYMENT	
Balance of trade	.062	Employment	22113
Export index	325.6	Unemployment	7787
Terms of trade	79.2	Unem rate	26.04
% change in tt	15.42	Growth emplt	3.59

0

+ Part 1

	Consum -ption	Govern -ment	Invest -ment	Stock -bd'ng	Final demand	Interm demand	Home demand	Export demand	Total demand	Import supply	Import duties	Total output
1. Primary	35137	0	0	0	35137	6505	41642	2509	44151	722	101	43328
2. Manufacturing	8784	0	1025	0	9809	5059	14869	1747	16616	2021	505	14J89
3. Construction	0	0	3246	0	3246	224	3469	115	3584	0	0	3584
4. Services	11022	1331	0	0	12353	12173	24526	458	24984	846	108	24030
Total commodities	54944	1331	4270	0	60545	23961	84506	4829	89335	3590	715	85031
Direct imports	0	0	0	0	0	0	0	0	0	0	0	0
Indirect taxes	5717	0	0	0	5717	0	5717	0	5717	0	0	5717
Other value-added	0	0	0	0	0	0	0	0	0	0	0	0
Foreign tourists	0	0	0	0	0	0	0	0	0	0	0	0
Grand total	60661	1331	4270	0	66262	23961	90223	4829	95052	3590	715	90748

1

0

+ Part 2

	Total supply
1. Primary	44151
2. Manufacturing	16616
3. Construction	3584
4. Services	24984
Total commodities	89335
Direct imports	0
Indirect taxes	5717
Other value-added	0
Foreign tourists	0
Grand total	95052

1

0FOREIGN TRADE SIMULATION — Commodity imports and import ratios — EDFG 1 0 0: 0 0 51

+ 1978

0	IMPORT VOLUME	DUTIES (BASE)	OUTPUT VOLUME	IMPORT RATIO	QUOTA RATES	IMPORT VALUE	IMPORT PRICE	PRODN PRICE
1. AGRICULTURE	722	101	43328	1.74	0.00	2996	4.148	2.054
2. INDUSTRY	2021	505	14089	14.07	0.00	9199	4.551	2.513
3. CONSTRUCTION	0	0	3584	0.00	0.00	0	5.161	2.977
4. ELECTRICITY, GAS	494	99	1525	25.93	0.00	2471	5.003	2.027
5. TRANSPORT	146	9	4084	3.55	0.00	604	4.134	2.099
6. TRADE	146	0	5330	2.72	0.00	541	3.703	1.683
7. GOVERNMENT, SERVICES	60	1	13091	0.46	600.00	250	4.160	2.112
Total	3590	715	85031	4.28	0.00	16060	4.474	2.156

1

0FOREIGN TRADE SIMULATION — World, import and domestic pr'ues — EDFG 1 0 0: 0 0 51

+ 1978

0	WORLD PRICE	IMPORT PRICE	PRODN PRICE	ABSPN PRICE	TARIFF RATE	IMPORT VOLUME
1. AGRICULTURE	1.350	4.148	2.054	1.987	0.581	722
2. INDUSTRY	0.987	4.551	2.513	2.719	1.138	2021

3. CONSTRUCTION	1.095	5.161	2.977	2.952	0.000	0
4. ELECTRICITY, GAS	1.095	5.003	2.027	2.686	1.001	494
5. TRANSPORT	1.095	4.134	2.099	2.126	0.248	146
6. TRADE	1.095	3.703	1.683	1.695	0.000	146
7. GOVERNMENT, SERVICES	1.095	4.160	2.112	2.108	0.042	60
Total	1.085	4.474	2.156	2.175	0.906	3590

1

0FOREIGN TRADE SIMULATION Commodity, import and export prices EDFG 1 0 0: 0 0 51
+ 1978

0	PROD-N PRICES	HOME PRICES	IMPORT PRICES	EXPORT PRICES	ABSP-N PRICES
1. AGRICULTURE	2.054	1.949	4.148	3.729	1.987
2. INDUSTRY	2.513	2.405	4.551	3.204	2.719
3. CONSTRUCTION	2.977	2.952	5.161	3.659	2.952
4. ELECTRICITY, GAS	2.027	1.892	5.003	3.659	2.686
5. TRANSPORT	2.099	2.053	4.134	3.659	2.126
6. TRADE	1.683	1.638	3.703	3.659	1.695
7. GOVERNMENT, SERVICES	2.112	2.098	4.160	3.659	2.108

1

0FOREIGN TRADE SIMULATION Industrial output and investment EDFG 1 0 0: 0 0 51
+ 1978

0	OUTPUT	% CHANGE	PRICE	OUTPUT VALUE	PROFIT	FIXED CAPITA	TOTAL	TOTAL VALUE	AV. PR ICE
1. AGRICULTURE	43328	0.389	2.050	88822	32039	224	224	650	2.896
2. INDUSTRY	14089	3.527	2.419	34086	14223	876	876	2536	2.896
3. CONSTRUCTION	3584	-20.940	2.977	10668	5524	1763	1763	5106	2.896
4. ELECTRICITY, GAS	1525	155.511	2.027	3092	2218	98	98	285	2.896
5. TRANSPORT	4084	22.591	2.099	8573	6314	74	74	215	2.896
6. TRADE	5330	20.731	1.683	8972	6946	682	682	1976	2.896
7. GOVERNMENT, SERVICES	13091	28.922	2.112	27652	14724	252	252	730	2.896
Total	85031	6.556	2.139	181864	81938	3970	3970	11497	2.896

1

0FOREIGN TRADE SIMULATION Industrial output, employment & wages EDFG 1 0 0: 0 0 51
+ 1978

0	OUTPUT	% CHANGE	INVEST -MENT	EMPLOY -MENT	HOURS	WAGE RATES%	G R MEN %	G R HOURS%	G R PRDTY%
1. AGRICULTURE	43328	0.39	224	16182	-0.0	2	5.08	-100.00	0.39
2. INDUSTRY	14089	3.53	876	2104	-0.0	2	2.12	-100.00	3.53
3. CONSTRUCTION	3584	-20.94	1763	180	-0.0	2	-22.67	-100.00	-20.94
4. ELECTRICITY, GAS	1525	155.51	98	272	-0.0	2	136.30	-100.00	155.51
5. TRANSPORT	4084	22.59	74	396	-0.0	2	20.86	-100.00	22.59
6. TRADE	5330	20.73	682	348	-0.0	2	20.90	-100.00	20.73
7. GOVERNMENT, SERVICES	13091	28.92	252	2631	-0.0	2	15.41	-100.00	28.92
Total	85031	6.56	3970	22113	-0.0	2	6.81	-100.00	6.56

1

0FOREIGN TRADE SIMULATION Industrial stockbuilding & stock appn EDFG 1 0 0: 0 0 51
+ 1978

0	OUTPUT	CHANGE	% CHANGE	CON PR STKBDG	CUR PR STKBDG	VAL OF STOCKS
1. AGRICULTURE	43328	168	0.39	0	0	0
2. INDUSTRY	14089	480	3.53	0	0	0
3. CONSTRUCTION	3584	-949	-20.94	0	0	0
4. ELECTRICITY, GAS	1525	928	155.51	0	0	0
5. TRANSPORT	4084	753	22.59	0	0	0
6. TRADE	5330	915	20.73	0	0	0
7. GOVERNMENT, SERVICES	13091	2937	28.92	0	0	0

Total	85031	5232	6.56	0	0	0

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0FOREIGN TRADE SIMULATION 1978 Consumers' expenditure cons & curr price EDFG 1 0 0: 0 0 51

0 + Part 1	COMMOD -ITIES	IMPORT	OTHER VAL.AD	TAX (BASE)	TOTAL VOLUME	IMPORT	VALUE ADDAD	TAXES	AD VA LOREM	SPEC -IFIC	SUBSI DIES	TOTAL VALUE
1. AGRICULTURE	35137	0	0	0	35137	0	0	0	0	0	0	69816
2. INDUSTRY	8784	0	-2020	2020	8784	0	0	7384	7157	0	0	31116
3. CONSTRUCTION	0	0	0	0	0	0	0	0	0	0	0	0
4. ELECTRICITY, GAS	1657	0	0	0	1657	0	0	0	0	0	0	4452
5. TRANSPORT	1657	0	0	0	1657	0	0	0	0	0	0	3524
6. TRADE	0	0	0	0	0	0	0	0	0	0	0	0
7. GOVERNMENT, SERVICES	7707	0	848	-848	7707	0	0	-1667	-1607	0	0	14611
Total	54944	0	-1173	1173	54944	0	0	5717	5549	0	0	123519

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0 + Part 2	PRICE
1. AGRICULTURE	1.987
2. INDUSTRY	3.542
3. CONSTRUCTION	0.000
4. ELECTRICITY, GAS	2.686
5. TRANSPORT	2.126
6. TRADE	0.000
7. GOVERNMENT, SERVICES	1.896
Total	2.248

0	DIRECT TAXES
1. AGRICULTURE	35137
2. INDUSTRY	8784
3. CONSTRUCTION	0
4. ELECTRICITY, GAS	1657
5. TRANSPORT	1657
6. TRADE	0
7. GOVERNMENT, SERVICES	7707
Total	54944

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0FOREIGN TRADE SIMULATION 1978 Aggregate consumption, disposable income EDFG 1 0 0: 0 0 51

0	CONS VOLUME	CONS VALUE	CONS PRICE	PERCAP VOLUME	PERCAP VALUE	NOOF CONSUM	PERCAP PDI	PERCAP RPDI	TOTAL WEALTH	PERCAP WEALTH
1. DIRECT TAXES	54725	123029	2.248	1		185000000	1	1	993114	12

0	CONS VOLUME	CONS VALUE	CONS PRICE	CURR PDI	REAL PDI	EXP-TD RPDI	% G R PDI	% G R RPDI	% G R CONS	CURR WEALTH
ALL CONSUMERS	54725	123029	2.248	109186	48568	21604	19.84	-12.04	-0.11	993114

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0FOREIGN TRADE SIMULATION 1978 Exports by commodity and area EDFG 1 0 0: 0 0 51

0	DEV.PE D MARK	DEV.PI NG MAR	CENTR. PLANN	REST O F WORL	TOTAL	PRICE
1. RAW JUTE	620	391	120	15	1146	3.659
2. JUTE GOODS	524	330	102	13	968	2.975
3. TEA	167	221	32	221	641	4.139
4. LEATHER, HIDES, SKIN	290	183	56	7	537	4.345
5. FISH AND SHRIMPS	94	59	18	2	173	2.385

6. REST	553	348	107	13	1022	3.040
Total	2247	1532	436	271	4486	3.472

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0FOREIGN TRADE SIMULATION — Export prices & competitors' prices — EDFG 1 0 0: 0 0 51

\+ 1978

0	EXPORT PRICES	LAGGED 1 YEAR	LAGGED 2 YEAR	EXPORT TAXES	COMPET PRICES	LAGGED 1 YEAR	LAGGED 2 YEAR	LAGGED 3 YEAR	EXPORT VOLUME
1. RAW JUTE	3.659	1.000	1.000	0.000	1.150	1.580	1.000	1.000	1146
2. JUTE GOODS	2.975	1.000	1.000	0.000	0.900	1.430	1.000	1.000	968
3. TEA	4.139	1.000	1.000	0.000	2.650	1.930	1.000	1.000	641
4. LEATHER, HIDES, SKIN	4.345	1.000	1.000	0.000	2.650	1.580	1.000	1.000	537
5. FISH AND SHRIMPS	2.385	1.000	1.000	0.000	2.650	1.930	1.000	1.000	173
6. REST	3.040	1.000	1.000	0.000	1.200	2.390	1.000	1.000	1022
Total	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4486

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0FOREIGN TRADE SIMULATION — Wage rates and inflation — EDFG 1 0 0: 0 0 51

\+ 1978

0	AV-GE WAGE	LAGGED 1 YEAR	MONEY CHANGE	% CHANGE	TOTAL EMP-T	TOTAL UNEM-T	UNEM-T RATE	% G R PRICES	% G R RET-NS
1. TOTAL EMPLOYMENT	2496	1	2495	*********	22113	7787	0.26	36.25	0.00

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0FOREIGN TRADE SIMULATION — Indirect taxes by expenditure category — EDFG 1 0 0: 0 0 51

\+ 1978

0	COMMOD -ITIES	INDUS -TRIES	CONSUM -PTION	GOVERN -MENT	REC- EIPTS	INST-L SECTOR	STOCK- BLDING	INVEST MENT	FINANC ASSETS	EXPORT	IMPORT	TOTAL
1. INDIRECT TAXES	0	-1259	5717	0	0	0	0	0	0	0	3252	7710

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0FOREIGN TRADE SIMULATION — Aggregate investment by asset — EDFG 1 0 0: 0 0 51

\+ 1978

0	SOCIAL (VOL)	IND-L (VOL)	TOTAL (VOL)	SOCIAL (VAL)	IND-L (VAL)	TOTAL (VAL)	ASSET PRICE	TOTAL TAX	TAX RATE
1. FIXED CAPITAL INVEST	300	3970	4270	869	11497	12366	2.896	0	0.000

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0FOREIGN TRADE SIMULATION — Industrial wages, profits and taxes — EDFG 1 0 0: 0 0 51

\+ 1978

0 / + Part 1	OUTPUT VALUE	MATS INPUT	WAGE BILL	PROFIT	DIRECT IMPORT	OTHER INPUTS	TAX ON LABOUR	TAX ON OTPUT	TAX ON INPUT	TOTAL TAXES	UNIT L COST	AV-GE WAGES
1. AGRICULTURE	88822	22145	38947	32039	0	561	0	0	-888	-928	0.899	2407
2. INDUSTRY	34086	14468	5723	14223	0	-526	0	0	-136	-138	0.406	2720
3. CONSTRUCTION	10668	4665	474	5524	0	-825	0	0	-128	-126	0.132	2631
4. ELECTRICITY, GAS	3092	262	715	2218	0	46	0	0	0	0	0.469	2631
5. TRANSPORT	8573	1713	1043	6314	0	-322	0	0	-343	-350	0.255	2631
6. TRADE	8972	1221	916	6946	0	-667	0	0	0	0	0.172	2631
7. GOVERNMENT, SERVICES	27652	6281	6922	14724	0	-341	0	0	277	283	0.529	2631
Total	182141	50755	54740	81988	0	-2075	0	0	-1219	-1259	0.644	1182

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0 / + Part 2	IND-L PRICE
1. AGRICULTURE	2.050
2. INDUSTRY	2.419

3.	CONSTRUCTION	2.977
4.	ELECTRICITY, GAS	2.027
5.	TRANSPORT	2.099
6.	TRADE	1.683
7.	GOVERNMENT, SERVICES	2.112
	Total	2.139

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0FOREIGN TRADE SIMULATION Commodity demands and supplies EDFG 1 0 0: 0 0 51
+ 1978

0

+ Part 1

		CONSUM -PTION	GOVERN -MENT	INVEST -MENT	STOCK -BD'NG	FINAL DEMAND	INTERM DEMAND	HOME DEMAND	EXPORT DEMAND	TOTAL DEMAND	IMPORT SUPPLY	IMPORT DUTIES	TOTAL OUTPUT
1.	AGRICULTURE	35137	0	0	0	35137	6505	41642	2509	44151	722	101	43328
2.	INDUSTRY	8784	0	1025	0	9809	5059	14869	1747	16616	2021	505	14089
3.	CONSTRUCTION	0	0	3246	0	3246	224	3469	115	3584	0	0	3584
4.	ELECTRICITY, GAS	1657	0	0	0	1657	346	2004	115	2118	494	99	1525
5.	TRANSPORT	1657	0	0	0	1657	2466	4124	115	4238	146	9	4084
6.	TRADE	0	0	0	0	0	5362	5362	115	5476	146	0	5330
7.	GOVERNMENT, SERVICES	7707	1331	0	0	9038	3999	13037	115	13151	60	1	13091
	Total	54944	1331	4270	0	60545	23961	84506	4829	89335	3590	715	85031

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0

+ Part 2

		TOTAL SUPPLY											
1.	AGRICULTURE	44151											
2.	INDUSTRY	16616											
3.	CONSTRUCTION	3584											
4.	ELECTRICITY, GAS	2118											
5.	TRANSPORT	4238											
6.	TRADE	5476											
7.	GOVERNMENT, SERVICES	13151											
	Total	89335											
	DIRECT IMPORTS	0	0	0	0	0	0	0	0	0	0	0	0
	INDIRECT TAXES	5717	0	0	0	5717	0	5717	0	5717	0	0	5717
	OTHER VALUE-ADDE	0	0	0	0	0	0	0	0	0	0	0	0
	FOREIGN TOURISTS	0	0	0	0	0	0	0	0	0	0	0	0
	GRAND TOTAL	60661	1331	4270	0	66262	23961	90223	4829	95052	3590	715	90748
	DIRECT IMPORTS	0											
	INDIRECT TAXES	5717											
	OTHER VALUE-ADDE	0											
	FOREIGN TOURISTS	0											
	GRAND TOTAL	95052											

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0FOREIGN TRADE SIMULATION Aggregate employment & unemployment EDFG 1 0 0: 0 0 51
+ 1978

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		IND-L EMPT	GOV-T EMPL-T	H-HOLD EMPL-T	TOTAL EMPL-T	REG-D UNEM-L	UNREGD UNEM-T	TOTAL UNEM-T	LABOUR FORCE	REG-RD U RATE	TOTAL URATE
1.	TOTAL EMPLOYMENT	22113	0	0	22113	7787	0	7787	29900	26.04	26.04

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0FOREIGN TRADE SIMULATION Sector incomes and expenditures EDFG 1 0 0: 0 0 51
+ 1978

0

		HOUSHO LDS	COMPAN IES	GOVERN MENT	R.O.W
1.	WAGES	51524	0	0	0
2.	PROFITS	58876	37577	5131	0
3.	TAXES	0	0	8924	0
4.	IMPORTS	0	0	0	0
5.	GOODS, SERVICES	0	0	12756	16234

	HOUSHOLDS	COMPANIES	GOVERNMENT	R.O.W
Total	110400	37577	26811	16234

	HOUSHOLDS	COMPANIES	GOVERNMENT	R.O.W
1. WAGES	0	0	0	979
2. PROFITS	0	0	17475	0
3. TAXES	1214	0	0	0
4. IMPORTS	0	0	0	0
5. GOODS, SERVICES	123029	0	2805	30053
Total	124243	0	20280	31032

	HOUSHOLDS	COMPANIES	GOVERNMENT	R.O.W
SECTOR SAVING	-13843	375[illegible]	65[illegible]1	-14798

0FOREIGN TRADE SIMULATION   Input-output flows at constant prices   EDFG 1 0 0: 0 0 51

1978

	AGRICULTURE	INDUSTRY	CONSTRUCTION	ELECTRICITY,	TRANSPORT	TRADE	GOVERNMENT,
1. AGRICULTURE	4809	1282	326	0	20	[illegible]	0
2. INDUSTRY	433	2804	1308	61	355	43	79
3. CONSTRUCTION	0	0	0	0	0	[illegible]	223
4. ELECTRICITY, GAS	0	183	0	27	16	27	92
5. TRANSPORT	1863	324	0	0	0	0	249
6. TRADE	4073	1226	0	0	0	0	0
7. GOVERNMENT, SERVICES	260	493	219	11	314	490	2199
Total	11439	6312	1853	99	706	560	2841

0FOREIGN TRADE SIMULATION   Use of resources and condensed tables   EDFG 1 0 0: 0 0 51

1979

	GDP	C'EXP	GOV'T	INV'T	STKB'G	EXPORTS	IMPORTS
1973 prices	66199	59022	1597	4465	0	4829	3714
Current prices	152341	135178	3415	12945	0	17413	16610
Price indices	2.301	2.290	2.138	2.899	-0.000	3.606	4.472
Inflation rates	1.74	1.88	1.45	0.13	0.00	0.67	-1.12
% growth volume	7.52	7.85	19.98	4.55	0.00	0.00	3.47
Growth from 1978	12.55	7.73	44.00	25.03	0.00	44.37	9.40

TRADE		EMPLOYMENT	
Balance of trade	803	Employment	22934
Export index	313.6	Unemployment	7775
Terms of trade	80.6	Unem rate	25.32
% change in tt	1.81	Growth emplt	3.71

Part 1

	Consum -ption	Govern -ment	Invest -ment	Stock -bd'ng	Final demand	Interm demand	Home demand	Export demand	Total demand	Import supply	Import duties	Total output
1. Primary	37267	0	0	0	37267	6738	44004	2509	46513	749	105	45659
2. Manufacturing	9317	0	1072	0	10388	5293	15681	1747	17429	2119	530	14780
3. Construction	0	0	3393	0	3393	237	3630	115	3745	0	0	3745
4. Services	11690	1597	0	0	13287	12669	25956	458	26414	846	108	25460
Total commodities	58273	1597	4465	0	64335	24937	89272	4829	94101	3714	743	89644
Direct imports	0	0	0	0	0	0	0	0	0	0	0	0
Indirect taxes	5862	0	0	0	5862	0	5862	0	5862	0	0	5862
Other value-added	0	0	0	0	0	0	0	0	0	0	0	0
Foreign tourists	0	0	0	0	0	0	0	0	0	0	0	0
Grand total	64135	1597	4465	0	70197	24937	95134	4829	99963	3714	743	95506

Part 2

	Total supply
1. Primary	46513
2. Manufacturing	17429
3. Construction	3745
4. Services	26414
Total commodities	94101
Direct imports	0