Outline
of
the ICSEAD US Model

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Outline of the ICSEAD US Model(*)

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I. Introduction

This paper gives an outline of the "ICSEAD US Model" which ICSEAD developed as a part of the ICSEAD World Link Model(1). The ICSEAD World Link Model is an annual macro-econometric model comprising the country models for Japan, US, NIEs countries (Korea, Taiwan and Hongkong for the time being) and ASEAN countries (Thailand and Malaysia for the time being) and the Fukuoka model which is a sub-model of the Japan Model. Reflecting the increasingly active flows of trade and direct investment among these countries, the model is designed to describe the mutual dependence of as many economic variables as possible and provide medium- to long-term economic forecasts. Since the US Model, like the Japan Model, performs an important role in the entire system, its size is larger than other national models.

The development of macro-economic models for American economy dates back to the studies initiated by Klein (1950) and Goldberger (1955). During the
1960s when American economy grew steadily, many government agencies, with the Department of Commerce at the helm, colleges and universities, and private research institutes developed macro-econometric models for American economy that have been used for the analysis of the effects of Keynesian economic policies etc. In the following 1970s, such significant structural changes as the collapse of the Bretton Woods system and the sudden hike of oil prices threw the macro-economies in the United States and other industrially advanced nations into a turmoil. As a consequence, doubts were raised about the reliability of the macro-econometric models developed on the basis of stable economic structures and the effectiveness of the traditional Keynesian economic policies closely associated with them. Accordingly, the conventional macro-econometric models were required to make various breakthroughs. To be specific, for example, they were required to incorporate the mutual influences of monetary and real economy while maintaining the Keynesian economic model style. The need to prepare such overseas transaction blocks as can reflect exchange rates was also studied. The MPS model (Brayton and Mauskopf(1985)) of the Board of Governors of the US Federal Reserve System and the US Model in the World Economic Model (Amano et al.(1981)) of the Economic Planning Agency of Japan are typical examples of the models developed to meet the above requirements.

The ICSEAD US Model to be discussed below is based on Inada’s macro-econometric model for US economy (Inada,(1991)) which was developed based on the historical and theoretical backgrounds mentioned above. Inada’s model is a standard Keynesian model of the demand-predetermined type in which supply restriction and mutual association between monetary and real economy are considered.

One of the key improvements added to Inada’s former model was to separate the consumption expenditures of the government from its investment expenditures. American economic statistic systems are unique; they are based on the national income and product account (NIPA) rather than on the system of national account (SNA). Indeed, standardized statistical data can be used over a long period of time since American system has been conventional, however the structure of Econometric model for the United States should involve some structural deviations from such SNA based models as the ICSEAD Japan Model and Fukuoka Model since NIPA concepts differ from those used in Japan and other countries employing the SNA. Recently, roles of social capital by government investment and armament
reduction after the end of the Cold War are often discussed together in the United States (Aschauer (1989) and Munnell (1990)). Therefore, the ICSEAD US Model is designed to analyze the effects of government investment on entire economy by formulating private and government capital stocks in separate concepts.

A full list of the equations and variables used in the Model is given in the appendix. The numbers suffixed to the variables or used in the following description with [ ] correspond to the equation numbers in the equation list.

As this paper is confined to the description of main features of the ICSEAD US Model, the results of simulation analyses of economic policies made by the use of the ICSEAD US Model will be reported later.

II. Structure of the ICSEAD US Model

The ICSEAD US Model consists of nine blocks as shown in Chart II-1. The system of national account (SNA) distinguishes an "income-outlay account" dealing with current income and expenditure from a "capital finance account" dealing with accumulation of real capital stock or financial assets. By comparison, the National Income and Product Accounts (NIPA) of the United States does not make such distinction about the government accounting as mentioned before. (In the NIPA, the consumption and investment expenditures of the government and their resources are not clearly distinguished.) The ICSEAD US Model divides the government expenditure into consumption and investment expenditures, as will be discussed later in II-1, Gross National Expenditure block. While the SNA has five institutional sectors; i.e., non-financial incorporated enterprises, financial institutions, general government, private non-profit institutions serving households, and households, the ICSEAD (NIPA based) US Model has only two broader sectors, private and government, if anything. Roughly speaking, the National Income block (II-2) covers the economic activities of private incorporated enterprises and households, whereas the Government Accounts block (II-3) covers those of the government. The main features of each block will be discussed below.
II-1. Gross National Expenditure Blocks (Real and Nominal)

The ICSEAD US Model is basically a conventional Keynesian demand-predetermined type model centered on two Gross National Expenditure blocks. Chart II-2 shows the variables used in these two blocks. The nominal and real variables respectively correspond to the items listed in Table 1.1 Gross National Product and Table 1.2 Gross National Product in Constant Dollars of the NIPA accounts.

Final consumption expenditure of households was divided into expenditure for durable goods[A-02], non-durable goods[A-05] and services[A-08]. Expenditure for durable goods was sub-divided into purchase of automobiles[A-03] and other durable goods[A-04], whereas expenditure for non-durable goods into purchase of gasoline[A-06] and other non-durable goods[A-07]. For an explanation of the expenditure for durable goods, disposable income and interest on consumer loans were considered. The expenditure for nondurable goods was, as a rule, expressed as a function of disposable income and the relative price of purchased goods. As to the expenditure for gasoline, the number of automobiles possessed by households was also considered.
## Chart II-2. Variables for Gross National Expenditure

<table>
<thead>
<tr>
<th>Final Consumption Expenditure of Households</th>
<th>Real</th>
<th>Nominal</th>
<th>Deflator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Durable Goods</td>
<td>US_CP</td>
<td>US_CPN</td>
<td>US_PCP</td>
</tr>
<tr>
<td>Automobile</td>
<td>US_CPD</td>
<td>US_CPDN</td>
<td>US_PCPD</td>
</tr>
<tr>
<td>Others</td>
<td>US_CPD</td>
<td>US_CPDNM</td>
<td>US_PCPDM</td>
</tr>
<tr>
<td>Nondurable Goods</td>
<td>US_CPND</td>
<td>US_CPNDN</td>
<td>US_PCPND</td>
</tr>
<tr>
<td>Gasoline</td>
<td>US_CPNDG</td>
<td>US_CPNDGN</td>
<td>US_PCPNDG</td>
</tr>
<tr>
<td>Others</td>
<td>US_CPND</td>
<td>US_CPNDON</td>
<td>US_PCPND</td>
</tr>
<tr>
<td>Services</td>
<td>US_CPS</td>
<td>US_CPSN</td>
<td>US_PCPS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Private Investment Expenditure</th>
<th>Real</th>
<th>Nominal</th>
<th>Deflator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Investment</td>
<td>US_IP</td>
<td>US_IPN</td>
<td>USPIP</td>
</tr>
<tr>
<td>Business Capital Investment for Plant and Equipment</td>
<td>US_FNR</td>
<td>US_IFN</td>
<td>US_PIFR</td>
</tr>
<tr>
<td>Increase in Inventory</td>
<td>US_J</td>
<td>US_JN</td>
<td>US_PKJ</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Balance of Current Account</th>
<th>Real</th>
<th>Nominal</th>
<th>Deflator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export of Goods and Services</td>
<td>US_BEM</td>
<td>US_BEMN</td>
<td>US_BEM</td>
</tr>
<tr>
<td>Import of Goods and Services (-)</td>
<td>US_EX</td>
<td>US_EXN</td>
<td>US_PEX</td>
</tr>
<tr>
<td>Gross National Products (Expenditure)</td>
<td>US_GDP</td>
<td>US_GDPN</td>
<td>US_PGDP</td>
</tr>
</tbody>
</table>

Private investment expenditure[A-09] was divided into residential investment[A-10], non-residential investment for plant and equipment[A-11] and increase in inventory[A-12]. For a residential investment function, an ordinary income factor and a cost factor (interest burden) were considered, and stock adjustment is also a significant explanatory variable. Business non-residential investment for plant and equipment can be explained by the use of real national income (activity factor) and stock adjustment (a negative function of stock). Business inventory investment was explained by the use of an stock adjustment factor (a negative function of stock), a demand factor (a positive function of production level) and a cost factor (a negative function of interest burden).

Nominal NIPA-based variables for export and import were determined through statistical equations connecting the IMF-based values first determined in the Overseas Transaction block. Then, real NIPA-based variables were determined by dividing the nominal variables by the corresponding deflators. The method of connection will be fully discussed later in II-6 Overseas Transaction Block.
[Division of Government Expenditure]

The NIPA-based statistics do not divide the expenditure of the general government into consumption and investment. Instead, they divide the expenditure into one by the federal government and one by the state and local governments. The former includes national defence and other expenditures of the federal government, whereas the latter includes educational and other expenditures of the local governments. In the ICSEAD US Model, the variables for these government expenditures were divided into those for consumption and investment in a manner as described below.

First, government capital stock data was defined by the use of Musgrave's data (Musgrave(1992)). The net capital stock (net fixed asset) based on the fixed price of 1987 was used as the government capital stock in the model. However, the capital stock associated with national defence was deducted from the original data since it would not work as a production factor to add new values. The capital stock of the government has the following relationship with its investment expenditure:

Federal Government:

\[
\text{US\_KNFFND} \text{ (capital stock of the current period)} = \text{US\_KNFFND} [-1] \text{ (capital stock of the preceding period)}
+ \text{US\_IFFND} \text{ (non-national-defence investment expenditure)}
- \text{US\_RNFFND} \text{ (replacement)}
\]

State and Local Governments:

\[
\text{US\_KNFSL} \text{ (capital stock of the current period)} = \text{US\_KNFSL} [-1] \text{ (capital stock of the preceding period)}
+ \text{US\_IFSL} \text{ (investment expenditure)}
- \text{US\_RNFSL} \text{ (replacement)}
\]

Given the value of replacement of capital stock, the investment expenditure of the federal, state and local government can be derived from the above equations and their capital stock data. In this paper, the rate of replacement of the governmental capital stock is assumed to be equal to that of the private capital stock. The consumption expenditure can be obtained by deducting the investment expenditure from the total government expenditure in the NIPA account.

The real variables for the investment and consumption expenditures of the government were treated in the model as exogenous variables. The nominal vari-
ables for the governmental demand items were derived by multiplying the real variables by their corresponding deflators. Chart II-3 lists the government expenditure variables used in the ICSEAD US Model.

**Chart II-3. Government Expenditure Variables**

<table>
<thead>
<tr>
<th></th>
<th>Real</th>
<th>Nominal</th>
<th>Deflator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Government Expenditure</strong></td>
<td>US_G</td>
<td>US_GN</td>
<td>US_PG</td>
</tr>
<tr>
<td>National Defence Expenditure</td>
<td>US_GFD(*)</td>
<td>US_GFDN</td>
<td>US_PGFD</td>
</tr>
<tr>
<td>Others</td>
<td>US_GFND</td>
<td>US_GFNDN</td>
<td>US_PGFND</td>
</tr>
<tr>
<td>Consumption Expenditure</td>
<td>US_CGFD(*)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Investment Expenditure</td>
<td>US_IFFND(*)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>State and Local Governments</td>
<td>US_GSL</td>
<td>US_GSLN</td>
<td>US_PGSL</td>
</tr>
<tr>
<td>Consumption Expenditure</td>
<td>US_CGSLF(*)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Investment Expenditure</td>
<td>US_IFSL(*)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note: The asterisked variables are exogenous variables.*

**II-2. National Income Block**

The National Income block deals with the distribution of income in the United States. National income (at factor cost) [C-01] can be derived from the gross domestic product in the following equation.

\[
\text{National income} = \text{gross domestic product} - \text{depreciations} - (\text{indirect taxes} - \text{net subsidies}) - \text{transfer payment of firms} - \text{statistical discrepancy}^{(3)}
\]

National income used in the model was derived from the same equation. The account concerning the distribution of national income corresponds to Table 1.14, National Income by Type of Income in the NIPA account, whereas the breakdown of personal income and expenditure is based on Table 2.1, Personal Income and Its Disposition. Charts II-4 and II-5 show the relationship between these NIPA accounts and the variables used in the National Income Block of the ICSEAD US Model.

National income can be broadly classified into corporate profits, proprietors’ income and compensation of employees as outlined below.
[Corporate Profits]

Corporate Profits[C-04] is the aggregate of the operating surplus (in SNA concept) and net property income of corporate businesses. The value of corporate profit in this model is defined in a close definition used in actual corporate accounting. It is explained on the basis of and the balance obtained by deducting corporate wage costs from the total national income corporate financial cost. The balance obtained by deducting stock valuation adjustment[C-09] and capital consumption adjustment[C-10] from corporate business income is corporate profit before tax[C-05]. Stock valuation adjustment and capital consumption adjustment are explained in terms of the fluctuations of inventory deflator and private enterprise capital investment deflator. Deducting corporate direct tax (defined in the Government Accounts Block) from corporate profit before tax leaves after-tax corporate profit[C-06]. After-tax corporate profit is either reserved inside as part of the fund for investment[C-08] or paid to individuals as dividend[C-07] that constitutes part of their disposable income.

Chart II-4. Distribution of National Income

<table>
<thead>
<tr>
<th>National Income</th>
<th>US_NIF</th>
<th>[C-01]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compensation of Employees</td>
<td>US_YWT</td>
<td>[C-02]</td>
</tr>
<tr>
<td>Wage and Salary (on Accrual Basis)</td>
<td>US_YW</td>
<td>[C-13]</td>
</tr>
<tr>
<td>Wage and Salary (on Payment Basis)</td>
<td>US_WDF(*)</td>
<td>[C-13]</td>
</tr>
<tr>
<td>Balance between Wages and Salaries on Accrual and Payment Basis</td>
<td>US_WDS(*)</td>
<td></td>
</tr>
<tr>
<td>Employer Contribution for Social Insurance</td>
<td>US_SSCC(*)</td>
<td></td>
</tr>
<tr>
<td>Other Labor Income</td>
<td>US_YOL</td>
<td>[C-14]</td>
</tr>
<tr>
<td>Proprietors’ Income (with Adjustment of Inventory Valuation and Capital Consumption) and Rent</td>
<td>US_YPRP</td>
<td>[C-03]</td>
</tr>
<tr>
<td>Corporate Profits (with Adjustment of Inventory Valuation and Capital Consumption)</td>
<td>US_YCICA</td>
<td>[C-04]</td>
</tr>
<tr>
<td>Corporate Profits (with Inventory Valuation Adjustment)</td>
<td>US_YCBT</td>
<td>[C-05]</td>
</tr>
<tr>
<td>Profits Before Tax</td>
<td>US_TG(**)</td>
<td>[D-03]</td>
</tr>
<tr>
<td>Corporate Tax liability</td>
<td>US_YCAT</td>
<td>[C-06]</td>
</tr>
<tr>
<td>Profit After-tax Corporate Business</td>
<td>US_DIVC</td>
<td>[C-07]</td>
</tr>
<tr>
<td>Dividends</td>
<td>US_SC</td>
<td>[C-08]</td>
</tr>
<tr>
<td>Undistributed Profits</td>
<td>US_CIVA</td>
<td>[C-09]</td>
</tr>
<tr>
<td>Inventory Valuation Adjustment</td>
<td>US_CCA</td>
<td>[C-10]</td>
</tr>
<tr>
<td>Capital Consumption Adjustment</td>
<td>US_NINT</td>
<td>[C-12]</td>
</tr>
<tr>
<td>Net Interest</td>
<td>US_NCC</td>
<td>[C-11]</td>
</tr>
</tbody>
</table>

(*) Exogenous variables

(**) Variables determined in other blocks
Proprietors’ income is the aggregate of the income of unincorporated individual businesses, and agricultural, forestry and fishery industries. In the SNA, the imputed rent of owned houses and the income from unincorporated housing rentals constitute part of the income of proprietors. Accordingly, the rent according to the SNA is limited to the rent for unreproducible assets like land or loyalty. By contrast, the NIPA of the United States seems together all these rents in the "Rent" in the National Income Account. The ICSEAD US Model redefined the income of proprietors[C-03] by adding the rent income of individuals to the income of proprietors. Then, the new definition is similar to the concept of the SNA. The income of proprietors was explained in terms of nominal gross domestic product and nominal housing stock that are scale variables.

Chart II-5 shows the breakdown of the personal income account of NIPA. This account is substantially equivalent to the "Income and Outlay Accounts by Institutional Sectors" of the SNA.

Personal income largely consists of compensation of employees[C-02] which is classified into wage and salary, employers contribution for social security, and other labor income. The NIPA handles wage and salary in a somewhat special way. In the NIPA, the wage and salary in the national income accounts are counted on an accrual basis, whereas those in the personal income account on a payment basis. This difference arises when counting the wage and salary paid to the government employees. The "wage and salary" according to the ICSEAD US Model is defined on a payment basis (as in the personal income account). Accordingly, the balance between them was adjusted in the national income accounts(US_YDF for the federal government and US_YDSL for the state and local governments). The personal income account of the NIPA model has two other receipt items, which are collectively called property income. They are the income from interests[C-15] and the income from dividends[C-16]. While the former is explained in terms of the product of the deposit balance and the deposit interest rate, the latter is a function of the dividends paid by corporate businesses. The last receipt item is the income transferred from other sectors.

Expenditure includes the payment of direct taxes[A-02], which is a transfer payment to the government defined in the Government Accounts Block, contribu-
<table>
<thead>
<tr>
<th>Chart II-5. Personal Income Account of the NIPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Consumption Expenditure          US_OPN(***)[B-01]</td>
</tr>
<tr>
<td>Personal Direct Taxes                     US_TP(***)[D-02]</td>
</tr>
<tr>
<td>Contribution for Social Security          US_SSCP[C-18]</td>
</tr>
<tr>
<td>Interest Paid                             US_INTPC[C-21]</td>
</tr>
<tr>
<td>Transfer to Overseas (net)                US_TRPA(*)</td>
</tr>
<tr>
<td>Compensation of Employees                 US_YWT[C-02]</td>
</tr>
<tr>
<td>- Wage and Salary (on a Payment Basis)    US_YW[C-13]</td>
</tr>
<tr>
<td>- Employer Contribution for Social Insurance US_SGCC[C-17]</td>
</tr>
<tr>
<td>- Other Labor Income ex                  US_YOL[C-14]</td>
</tr>
<tr>
<td>Proprietors' income and Income from Rental US_YPRP[C-03]</td>
</tr>
<tr>
<td>Income from Interest                      YS_YINT[C-15]</td>
</tr>
<tr>
<td>Income from Dividends                     US_YDIV[C-16]</td>
</tr>
<tr>
<td>Transfer Income</td>
</tr>
<tr>
<td>- From Federal Government                 US_TREP(***)[D-19]</td>
</tr>
<tr>
<td>- From State and Local Government         US_TRSLP(***)[D-34]</td>
</tr>
<tr>
<td>- From Corporate Business                 US_TRCP(*)</td>
</tr>
</tbody>
</table>

| Personal Saving                           US_SP[C-22] |
| Total of Expenditure                      Total of Income |

(*) Exogenous variables
(**) Variables determined in other blocks

The contribution for social security[C-18], and payment of interests, which is mainly to the corporate business sector. The contribution of social security is a function of wage and salary, whereas payment of interests is a function of nominal consumption and the rate of interest.

In the personal income account of the NIPA, the balance obtained by deducting the contribution for social security from the aggregate of all receipt items is called "Personal Income"[C-19]. Then, the balance obtained by further deducting the direct taxes paid by individuals therefrom is called "Personal Disposable Income"[C-20] (substantially like the definition in the SNA). Personal disposable income, in turn from another point of view, is the aggregate of personal expenditures (which is the aggregate of personal final consumption expenditure, personal payment of interests and personal transfer payment to overseas) and personal savings. The amount of personal disposable income, therefore, is for the choice between immediate consumption and accumulation of assets (houses and financial assets). Accumulated saving is called "Net Worth", which is in other words the difference between the total assets and total liabilities of individual persons.
By the way, the "income and outlay account" in the SNA deals with the current flow of goods, services and funds, whereas the "capital finance account" deals with the distribution of savings to real or financial assets. The NIPA however, has no perfect counterparts of them as repeatedly mentioned. Then "Saving-Investment Balance" (SI Balance) is unfortunately not given sector wise in the NIPA. SI Balance is an indicator of a relative increase in the financial assets (surplus) of individual sectors or a relative increase in their liabilities (deficit).

Among most of advanced countries, the SI Balance of households is usually positive. The balance, therefore, is used for increasing the net amount of financial assets after part of personal savings has been invested in real assets. And the financial assets built up by households directly or indirectly finance the investment activities of the corporate business sector. The so called deficit of the government sector means a negative SI Balance of the government, which is also primarily filled with personal savings directly or indirectly. Institutional investors gathering funds from household sector have powerful influences over the tender of the US government bonds. Since the sum total of SI Balance of all sectors including the overseas sector should be zero, the sum total of SI Balance of all domestic sectors of the United States means net increase in American claims to foreign countries or, in other words, corresponds to the current account balance of payments. As is well known, the net increase in the US claims to foreign countries has been negative since the 1980s, posing a serious problem at home and globally.

II-3. Government Accounts Block

[General Government]

Chart II-4 lists the accounts of the general government. This block is solely for the merging of the accounts of the federal, state and local governments. The accounts shown in Chart II-4 corresponds to the aggregate of Table 3.2 Federal Government Receipts and Expenditures and Table 3.3 the State and Local Government Receipts and Expenditures of the NIPA, and compares to the "Current and Capital Transactions of the General Government" in the Annual Report on National Accounts of Japan. The government accounts of the NIPA are also not classified into current and capital expenditures as done in the SNA. In other words, the government accounts of the NIPA looks like a combination of the "Income and Outlay Accounts" and the "Capital Finance Accounts" of the general government according to the SNA, one placed on top of the other. Recently in the United
States, however, it is often discussed that the consolidation of social capital by
government investments could contribute to the improvement of productivity of US
industries. Therefore, the ICSEAD US Model tried to separate the capital expend-
itures of the governments from their total expenditures, as mentioned previously.

**Chart II-6. Accounts of the General Government**

<table>
<thead>
<tr>
<th>Purchase of Goods and Services</th>
<th>US_GN(***)</th>
<th>Personal Direct Tax</th>
<th>US_TP</th>
</tr>
</thead>
<tbody>
<tr>
<td>State and Local Governments</td>
<td>US_GSLN(***)</td>
<td>State and Local Governments</td>
<td>US_TPSL</td>
</tr>
<tr>
<td>Transfer Payments</td>
<td>US_TRG</td>
<td>Corporate Direct Tax</td>
<td>US_TC</td>
</tr>
<tr>
<td>Federal Government</td>
<td>US_TRF</td>
<td>Federal Government</td>
<td>US_TCF</td>
</tr>
<tr>
<td>State and Local Governments</td>
<td>US_TRSLP</td>
<td>State and Local Governments</td>
<td>US_TCSL</td>
</tr>
<tr>
<td>Net Interests Paid</td>
<td>US_NINTG</td>
<td>Indirect Business Tax</td>
<td>US_TI</td>
</tr>
<tr>
<td>State and Local Governments</td>
<td>US_NINTSL</td>
<td>State and Local Governments</td>
<td>US_TICL</td>
</tr>
<tr>
<td>Net Subsidies</td>
<td>US_SUB</td>
<td>Contribution for Social Security</td>
<td>US_SSCG</td>
</tr>
<tr>
<td>State and Local Governments</td>
<td>US_SUBSL</td>
<td>State and Local Governments</td>
<td>US_SSCSL</td>
</tr>
<tr>
<td>Surplus or Deficit</td>
<td>US_SG</td>
<td>Dividends Receivable</td>
<td>US_YDIVG(*)</td>
</tr>
<tr>
<td>Federal Government</td>
<td>US_SF</td>
<td>State and Local Governments</td>
<td>US_YDIVG(*)</td>
</tr>
<tr>
<td>State and Local Governments</td>
<td>US_SSL</td>
<td>Balance between Accrued and Paid Wages</td>
<td>US_WDF(*)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Federal Government</td>
<td>US_WDSL(*)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>State and Local Governments</td>
<td>US_WDSL(*)</td>
</tr>
<tr>
<td>Total Annual Expenditure</td>
<td>US_TGR</td>
<td>Total Annual Revenue</td>
<td>US_TGE</td>
</tr>
</tbody>
</table>

(*) *Exogenous variables*

(***) *Variables determined in other blocks*

**[Federal Government]**

Chart II-7 shows the accounts of the federal government. Personal direct taxes
[D-12], corporate direct taxes [D-14], indirect business taxes[D-15] and contribution
for social security [D-17] are the financial resources of the federal government.
Their equations tend to lack stability as most of their variables are strongly in-
fluenced by institutional factors. To avoid such instability, therefore, the personal
direct taxes, corporate direct taxes, indirect business taxes and contribution for social
security expenses were respectively expressed as products obtained by multiplying
certain exogenous variables and suitable base variable. The multiplied exogenous
variables were their ratios to the taxable personal income, corporate income before
tax, personal consumption expenditure and wage payment, respectively. For in-
direct tax, the equation was made to permit the analysis of the effect of the possible
introduction of gasoline tax[D-16] in the future.
The expenditures include the purchase of goods and services, transfer payments[D-19], grants in aid to the state and local governments(exogenous), payment of net interests[D-27] and net subsidies(exogenous). The transfer payments to individuals correspond to the social security benefits and social assistance grants in the SNA. The amounts of their payments were assumed almost proportional to the wage of individuals. The payment of net interests was expressed as a function based on the outstanding of the government bonds and their rate of interest. The "grants in aid to state and local government" and the "net subsidies" are exogenous.

Though the NIPA does not distinguish consumption expenditures from investment expenditures as the SNA does, the fiscal surplus of the federal government, which is the difference between its annual expenditures and income, corresponds to SI Balance in accordance to the SNA. The amount of a negative fiscal surplus corresponds to the amount of the revenue shortfall or the government bonds to be issued for makeup.

**Chart II-7. Revenue and Expenditure Accounts of the Federal Government**

| Purchase of Goods and Services | Purchase of Goods \& Services | US_GFN(**) |
| Transfer Payments | LEV | | US_TRF |
| To Persons | | | US_TRFP |
| To Foreigners | | | US_TRFA |
| Grants in Aid to State and Local Government | | | US_GRASL(*) |
| Net Interests Paid | | | US_NIINTFA |
| To Persons | | | US_NIINTFPC |
| To Foreigners | | | US_NIINTFA |
| Net Subsidies | | | US_SUBF(*) |
| Surplus or Deficit | | | US_SF |
| Total Expenditure | | | US_TFR |
| Personal Personal Tax | | | US_TPF |
| Corporate Direct Corporate Tax | | | US_TCF |
| Indirect Business Tax | | | US_TIF |
| Contribution for Social Security | | | US_SSCF |
| Difference between Accrued and Paid Wage and Salary | | | US_WDF(*) |

(*) Exogenous variables
(**) Variables determined in other blocks

[State and Local Governments]

Chart II-8 shows the accounts of the state and local governments, which were formulated essentially in the same way as those of the federal government. However, there are some differences between them as given below. To begin with, the grants in aid from the federal government (US_GRASL) is, of course, equal to the grants in aid to the state and local governments in the accounts of the federal government. They concretely correspond to the local allocation tax, local transfer
tax and national treasury disbursements of Japanese fiscal system. Next, the state and local governments have the dividend receipt(exogenous) in their revenue items since they are allowed to invest in enterprises promoting the public interest. The direct personal tax[D-30], corporate tax[D-31], indirect business taxes[D-34] and contribution for social security[D-35] were essentially equal to those in the federal government's account. However, the municipal property tax[D-33] among the indirect taxes was defined as a function of residential stock.

**Chart II-8. Revenue and Expenditure Accounts of the State and Local Governments**

| Purchase of Goods and Services | US_GFSN(**) | Personal Direct Tax | US_TPSL |
| Transfer Payments | US_TRSL | Corporate Direct Tax | US_TCSL |
| Net Interests Paid | US_NINTSL | Indirect Business Tax | US_TSL |
| Net Subsidies | US_SUBSSL(*) | Contribution for Social Security | US_SSCSL |
| | | Grants in Aid from Federal Government | |
| Surplus or Deficit | US_SSL | Dividends Receivable | US_YDIVG(*) |
| | | Difference between | US_WDSL(*) |
| | | Accrued and Paid Wage and Salary | |
| Total Expenditure | US_TSLR | Total Revenue | US_TSLE |

(* *) *Exogenous variables*

(** ) *Variables determined in other blocks.*

II-4. Employment, Wage and Deflator Blocks

These blocks determine the volume of employment according to the amount of production and adjust the level of wage according to the labor market situation. As has been mentioned repeatedly, the ICSEAD US Model is designed so that the consolidation of social capital by government investments may contribute to the improvement of productivity. To allow such design, private and government capital stocks had to be formulated separately. The variables concerning the private and government capital stocks were based on those proposed by Musgrave (1992).

The production function used in the ICSEAD US Model assumes that the "non-defense" investment activities of the governments are conducive to the consolidation of social capital and the increase of private production capacities. It is assumed here that the function specification is a conventional log-linear type of constant returns to scale. The estimated production function is given below.
\[
\ln \left( \frac{\text{GDPNG}}{\text{CUM} \times \text{KNFNR}[-1]} \right) = -0.575 + 0.004 \times \text{TIME} \\
+ 0.745 \times \ln \left( \frac{(N-\text{NG}) \times \text{HOUR}}{\text{CUM} \times \text{KNFNR}[-1]} \right) + 0.097 \times \ln \left( \frac{\text{KNFFND}[-1] + \text{KNFSL}[-1]}{\text{CUM} \times \text{KNFNR}[-1]} \right)
\]

where

- GDPNG = non-governmental gross domestic product,
- CUM = operating ratio of manufacturing industry,
- KNFNR = private equipment capital stock,
- N = total number of persons engaged,
- NG = persons engaged in governmental jobs,
- HOUR = mean weekly working hours,
- KNFFND = capital stock owned by the federal government, and
- KNFSL = capital stock owned by the state and local governments.

The estimation made by Aschauer(1992) claims that the capital productivity of the private sector increases by 0.4 % when the ratio of government capital stock to private capital stock increases by 1 %. According to the production function estimated for the ICSEAD US Model, however, the coefficient for the government capital stock (the second term on the right side) is approximately 0.1. Therefore, its effect is approximately only one-fourth the magnitude claimed in the above estimation.

The ICSEAD US Model determines the price essentially in the same way as the ICSEAD Japan Model. Chart II-9 schematically shows how the volume of employment, wage, and prices are determined. The price variable that constitutes the core of the ICSEAD US Model is the producer’s price index[G-01]. The producer’s price index is determined based on wage per head, labor productivity, import deflator[G-12], which are the cost factors of production, and the operating ratio of manufacturing, which reflects the relationship between supply and demand of goods. The operating ratio is explained in terms of the "level of supply capacity" derived from the production function and the "level of gross domestic product" that is defined the aggregate of final demand components.

The wage per head function[G-21] based on the Phillips curve is an increasing function of the personal consumption expenditure deflator and labor productivity[G-24], and a decreasing function of the rate of unemployment. While fluctuations in producer’s prices affect the deflators of all final demand components, those in the deflator of private final consumption expenditure affect the wage level as a feedback. The mutual-relation among those variables is shown in Chart II-9. When the
demand for goods increases in the ICSEAD US Model, employment and household income increase and consumer demand may also again increases. At the same time, however, an increase in final demand and operating ratio can result in a rise in commodity prices and wages which, in turn, can entail a reduction in employment, household income and consumer demand. This system incorporated in the ICSEAD US Model may be described as follows from the ordinary macro-economic viewpoint. As the IS (Investment-Saving) curve sifts rightward with an increase in the demand for goods, the AD (aggregate demand) curve also sifts rightward. This raises not only equilibrium income but also commodity prices and wages salaries, thus eating up part or all of the increased income.

**Chart II-9. Schematic System for Determining Employment, Wage and Salary, and Commodity Prices**

![Diagram](chart.png)

**II-5. Monetary Block**

The main function of the monetary block is to determine the short- and long-term interest rates by the standard method of the Federal Reserve Bank (based on the MPS model used by the Board of Governors of the Federal Reserve System). This method assumes that the short-term interest rate (or the federal fund rate) depends upon the supply-demand relationship of the reserve.
Chart II-10. Balance Sheet of the Federal Reserve Bank

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities and Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loans to Commercial Banks [H-06]</td>
<td>Issued Bank Notes</td>
</tr>
<tr>
<td>Other Credits (Government Bonds, Corporate Bonds, Etc.)</td>
<td>Deposits from Commercial Banks [H-09]</td>
</tr>
<tr>
<td></td>
<td>Required Reserves [H-08]</td>
</tr>
<tr>
<td></td>
<td>Excess Reserves [H-07]</td>
</tr>
<tr>
<td></td>
<td>Current Deposit of Government</td>
</tr>
<tr>
<td></td>
<td>Other Liabilities and Capital</td>
</tr>
</tbody>
</table>

Chart II-10 shows the balance sheet of the Federal Reserve Bank. The ICSEAD US Model assumes that the short-term interest rate is determined as described below. Commercial banks’ demand for the reserve or, in other words, their deposit in the Federal Reserve Bank (reserve deposit[H-09]) consists of the required reserve[H-08] based on their deposit holdings and the excess reserve[H-07] saved with no restrictions. First, the required reserve is decided by multiplying the deposit balance of commercial banks by a given reserve ratio. Next, the excess reserve is assumed as a decreasing function of the federal fund rate. This is because commercial banks are able to find other profitable places to put their money other than excess reserve, when the credit screw is tightened or the federal fund rate is high. Given that the deposit balance of commercial banks is fixed, therefore, the demand function curve of the reserve currency will descend to the right as shown in Chart II-11.

On the other hand, the supply of the reserve looks as follows. From the viewpoint of commercial banks, the sources of reserves which they have are either borrowed from the F.R.B. (the borrowed reserve[H-06]) or derived from their own funds raised mainly through the bond operation with the F.R.B. (the non-borrowed reserve: exogenous variable). The borrowing costs of commercial banks from the Federal Reserve Bank can be divided into the pecuniary cost based on the official discount rate (borrowing rate of interest) and the non-pecuniary one arising from the surveillance of the F.R.B. It may be proper that the latter is an increasing function of the loan from the F.R.B. The supply function of the reserve, therefore, can be plotted as a line graph consisting of a vertical segment and a segment ascending to the upper right as shown in Chart II-11, if the total borrowing cost consisting of the official discount rate and the surveillance cost is reflected on the level of the federal fund rate. The equilibrium interest rate and total reserves is given from their intersection point. As can be seen, the equilibrium interest rate rises when the official discount rate rises, whereas the equilibrium interest rate falls when the non-borrowed reserve increases. Accordingly, the federal fund rate[H-10] in
the model is formulated as a reduced form solving the supply-demand balancing condition of reserve; that is to say, the increasing function of the official discount rate, the decreasing function of the non-borrowed reserve.

**Chart II-11  Decision of Interest Rate by the Method of the Federal Reserve Bank**

The Treasury bill rate[H-11] and the CD rate of the 3-month[H-17], which are relatively short-term interest rate, the yield of federal government bonds[H-13], which is a long-term interest rate, and the mortgage interest rate[H-15] were assumed to be determined on the basis of the federal fund interest rate. The yield rates of corporate[H-14] and municipal government bonds[H-16], were assumed to be determined based on the yield rate of federal government bonds.

To adopt the interest rate determination method just described, it is necessary to treat the money supply as an endogenous variable. The money supply[H-05] (generally classified as M2) is defined as the aggregate of the cash currencies (i.e., notes and coins) in circulation[H-01], demand deposits[H-02] and time and savings deposits[H-04]. The cash currencies and demand deposits are used in the settlement of daily transactions. Usually, the holding of cash currencies is limited to a minimum necessary for the settlement of small settlements. On the other hand, households hold demand deposits as a means for the pre-authorized direct bank debit systems, whereas companies hold them as a means for settling bills and checks.
Therefore, they are an increasing function of domestic demand that is an activity variable, and at the same time a decreasing function of the short-term interest rate (Treasury bill rate in the model) that is an opportunity cost. On the other hand, the time and savings deposits are held out of transaction and asset motives. Therefore, they were defined as an increasing function of not only domestic demand but also the spread between the treasury bill interest rate and CD rate, which is a proxy variable of the net gain.

II-6. Overseas Transaction Block

The overseas transaction block determines the amount of overseas transactions represented by export and import on the statistics of the IMF basis. The national gross expenditure block converts them into, or connect them to, the variables associated with overseas transactions used in the NIPA. Chart II-10 shows the relationship between the overseas transaction block and the overseas transactions defined in the NIPA. There is no doubt that the export and import of commodities in the statistical terms of the IMF ([I-01] and [I-05]) corresponds to the "export and import of goods" according to the NIPA ([B-14] and [B-16]). On the other hand, the "non-trade balance" according to the definition of the IMF is divided into four categories; (1) transportation, (2) travel, (3) investment income, and (4) others. Therefore, the investment income ([I-03] and [I-07]) was separated as a category corresponding to the "factor incomes from and to overseas" ([B-15] and [B-17]) according to the NIPA. Then, the other categories ([I-02] and [I-06]) were gathered together as the "export and import of services" and treated as a part of the "export and import of goods and services" in the NIPA. Since the export and import ([B-14] and [B-16]) in the NIPA consist of those of goods and those of services, the export and import according to the NIPA were determined by connecting the export and import of goods and services on IMF basis through a statistical equation.
Chart II-12. Relationship between the Overseas Transaction Block and the Gross National Expenditure Block

<table>
<thead>
<tr>
<th>Overseas Transaction Block (on IMF Basis)</th>
<th>NIPA's Concept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export of Commodities [I-01]</td>
<td>Export of Goods and Services (Excluding Factor Income from Overseas) [B-14]</td>
</tr>
<tr>
<td>Export of Services (Excluding Investment income) [I-02]</td>
<td></td>
</tr>
<tr>
<td>Export of Services (Investment Income) [I-03]</td>
<td>Factor Income from Overseas [B-15]</td>
</tr>
<tr>
<td>Balance of Transfer Account (Exogenous)</td>
<td>Transfer Payment (net)-(Exogenous)</td>
</tr>
<tr>
<td>Import of Commodities [I-05]</td>
<td>Import of Goods and Services (Excluding Factor Income to Overseas) [B-16]</td>
</tr>
<tr>
<td>Import of Service (Excluding Investment Income) [I-06]</td>
<td></td>
</tr>
<tr>
<td>Import of Services (Investment Income) [I-07]</td>
<td>Factor Income to Overseas [B-17]</td>
</tr>
</tbody>
</table>

The link model system of the ICSEAD has a trade linkage model that deals solely with international and inter-regional commodity trades. Therefore, all commodity trades between countries and regions are decided in the trade linkage model. (In other words, no individual country model has an export or import function as the behavioral equation.) For the basic structure of the trade linkage model and the results of estimation of its import functions, refer to the report made by Inada and Fujikawa(1992). The commodity import equation used in the trade linkage model was derived from the trade matrix data developed by the Institute of Developing Economies (IDE). However, there is some discrepancy between the trade matrix of the IDE and the DOT (Direction of Trade) data announced by the IMF. In the ICSEAD US Model being discussed, therefore, they were connected by use of an exogenous variable representing the ratio between them (the export of commodities[I-01] and import of commodities[I-05]).

The export and import of services ([I-02] and [I-06]) usually occur in the form of the costs of transportation and travel attendant on the export and import of commodities. Accordingly, the export of services was treated as a function of the export of commodities and the import of services as a function of the import of commodities. While the inflow of investment income[I-03] was treated as a function of the balance of overseas assets owned by the United States, the outflow of investment income[I-07] as a function of the balance of assets in the USA owned by the overseas sector.
[Notes]

(*) This paper discloses just the private views of the authors to invite from readers' solicit opinions. As such, the contents of this paper by no means represent the official views of the institutes to which the authors belong.

(1) Several econometric models for the world economy have been developed by, for example, the United Nations (known as the Project LINK), the Economic Planning Agency of Japan (EPA(1991) and the essence of the model summarized by Sadahiro(1992)), the National Institute for Research Advancement (NIRA (1990)) and the Institute of Developing Economies(IDE)(1985). Amano(1985) gives a convenient summary of the world econometric models so far developed.

(2) The BEA Model of the Bureau of Econometric Analysis of the Department of Commerce, the Brookings Model of the Brookings Institute, and the Wharton Model of Pennsylvania University are examples of the macro-econometric models for the US economy. Hickman(1972) gives a convenient summary of these models.

(3) The equation in the NIPA account Table 1.2, Relation of Gross National Product, Net National Product, National Income and Personal Income.


[Bibliography]

Amano, Akihiro, "International Macro-economy Models in Japan: Outline."


APPENDIX

Appendix 1.  Equation List of the ICSEAD US Model

Appendix 2.  Variable List of the ICSEAD US Model
A. GROSS DOMESTIC PRODUCT BLOC (AT CONSTANT PRICES)

[A-01]: USA: US CPD (IDENTITY) (PERSONAL CONSUMPTION EXPENDITURES)
US_CP = US_CPD + US_CPN + US_CPS

[A-02]: USA: US CPD (IDENTITY) (PERSONAL CONSUMPTION EXPENDITURES (DURABLE GOODS))
US_CPD = US_CPD + US_CPD + US_CPD

[A-03]: USA: US CPD (IDENTITY) (PERSONAL CONSUMPTION EXPENDITURES (DURABLE GOODS: MOTOR VEHICLES AND PARTS))
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
US_CPD = 0.8971 * US_CPD + (-1) + 0.06362 * (US_YDP/US_PCP*100) - 180.270 * US_PCPD*US_INRNB*US_RNDB)/100/US_PCP
= 5.20995 (3.50793)
(0.93726) - 0.27395 * US_KNDB[-1] - 30.9425 * D74 - 22.2298 * D80 - 16.7332 * D79 + 12.3205 * D88 + 38.7552
(3.3721) (3.29770) (2.64279)
(1.99446) (1.50820) (0.43140)
SUM SQ 697.009 STD ERR 7.6213 LHS MEAN 144.173
R SQ 0.9710 R BAR SQ 0.9516 F 8, 12 50.1375
D.W.( 1) 2.0127 D.W.( 2) 2.5172 H -0.3626

[A-04]: USA: US CPD (IDENTITY) (PERSONAL CONSUMPTION EXPENDITURES (DURABLE GOODS: OTHER THAN MOTOR VEHICLES AND PARTS))
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
US_CPD = 0.53546 * US_CPD + (-1) + 0.06440 * (US_YDP/US_PCP*100) - 250.155 * US_PCPD*US_INRNB*US_RNDB)/100/US_PCP
= (4.9709) (8.62945)
(5.98054) - 0.07869 * US_KNDB[-1] + 37.9946
(3.01353) (1.78708)
SUM SQ 126.607 STD ERR 2.8133 LHS MEAN 168.717
R SQ 0.9971 R BAR SQ 0.9964 F 4, 16 1389.05
D.W.( 1) 2.0300 D.W.( 2) 2.3056 H -0.2999

[A-05]: USA: US CPD (IDENTITY) (PERSONAL CONSUMPTION EXPENDITURES (NONDURABLE GOODS))
US_CPD = US_CPN + US_CPN

[A-06]: USA: US CPD (IDENTITY) (PERSONAL CONSUMPTION EXPENDITURES (NONDURABLE GOODS: GASOLINE AND OIL))
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
LOG(US_CPN) = US_KNDB + (1) - 0.08650 * LOG((US_YDP/US_PCP*100)/US_KNDB[-1]) - 0.09709 * LOG(US_PCPD/US_PCP)
(3.1628) (5.9379)
(11.5415) + 0.03997 * D77 - 3.15291
(2.6371) (23.7121)
SUM SQ 0.0032 STD ERR 0.0142 LHS MEAN 1.0025
R SQ 0.9963 R BAR SQ 0.9994 F 4, 16 1088.26
D.W.( 1) 1.7275 D.W.( 2) 2.2748

[A-07]: USA: US CPD (IDENTITY) (PERSONAL CONSUMPTION EXPENDITURES (NONDURABLE GOODS: OTHER THAN GASOLINE AND OIL))
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
US_CPN = 0.29618 * US_CPN = (-1) + 0.14432 * (US_YDP/US_PCP*100) - 203.878 * US_PCPD/US_PCP - 15.7486 * D82
(2.6527) (2.65352)
(2.41520) - 11.2190 * D81 - 15.2003 * D91 + 382.186
(1.73247) (2.02948) (3.89314)
SUM SQ 555.922 STD ERR 6.3055 LHS MEAN 813.523
R SQ 0.9974 R BAR SQ 0.9962 F 6, 14 880.984
D.W.( 1) 1.5203 D.W.( 2) 2.3792 H 1.2047

[A-08]: USA: US CPS (IDENTITY) (PERSONAL CONSUMPTION EXPENDITURES (SERVICES))
ANNUAL DATA FOR 22 PERIODS FROM 1970 TO 1991
LOG(US CPS) = 0.67362 * LOG(US_YDP/US_PCP*100) - 0.10243 * LOG(US_PCPD/US_PCP) + 0.67688 * LOG(US_POP65)
(7.70008) (1.67581)
(6.67985) - 0.01968 * D84 - 0.01371 * D86 - 3.43392
(3.03113) (2.0136) (18.4179)
SUM SQ 0.0006 STD ERR 0.0062 LHS MEAN 7.1847
R SQ 0.9993 R BAR SQ 0.9991 F 5, 16 4826.08
D.W.( 1) 1.2653 D.W.( 2) 2.0833

[A-09]: USA: US IP (IDENTITY) (GROSS PRIVATE DOMESTIC INVESTMENT (TOTAL))

23
### A-10: USA: US IFR (GROSS PRIVATE DOMESTIC INVESTMENT (RESIDENTIAL))

**ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991**

| US IFR | \[ 0.26913 \times \text{US IFR}[\cdot] - 0.33332 \times (\text{US YDP/US PCP}^*100) \\
| \quad (2.2211) | (8.25001) \\
| \quad - 0.26156 \times \text{US KMF}[\cdot] - 0.93099 \times \text{US PIFR}(\text{US INRMG}^*\text{US RRNF})/\text{US PCP} \\
| \quad (7.73853) | (0.96003) \\
| \quad + 37.9904 \times \text{D77} + 30.3150 \times \text{D78} + 29.0639 \times \text{D79} + 26.8604 \times \text{D80} + 26.8604 \times \text{D81} + 16.9804 \times \text{D82} + 21.5831 \times \text{D83} + 91.9273 \times \text{D84} \\
| \quad (3.99571) | (3.05806) \\
| \quad - (2.76555) | (2.34930) \\
| \quad + (1.70508) | (2.08508) \\
| \quad - (4.84056) \\
| \quad | \\
| SUM SQ | 823.585 \\
| STD ERR | 9.0752 \\
| R SQ | 0.9535 \\
| R BAR SQ | 0.9069 \\
| F | 10, 10 \\
| 20.4889 \\
| D.W. (1) | 2.0432 \\
| D.W. (2) | 2.3665 \\
| H | 0.1887 |

### A-11: USA: US IFNR (GROSS PRIVATE DOMESTIC INVESTMENT (NONRESIDENTIAL))

**ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991**

| US IFNR | \[ 0.73237 \times \text{US IFNR}[\cdot] + 0.34099 \times (\text{US MCC/US PPI}^*100) + 7.30006 \times \text{US GDPN/US CC} \\
| \quad (7.9029) | (3.25546) \\
| \quad - 35.2924 \times \text{D81} - 44.64732 \times \text{D75} + 30.6683 \times \text{D85} - 43.29096 \times \text{D91} - 32.1012 \times \text{D79} + 36.8294 \times \text{D81} - 46.5082 \times \text{D81} \\
| \quad (3.25701) | (3.08682) \\
| \quad - (1.99690) | (2.60531) \\
| \quad + (2.16552) | (2.27036) \\
| \quad - (0.72924) \\
| \quad | \\
| SUM SQ | 2225.50 \\
| STD ERR | 14.2239 \\
| R SQ | 0.9833 \\
| R BAR SQ | 0.9695 \\
| F | 9, 11 \\
| 71.7490 \\
| D.W. (1) | 1.7884 \\
| D.W. (2) | 2.1263 \\
| H | 0.1192 |

### A-12: USA: US J (GROSS PRIVATE DOMESTIC INVESTMENT (CHANGE IN BUSINESS INVENTORIES))

**ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991**

| US J | \[ 0.07323 \times (\text{US GDP-US J}) - 0.36980 \times \text{US KJ}[\cdot] - 0.65731 \times (\text{US INRCLB-PCH(US PKJ)}) \\
| \quad (3.1680) | (3.0400) \\
| \quad - (1.72835) | (1.72835) \\
| \quad + 0.16000 \times (\text{US GDP-US GDP}[\cdot]-\text{US J-US J}) \\
| \quad (4.51098) | \\
| \quad + 28.5998 \times \text{D81} + 31.8911 \times \text{D74} - 18.5156 \times \text{D88} + 12.6700 \times \text{D82} + 35.1353 \times \text{D84} + 12.0851 \times \text{D84} \\
| \quad (3.49710) | (3.52517) \\
| \quad - (2.14601) | (1.30028) \\
| \quad + (4.00791) | (0.72815) \\
| \quad | \\
| SUM SQ | 587.315 \\
| STD ERR | 7.3070 \\
| R SQ | 0.9283 \\
| R BAR SQ | 0.8696 \\
| F | 9, 11 \\
| 15.8141 \\
| D.W. (1) | 1.7654 \\
| D.W. (2) | 1.8176 |

### A-13: USA: US BEM (IDENTITY)(NET EXPORTS OF GOODS AND SERVICES)

| US BEM | \[ = \text{US EX-US IM} | 

### A-14: USA: US EX (IDENTITY)(EXPORTS)

| US EX | \[ = \text{US EXN-US PEX}^*100 |

### A-15: USA: US IM (IDENTITY)(IMPORTS)

| US IM | \[ = \text{US IMN-US PIM}^*100 |

### A-16: USA: US G (IDENTITY)(GOVERNMENT PURCHASES OF GOODS AND SERVICES)

| US G | \[ = \text{US GDP-US GDP-US GPC,DUS IFFN=US CGS}^*\text{US IFSL} |

### A-17: USA: US DD (IDENTITY)(GROSS DOMESTIC PURCHASES)

| US DD | \[ = \text{US CF+US IP-US G} |

### A-18: USA: US GDP (IDENTITY)(GROSS DOMESTIC PRODUCT)

| US GDP | \[ = \text{US DD-US BEM} |

### A-19: USA: US GDPN (IDENTITY)(GROSS DOMESTIC PRODUCT: PRIVATE)

| US GDPN | \[ = \text{US GDP-US GDPG} |

### A-20: USA: US GDPG (IDENTITY)(GROSS DOMESTIC PRODUCT: PUBLIC)

| US GDPG | \[ = \text{US GDPG/US PGDPG}^*100 |

### B. GROSS DOMESTIC PRODUCT BLOCK (AT CURRENT PRICES)

#### B-01: USA: US CPN (IDENTITY)(PERSONAL CONSUMPTION EXPENDITURES)

| US CPN | \[ = \text{US CPD+N-US CPDM+N-US CPN} |

#### B-02: USA: US CPDN (IDENTITY)(PERSONAL CONSUMPTION EXPENDITURES (DURABLE GOODS))

| US CPDN | \[ = \text{US CPD+N-US CPDN} |

#### B-03: USA: US CPDMN (IDENTITY)(PERSONAL CONSUMPTION EXPENDITURES (DURABLE GOODS: MOTOR VEHICLES AND PARTS))

| US CPDMN | \[ = \text{US CPDM+N-US CPDMN} |

#### B-04: USA: US CPD0 (IDENTITY)(PERSONAL CONSUMPTION EXPENDITURES (DURABLE GOODS: OTHER THAN MOTOR VEHICLES AND PARTS))

| US CPD0 | \[ = \text{US CPD0-US CPD0} |

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[B-05]: USA: US CPNDN (IDENTITY) (PERSONAL CONSUMPTION EXPENDITURES (NONDURABLE GOODS))
US CPNDN = US CPNDN + US CPNDN

[B-06]: USA: US CPNDN (IDENTITY) (PERSONAL CONSUMPTION EXPENDITURES (NONDURABLE GOODS: GASOLINE AND OIL))
US CPNDN = US CPNDN + US CPNDN / 100

[B-07]: USA: US CPNDN (IDENTITY) (PERSONAL CONSUMPTION EXPENDITURES (NONDURABLE GOODS: GASOLINE AND OIL))
US CPNDN = US CPNDN + US CPNDN / 100

[B-08]: USA: CPSN (IDENTITY) (PERSONAL CONSUMPTION EXPENDITURES (SERVICES))
US CPSN = US CPS + US CPSN / 100

[B-09]: USA: IPM (IDENTITY) (GROSS PRIVATE DOMESTIC INVESTMENT (TOTAL))
US IPM = US IPM + US IPM / 100

[B-10]: USA: IFRN (IDENTITY) (GROSS PRIVATE DOMESTIC INVESTMENT (RESIDENTIAL))
US IFRN = US IFRN + US IFRN / 100

[B-11]: USA: IFRN (IDENTITY) (GROSS PRIVATE DOMESTIC INVESTMENT (NONRESIDENTIAL))
US IFRN = US IFRN + US IFRN / 100

[B-12]: USA: JN (IDENTITY) (GROSS PRIVATE DOMESTIC INVESTMENT (CHANGE IN BUSINESS INVENTORIES))
US JN = US JN + US JN / 100

[B-13]: USA: BEMN (IDENTITY) (NET EXPORTS OF GOODS AND SERVICES)
US BEMN = US EXN / US IMN

[B-14]: USA: EXN (IDENTITY) (ANNUAL DATA FOR 22 PERIODS FROM 1970 TO 1991)
US EXN = 1.03896 * (US EXN + US EOS) / 1000 - 1.48025
SUM SQ 77.7516 STD ERR 1.9717 LHS MEAN 263.365
R SQ 0.9999 R BAR SQ 0.9998 F 1, 20 135993
D.W.(1) 1.7469 D.W.(2) 1.4387

[B-15]: USA: EXN (IDENTITY) (ANNUAL DATA FOR 22 PERIODS FROM 1970 TO 1991)
US EXN = 1.10731 * (US FAD / 1000) - 0.18734
SUM SQ 85.2904 STD ERR 2.0651 LHS MEAN 76.211
R SQ 0.9982 R BAR SQ 0.9981 F 1, 20 11167.0
D.W.(1) 0.9935 D.W.(2) 1.4355

[B-16]: USA: IMN (IDENTITY) (ANNUAL DATA FOR 22 PERIODS FROM 1970 TO 1991)
US IMN = 1.01525 * (US IMN + US IOS) / 1000 + 0.14521
SUM SQ 41.5845 STD ERR 1.4420 LHS MEAN 306.474
R SQ 0.9999 R BAR SQ 0.9999 F 1, 20 NC
D.W.(1) 1.5750 D.W.(2) 1.3766

[B-17]: USA: IMF (IDENTITY) (ANNUAL DATA FOR 22 PERIODS FROM 1970 TO 1991)
US IMF = 1.13890 * (US FAO / 1000) + 1.05498
SUM SQ 96.3113 STD ERR 2.1944 LHS MEAN 58.1773
R SQ 0.9979 R BAR SQ 0.9978 F 1, 20 9358.77
D.W.(1) 0.6178 D.W.(2) 1.3867

[B-18]: USA: GN (IDENTITY) (GOVERNMENT PURCHASES OF GOODS AND SERVICES)
US GN = US GFND + US GSGL

[B-19]: USA: GFN (IDENTITY) (GOVERNMENT PURCHASES OF GOODS AND SERVICES (FEDERAL))
US GFN = US GFN + US GFND

[B-20]: USA: GFN (IDENTITY) (GOVERNMENT PURCHASES OF GOODS AND SERVICES (FEDERAL: DEFENSE))
US GFND = US GFN + US PGFD / 100

[B-21]: USA: GFN (IDENTITY) (GOVERNMENT PURCHASES OF GOODS AND SERVICES (FEDERAL: NONDEFENSE))
US GSGL = (US GFND + US IFND) + US PGFD / 100
C. NATIONAL INCOME BLOC

[C-01]: US NIF(IDENTITY)(NATIONAL INCOME)

[C-02]: US YWT(IDENTITY)(COMPENSATION OF EMPLOYEES)

[C-03]: US YPRP(IDENTITY)(PROPRIETORS' INCOME WITH INVENTORY VALUATION AND CAPITAL CONSUMPTION ADJUSTMENTS)
Annual Data for 21 Periods from 1971 to 1991

(1.00021) (1.11233)
+ 0.05357 * US GDPN - 29.8813 * DB2 - 27.0580 * DB3 + 69.6846
(4.20504) (3.27202) (2.46775)
SUM SQ 690.068 STD ERR 6.7827 LHS MEAN 219.615
R SQ .9954 R BAR SQ .9939 F 5, 15 648.694
D.W.(1) 1.7422 D.W.(2) 2.5649 H .5025

[C-04]: US YCICA(IDENTITY)(CORPORATE PROFITS WITH INVENTORY VALUATION AND CAPITAL CONSUMPTION ADJUSTMENTS)
Annual Data for 21 Periods from 1971 to 1991

US YCICA = 0.63389 * US NIF - 0.88225 * US YWT + 0.36088 *(US PIFR*US INACB*US KNFR[-1]/10000)
(8.91777) (7.72222) (3.91171)
+ 0.10893 * (US PIFR*US KNFR[-1]/100) - 40.1172 * DB6 + 18.6643 * DB8 + 21.5916
(3.11054) (3.65355) (1.87462) (3.71105)
SUM SQ 1113.58 STD ERR 8.9186 LHS MEAN 217.015
R SQ .9937 R BAR SQ .9909 F 6, 14 365.789
D.W.(1) 1.2071 D.W.(2) 1.6146

[C-05]: US YCBT(IDENTITY)(CORPORATE PROFITS BEFORE TAX)

[C-06]: US YCAT(IDENTITY)(CORPORATE PROFIT AFTER TAX)
US YCAT = US YCBT - US TC

[C-07]: US DIVC(CORPORATE DIVIDENDS)
Annual Data for 21 Periods from 1971 to 1991

US DIVC = 0.89021 * US DIVC[-1] + 0.05498 * US YCBT + 16.6508 * DB6 + 14.0956 * DB9 + 11.0927 * D90 - 1.08325
(17.7010) (2.23503) (3.77295) (3.12127) (2.38399) (0.3311)
SUM SQ 244.220 STD ERR 4.0350 LHS MEAN 72.8048
R SQ .9928 R BAR SQ .9904 F 5, 15 413.860
D.W.(1) 2.2240 D.W.(2) 1.4572 H -.7238

[C-08]: US SC(IDENTITY)(CORPORATE UNDISTRIBUTED PROFITS)
US SC = US YCAT - US DIVC

[C-09]: US CIVA(CORPORATE INVENTORY VALUATION ADJUSTMENTS)
Annual Data for 21 Periods from 1971 to 1991

(16.5353)
SUM SQ 194.247 STD ERR 3.3803 LHS MEAN -15.781
R SQ .9919 R BAR SQ .9434 F 3, 17 112.084
D.W.(1) 1.1626 D.W.(2) 1.7326
[C-10]: USA: US CCA (CORPORATE CAPITAL CONSUMPTION ADJUSTMENTS)
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
US CCA
  (7.75752)  (7.57925)  (3.92299)  (12.9799)
+ 38.7792 * D89 + 20.9874 * D90 + 13.1045
  (6.99137)  (3.72847)  (2.99406)
SUM SQ 324.098  STD ERR 4.8114  LHS MEAN 9.2857
R SQ 0.9732  R BAR SQ 0.9617  F 6, 14 84.7095
D.W.(1) 1.7382  D.W.(2) 2.1350

[C-11]: USA: US NCC (IDENTITY) (NET CASH FLOW WITH INVENTORY VALUATION AND CAPITAL CONSUMPTION ADJUSTMENTS)

[C-12]: USA: US NINT (IDENTITY) (NET INTEREST)

[C-13]: USA: US YW [IDENTITY] (WAGE AND SALARY DISBURSEMENTS)
US YW = US WAGE * (US HOUR / 41.02) * US N / 100

[C-14]: USA: US YOL [IDENTITY] (OTHER LABOR INCOME)
US YOL = US YTOL + US YW / 100

[C-15]: USA: US YINT (PERSONAL INTEREST INCOME)
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
US YINT
= 0.32163 * US INRC + US TD[-1] / 100 + 0.29331 * US TIC[-1] - 42.7519 * D78 - 37.9142 * D79 - 31.6735 * D87
  (6.66631)  (69.2057)  (5.68146)  (5.66609)  (4.60492)
  (4.50738)  (3.85438)  (3.52222)  (2.12189)  (1.36783)  (18.1526)
SUM SQ 398.093  STD ERR 6.3095  LHS MEAN 345.496
R SQ 0.9996  R BAR SQ 0.9992  F 10, 10 2412.26
D.W.(1) 2.3069  D.W.(2) 2.3110

[C-16]: USA: US YDIV (PERSONAL DIVIDEND INCOME)
ANNUAL DATA FOR 22 PERIODS FROM 1970 TO 1991
US YDIV = 0.93001 * US DIVC + 1.66075
  (376.897)  (8.26719)
SUM SQ 4.4128  STD ERR 0.4657  LHS MEAN 67.2945
R SQ 0.9996  R BAR SQ 0.9992  F 1, 20 142039
D.W.(1) 0.7586  D.W.(2) 1.1148

[C-17]: USA: US SSCC (IDENTITY) (EMPLOYER'S CONTRIBUTION FOR SOCIAL INSURANCE)
US SSCC = US ASSCC + US SSCP + US SSCS / 100

[C-18]: USA: US SSCP (IDENTITY) (PERSONAL CONTRIBUTION FOR SOCIAL INSURANCE)
US SSCP = US SSCP - US SSCC

[C-19]: USA: US YPI [IDENTITY] (PERSONAL INCOME)

[C-20]: USA: US YDP [IDENTITY] (DISPOSABLE PERSONAL INCOME)
US YDP = US YPI - US TP

[C-21]: USA: US INTPC (INTEREST PAID BY CONSUMERS TO BUSINESS)
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
US INTPC
= 0.98152 * US INTPC[-1] + 0.02465 * (US INMB*US CPRH) / 100 - 5.35220 * D88 - 4.59788 * D87 + 1.31928
  (26.3703)  (2.25220)  (2.37536)  (1.99479)  (1.32570)
SUM SQ 69.5261  STD ERR 2.0846  LHS MEAN 58.8107
R SQ 0.9967  R BAR SQ 0.9959  F 4, 16 1216.29
D.W.(1) 1.0162  D.W.(2) 2.2789  H 2.2326

[C-22]: USA: US SP [IDENTITY] (PERSONAL SAVING)

D. GOVERNMENT RECEIPTS AND EXPENDITURES BLOC

D-1. GENERAL GOVERNMENT RECEIPTS AND EXPENDITURES

[D-01]: USA: US TGR [IDENTITY] (GOVERNMENT RECEIPTS (TOTAL))

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D.2. Federal Government Receipts and Expenditures

[D-11]: USA: US TFR(Identity)(Government Receipts (Total))

[D-12]: USA: US TPF(Identity)(Personal Tax and Nontax Receipts)
US_TPF = US_RTPF*US_YPT/100

[D-13]: USA: US YPT(Identity)(Personal Taxable Income)

[D-14]: USA: US TCF(Identity)(Corporate Profits Tax Liability)
US_TCF = US_RTPF*US_YCBT/100

[D-15]: USA: US TIF(Identity)(Indirect Business Tax and Nontax Accruals)

[D-16]: USA: US TIGAS(Identity)(Indirect Business Tax and Nontax Accruals: Gasoline Tax)
US_TIGAS = (US_PCPN0G-US_PCPN0GO)*US_CPSC/100

[D-17]: USA: US SSCF(Identity)(Contribution for Social Insurance)
US_SSCF = US_RSSCF*US_YWT/100

[D-18]: USA: US TFE(Identity)(Government Expenditures (Total))

[D-19]: USA: US TRF(Identity)(Government Transfer Payments)
US_TRF = US_TRFP+US_TRFA

[D-20]: USA: US TRF0A(Identity)(Government Transfer Payments to Person: OASDI)
Annual Data for 22 Periods from 1971 to 1992

\[
\text{US_TRF0A} = 0.94671 \times \text{US_TRF0A} - 1 + 0.00633 \times \text{US_PCPMPSM} \times \text{US_PCPP65/100} + 10.2866 \times \text{DBI} - 5.65579 \times \text{DB7 (17.1429)} - 1.83162 \times \text{DB8} + 6.69951 \times \text{DB} + 5.4354 \times \text{DB7 (2.33022)} - 1.90283 \times \text{DB8} + 0.421711
\]

\[
\text{SUM} = 1.0462 \times \text{DB} + 0.00633 \times \text{US_PCPMPSM} \times \text{US_PCPP65/100} + 10.2866 \times \text{DBI} - 5.65579 \times \text{DB7 (17.1429)} - 1.83162 \times \text{DB8} + 6.69951 \times \text{DB} + 5.4354 \times \text{DB7 (2.33022)} - 1.90283 \times \text{DB8} + 0.421711
\]

\[
\text{SUM SQ} = 83.0462 \times \text{DB} + 0.00633 \times \text{US_PCPMPSM} \times \text{US_PCPP65/100} + 10.2866 \times \text{DBI} - 5.65579 \times \text{DB7 (17.1429)} - 1.83162 \times \text{DB8} + 6.69951 \times \text{DB} + 5.4354 \times \text{DB7 (2.33022)} - 1.90283 \times \text{DB8} + 0.421711
\]

\[
\text{R SQ} = 0.9993 \times \text{DB} + 0.00633 \times \text{US_PCPMPSM} \times \text{US_PCPP65/100} + 10.2866 \times \text{DBI} - 5.65579 \times \text{DB7 (17.1429)} - 1.83162 \times \text{DB8} + 6.69951 \times \text{DB} + 5.4354 \times \text{DB7 (2.33022)} - 1.90283 \times \text{DB8} + 0.421711
\]

\[
\text{D.W. (1)} = 1.7709 \times \text{DB} + 0.00633 \times \text{US_PCPMPSM} \times \text{US_PCPP65/100} + 10.2866 \times \text{DBI} - 5.65579 \times \text{DB7 (17.1429)} - 1.83162 \times \text{DB8} + 6.69951 \times \text{DB} + 5.4354 \times \text{DB7 (2.33022)} - 1.90283 \times \text{DB8} + 0.421711
\]

\[
\text{D.W. (2)} = 2.0805 \times \text{DB} + 0.00633 \times \text{US_PCPMPSM} \times \text{US_PCPP65/100} + 10.2866 \times \text{DBI} - 5.65579 \times \text{DB7 (17.1429)} - 1.83162 \times \text{DB8} + 6.69951 \times \text{DB} + 5.4354 \times \text{DB7 (2.33022)} - 1.90283 \times \text{DB8} + 0.421711
\]
[D-22]: USA: US TRFH (GOVERNMENT TRANSFER PAYMENTS TO PERSON: HEALTH INSURANCE)
ANNUAL DATA FOR 22 PERIODS FROM 1971 TO 1992
US_TRFH = 0.40109 * US_TRFH[-1] + 0.02025 * US_PCP*US_PCP/100 + 0.40992 * D92 - 6.15283
(2.96262) (4.96834) (3.10981) (3.63783)
SUM SQ 23.3136 STD ERR 1.1381 LHS MEAN 52.8819
R SQ 0.9992 R BAR SQ 0.9991 F 3, 18 7081.12
D.W.( 1) 1.4667 D.W.( 2) 1.4155 H 1.6059

[D-23]: USA: US TRFU (GOVERNMENT TRANSFER PAYMENTS TO PERSON: UNEMPLOYMENT INSURANCE)
ANNUAL DATA FOR 22 PERIODS FROM 1971 TO 1992
US_TRFU/US_PCP*100 = 0.4363 * US_TRFU/US_PCP/100[-1] + 0.01900 * US_U + 17.3870 * D75 - 8.89473 * D84
(3.63602) (3.97142) (5.26896) (2.57071)
+ 6.31063 * 092 - 2.87912
(1.83465) (0.90457)
SUM SQ 158.165 STD ERR 3.1441 LHS MEAN 20.1685
R SQ 0.8605 R BAR SQ 0.8169 F 5, 16 19.7415
D.W.( 1) 1.6239 D.W.( 2) 1.2556 H 0.7761

[D-24]: USA: US TRRF (GOVERNMENT TRANSFER PAYMENTS TO PERSON: RETIREMENT BENEFITS)
USAEQ=US TRRF
ANNUAL DATA FOR 22 PERIODS FROM 1971 TO 1992
US_TRRF/US_PCP*100 = 0.94994 * US_TRRF/US_PCP/100[-1] - 3.03568 * D84 + 3.46851
(62.8871) (4.32714) (6.14096)
SUM SQ 8.7116 STD ERR 0.6771 LHS MEAN 38.1328
R SQ 0.9953 R BAR SQ 0.9484 F 2, 19 190.45
D.W.( 1) 1.6705 D.W.( 2) 2.5060 H 0.5716

[D-25]: USA: US TRFV (GOVERNMENT TRANSFER PAYMENTS TO PERSON: VETERANS BENEFITS)
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
US_TRFV/US_NIF*100 = 0.90899 * US_TRFV/US_NIF/100[-1] + 0.20645 * D75 - 0.02761 * D77 + 0.11684 * D74 + 0.11534 * D71 + 0.02311
(26.4801) (6.24990) (2.18774) (3.60180) (3.56966) (0.97049)
SUM SQ 0.0137 STD ERR 0.0302 LHS MEAN 0.6923
R SQ 0.9872 R BAR SQ 0.9837 F 5, 15 241.666
D.W.( 1) 1.6727 D.W.( 2) 1.4672 H 0.7380

[D-26]: USA: US TRFO (GOVERNMENT TRANSFER PAYMENTS TO PERSON: OTHER BENEFITS)
ANNUAL DATA FOR 22 PERIODS FROM 1971 TO 1992
US_TRFO/US_PCP*100 = 0.94319 * US_TRFO/US_PCP/100[-1] + 6.23790 * D80 + 0.46682 * D74 + 5.43534 * D92 + 5.37609 * D75 + 2.98636
(21.4235) (3.21130) (4.05985) (2.66791) (2.73413) (1.68980)
SUM SQ 57.1375 STD ERR 1.8097 LHS MEAN 40.4020
R SQ 0.9734 R BAR SQ 0.9651 F 5, 16 117.290
D.W.( 1) 1.5263 D.W.( 2) 1.7266 H 1.0763

[D-27]: USA: US NINT (IDENTITY) (NET INTEREST PAID)
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
(39.2257)
+ 34.1558 * D86 - 21.3448 * D81 + 32.2476 * D91 + 16.1624 * D87 - 15.6954 * D80 - 4.28004
(5.73518) (3.59237) (5.12556) (2.67187) (2.65397) (1.79496)
SUM SQ 460.803 STD ERR 5.7371 LHS MEAN 81.2345
R SQ 0.9935 R BAR SQ 0.9907 F 6, 14 355.061
D.W.( 1) 2.3712 D.W.( 2) 1.5557

[D-28]: USA: US SF (IDENTITY) (SURPLUS OR DEFICIT, NATIONAL INCOME AND PRODUCT ACCOUNT)
US_SF = US_TFR - US_TFE

D-3. STATES AND LOCAL GOVERNMENT RECEIPTS AND EXPENDITURES

[D-29]: USA: US TSL (IDENTITY) (GOVERNMENT RECEIPTS(TOTAL))

[D-30]: USA: US TPSL (IDENTITY) (PERSONAL TAX AND NONTAX PAYMENTS)
US_TPSL = US_RTPS*US_YPT/100

[D-31]: USA: US TCSL (IDENTITY) (CORPORATE PROFITS TAX LIABILITY)
US_TCSL = US_RTCSL*US_YCST/100

[D-32]: USA: US TSL (IDENTITY) (INDIRECT BUSINESS TAX AND NONTAX ACCRUALS)
US_TSL = US_TILS*US_TSLP
[D-33]: USA: US TISL(PROPERTY TAXES)
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
US TISLP = 0.02723 * (US_PIFR*US_KNFR[-1]/100) - 15.3238 * DB0 - 14.1794 * DB1 - 11.2978 * DB2 + 16.3141 * DB9 + 15.2040 DB10
(29.0639) (2.94831) (2.72542) (2.16681) (2.90833) (5.67126)
SUM SQ 382.693 STD ERR 5.0510 LHS MEAN 87.1429
R SQ 0.9864 R BAR SQ 0.9819 F 5, 15 217.422
D.W. (1) 1.2574 D.W. (2) 1.8835

[D-34]: USA: US TISLS(.IDENTITY)(SALES TAXES AND OTHERS)
US TISLS = US_RTISLS*US_CPN/100

[D-35]: USA: US SCSL(.IDENTITY)(CONTRIBUTION FOR SOCIAL INSURANCE)
US SCSL = US_RSCSSL*US_YWL/100

[D-36]: USA: US TSLC(.IDENTITY)(GOVERNMENT EXPENDITURES(TOTAL))

[D-37]: USA: US TRSLP(GOVERNMENT TRANSFER PAYMENTS TO PERSONS)
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
US TRSLP/US NIF*100 = 0.79513 * US_TRSLP/US NIF*100[-1]
(7.54611)
+ 0.02284 * US_PCP*USPopover56/US NIF + 0.74345 * DB9 + 0.39108 * DB9 + 0.22151 * D99 - 1.13828
(2.48872) (5.83973) (3.68800) (2.14794) (1.33549)
SUM SQ 0.1310 STD ERR 0.0935 LHS MEAN 3.1019
R SQ 0.9544 R BAR SQ 0.9393 F 5, 15 62.8452
D.W. (1) 1.7465 D.W. (2) 2.1172 H 0.6317

[D-38]: USA: US NINTS(NET INTEREST PAID)
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
US NINTS/US GDPN*100 = 0.98687 * US NINTS/US GDPN*100[-1]
(23.2770)
- 0.15108 * US_SSL[-1]/US GDPN*100 - 0.02227 * US_INRSL - 0.16238 * DB9 - 0.10893 * DB9 + 0.14785
(9.79865) (3.86329) (4.14268) (2.87085) (3.96070)
SUM SQ 0.0195 STD ERR 0.0361 LHS MEAN -0.6255
R SQ 0.9912 R BAR SQ 0.9882 F 5, 15 336.978
D.W. (1) 1.7133 D.W. (2) 2.1654 H 0.6169

[D-39]: USA: US SSL(.IDENTITY)(SURPLUS OR DEFICIT, NATIONAL INCOME AND PRODUCT ACCOUNT)
US SSL = US TSLR-US TSLC

E. STOCK AND OTHERS Bloc

[E-01]: USA: US KBNF(NET FEDERAL GOVERNMENT DEBTS)
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
US KBNF = 1.00408 * US KBNF[-1] - 1.02991 * US SF + 54.7816 * DB9 + 52.4178 * DB9 - 36.6390 * DB9 + 3.7932
(123.354) (14.6807) (3.73887) (3.47893) (2.29455) (1.46989)
SUM SQ 2306.74 STD ERR 12.4009 LHS MEAN 1105.40
R SQ 0.9998 R BAR SQ 0.9997 F 5, 15 15450.4
D.W. (1) 1.7643 D.W. (2) 1.6638 H 0.4115

[E-02]: USA: US ST(.IDENTITY)(GROSS SAVING)

[E-03]: USA: US DEP(CAPITAL CONSUMPTION ALLOWANCES WITH CAPITAL CONSUMPTION ADJUSTMENTS)
COCHRÁN-O'CURTIL
ANNUAL DATA FOR 20 PERIODS FROM 1972 TO 1991
US DEP = 0.08257 * US_PIFR*US_KNFR[-1]/100 + 0.06106 * US_PIFR*US_KNFR[-1]/100 - 34.0032
(3.78049) (3.30497) (2.88612)
SUM SQ 386.028 STD ERR 4.9119 LHS MEAN 356.717
R SQ 0.9993 R BAR SQ 0.9992 F 3, 16 7581.45
D.W. (1) 1.9449 D.W. (2) 1.7079
AR_0 = 0.61801 * AR_1
(2.53138)
[E-04]: USA: US DEPC (CORPORATE CAPITAL CONSUMPTION ALLOWANCES WITH CAPITAL CONSUMPTION ADJUSTMENTS)
COCHRAN-ORCUTT
US DEPC
- 0.62153 * US DEP - 5.42380
(163.270)  (3.42616)
SUM SQ 36.910 3 STD ERR 1.4320 LHS MEAN 208.749
R SQ 0.9998 R Bar SQ 0.9998 F 2, 18 57710.8
D.W. (1) 1.7857 D.W. (2) 1.8934
AR_0 = - 0.53102 * AR_1
(2.69720)

[E-05]: USA IGN (IDENTITY)
USA: (GROSS INVESTMENT)
US IGN = US IGN + US NFI

[E-06]: USA NFI (IDENTITY)
(NET FOREIGN INVESTMENT)

[E-07]: USA KNFR (IDENTITY)
(Net Capital stock (Residential at 1987 Price))

[E-08]: USA KNFR (IDENTITY)
(Net Capital stock (Nonresidential at 1987 Price))

[E-09]: USA KNMD (IDENTITY)
(Net stock of Durable goods (Motor vehicles and Parts at 1987 Price))

[E-10]: USA KND0 (IDENTITY)
(Net stock of Durable goods (Other than Motor vehicles and Parts at 1987 Price))
US KND0 = US KND0[-1] - US CPDO - US RNDO

[E-11]: USA RNFR (IDENTITY)
(Replacement of Net Capital stock (Residential at 1987 Price))
US RNFR = US RNFR*US KNFR[-1]/100

[E-12]: USA RNFR (IDENTITY)
(Replacement of Net Capital stock (Nonresidential at 1987 Price))
US RNFR = US RNFR*US KNFR[-1]/100

[E-13]: USA RNMD (IDENTITY)
(Replacement of Net stock of Durable goods (Motor vehicles and Parts at 1987 Price))
US RNMD = US RNMD*US KNMD[-1]/100

[E-14]: USA RNDO (IDENTITY)
(Replacement of Net stock of Durable goods Other than Motor vehicles and Parts 1987 Price)
US RNDO = US RNDO*US KND0[-1]/100

[E-15]: USA KJ (IDENTITY)
(Stock of Inventory at 1987 Price)

[E-16]: USA KJM (IDENTITY)
(Stock of Inventory)
US KJM = US KJM*US PK/J/100

[E-17]: USA KNW (IDENTITY)
(Net Worth)
US KNW = (US KNW*US IFNR + US KNFR*US IFNR)/100 + US KJN + US KNFI + US KNBF

[E-18]: USA KNF (IDENTITY)
(Accumulation of Net Foreign Investment)
US KNF = US KNF[-1] + US NF

[E-19]: USA DEPC (IDENTITY)
(Present Value of Corporate Capital Consumption Allowances with Capital Consumption Adjustments)
US DEPC
= (1 + US INRCB/100) * US DEPC ([US IFNR[-1] + US KNFR[-1]/100] + US INFN/100 +
US DEPC([US IFNR[-1] + US KNFR[-1]/100]))

[E-20]: USA CC (IDENTITY)
(Cost of Corporate Capital)

[E-21]: USA KNFFND (IDENTITY)
(Net Capital Stock (Federal Non-Defense at 1987 Price))
US KNFFND = 0.8913*US KNFFND[-1] + US IFFND

[E-22]: USA KNFSL (IDENTITY)
(Net Capital Stock (State and Local at 1987 Price))
US KNFSL = 0.8913*US KNFSL[-1] + US IFSL

F. Production, Capacity Utilization and Labor Bloc

[F-01]: USA GDPN (IDENTITY)
(Potential Gross Domestic Product: Private)
US GDPN = 
- EXP(-0.58510 + 0.00425*TIME + 0.74471*LOG(US LF - US NG) + 0.09708*LOG(US KNFFND[-1] + US KNFSL[-1]) + 0.15821*LOG(US KNFR[-1]))
[F-02]: USA: US CUM(CAPACITY UTILIZATION (MANUFACTURING))
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
LOG(US CUM) = 1.28319 * LOG(US GDPNG) - 1.38096 * LOG(US_QDPNGP) - 0.07037 * D71 - 0.07480 * D75 + 0.02767 * D79
(15.5791) (16.4693) (5.61084) (6.19975) (2.46682)
- 0.03328 * D76 - 0.02357 * D91 - 0.02208 * D86 + 5.34647
(2.88330) (1.99312) (1.94338) (34.0617)
SUM SQ 0.0014 STD ERR 0.0108 LHS MEAN 4.3893
R SQ 0.9723 R BAR SQ 0.9538 F 8, 12 52.5945
D.W.( 1) 2.1185 D.W.( 2) 1.8346

[F-03]: USA: US LF(IDENTITY)(LABOR FORCE)
US LF = US NLF*US NO/100

[F-04]: USA: US U(IDENTITY)(UNEMPLOYMENT)
US U = US LF-US N

[F-05]: USA: US UR(IDENTITY)(UNEMPLOYMENT RATIO)
US UR = US U/US LF*100

[F-06]: USA: US N(EMPLOYMENT)
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
LOG(US N) = 0.39138 * LOG(US N)[-1] - 0.31086 * LOG(US WAGE/US PDD)
(12.4308) (9.08220)
+ 0.47884 * LOG(US GDP) - 0.00622 * D91 - 0.01209 * D75 + 0.00619 * D74 + 1.15354
(18.3697) (2.46762) (3.66720) (1.98437) (12.6980)
SUM SQ 0.0000 STD ERR 0.0029 LHS MEAN 2.0212
R SQ 0.9996 R BAR SQ 0.9995 F 6, 14 6331.08
D.W.( 1) 2.4092 D.W.( 2) 1.9280 H -1.0868

[F-07]: USA: US HOUR(AVERAGE WEEKLY WORKING HOUR)
ANNUAL DATA FOR 22 PERIODS FROM 1970 TO 1991
LOG(US HOUR) = 0.75119 * LOG(US GDP) - 0.60939 * LOG(US N) - 0.00584 * TIME
(12.8048) (8.08954) (5.76895)
+ 0.01033 * D83 + 0.00957 * D84 + 0.00082 * D87 + 3.16787
(2.51813) (2.49917) (2.51179) (7.35560)
SUM SQ 0.0002 STD ERR 0.0037 LHS MEAN 3.6969
R SQ 0.9459 R BAR SQ 0.9242 F 6, 15 43.6772
D.W.( 1) 2.8290 D.W.( 2) 0.8915

G. WAGE AND DEFLECTOR BLOC

[F-01]: USA: US PPI(PRODUCER PRICE INDEX (TOTAL FINISHED GOODS))
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
US PPI = 0.58931 * US PPI[-1] + 0.04984 * US CUM + 0.28916 * US ULC + 0.26636 * US PM + 2.68272 * D88 - 2.25209 * D86
(12.1111) (1.03994) (3.69159) (14.9639) (3.42087) (2.88540)
- 1.89303 * D87 - 1.13122
(2.90341) (0.27951)
SUM SQ 6.4608 STD ERR 0.7050 LHS MEAN 84.6063
R SQ 0.9996 R BAR SQ 0.9993 F 7, 13 4145.86
D.W.( 1) 1.4561 D.W.( 2) 2.1283 H 1.1624

[F-02]: USA: US PCP(IDENTITY)(DEFLECTOR FOR PERSONAL CONSUMPTION EXPENDITURE)
US PCP = US CP/US CP*100

[F-03]: USA: US PCP(DEFLECTOR FOR PERSONAL CONSUMPTION EXPENDITURES(DURABLE GOODS))
US PCPD = US CPD/US CPD*100

[F-04]: USA: US PCPD(DEFLECTOR FOR PERSONAL CONSUMPTION EXPENDITURES(DURABLE GOODS: MOTOR VEHICLES AND PARTS))
ANNUAL DATA FOR 20 PERIODS FROM 1971 TO 1990
LOG(US PCPD) = 0.68900 * LOG(US PCPD)[-1] + 0.24260 * LOG(US PPI) + 0.28292
(12.7851) (4.91168) (5.41422)
SUM SQ 0.0039 STD ERR 0.0152 LHS MEAN 4.2797
R SQ 0.9978 R BAR SQ 0.9976 F 2, 17 3892.96
D.W.( 1) 1.2113 D.W.( 2) 1.9525 H 1.4311

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[G-05]: US: PCPDD (DEF LATOR FOR PERSONAL CONSUMPTION EXPENDITURES (DURABLE GOODS: OTHER THAN MOTOR VEHICLES AND PARTS))
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
LOG(US PCPDD) = 0.4131 + LOG(US PCPDD)[-1] + 0.39074 * LOG(US PPI) + 0.88220
(7.9710) (10.5216)
SUM SQ = 0.0015 STD ERR = 0.0091 LHS MEAN = 4.3952
R SQ = 0.9988 R BAR SQ = 0.9986 F = 2, 18 7346.92
D.W.(1) = 1.3835 D.W.(2) = 2.6721 H = 1.2470

[G-06]: US: PCPND (IDENTITY) (DEF LATOR FOR PERSONAL CONSUMPTION EXPENDITURES (NONDURABLE GOODS))
US PCPND = US CPNND / US CPND*100

[G-07]: US: PCPNDG (IDENTITY) (DEF LATOR FOR PERSONAL CONSUMPTION EXPENDITURES (NONDURABLE GOODS: GASOLINE AND OIL))
US PCPNDG = (1 + US RTI GAS/100) * US PCPND

[G-08]: US: PCPND (DEF LATOR FOR PERSONAL CONSUMPTION EXPENDITURES (NONDURABLE GOODS: OTHER THAN GASOLINE AND OIL))
ANNUAL DATA FOR 22 PERIODS FROM 1970 TO 1991
LOG(US PCPND) = 0.31837 * LOG(US PPI) + 0.62590 * LOG(US WAGE) - 0.03435 * DB8 + 1.24536
(6.16092) (12.6012) (2.02368) (12.6574)
SUM SQ = 0.0039 STD ERR = 0.0147 LHS MEAN = 4.2706
R SQ = 0.9986 R BAR SQ = 0.9984 F = 3, 18 4397.08
D.W.(1) = 0.5667 D.W.(2) = 1.1154

[G-09]: US: PCPS (DEF LATOR FOR PERSONAL CONSUMPTION EXPENDITURES (SERVICES))
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
LOG(US PCPS) = 0.62855 * LOG(US PCPS)[-1] + 0.03472 * LOG(US PPI) + 0.37890 * LOG(US WAGE) + 0.44072
(10.0761) (0.95409) (3.74826) (3.31178)
SUM SQ = 0.0006 STD ERR = 0.0057 LHS MEAN = 4.1986
R SQ = 0.9998 R BAR SQ = 0.9998 F = 3, 17 37204.1
D.W.(1) = 1.8576 D.W.(2) = 2.2916 H = 0.0456

[G-10]: US: PIFR (DEF LATOR FOR GROSS PRIVATE INVESTMENT (RESIDENTIAL))
ANNUAL DATA FOR 20 PERIODS FROM 1971 TO 1990
LOG(US PIFR) = 0.41942 * LOG(US PIFR)[-1] + 0.62062 * LOG(US PPI) + 0.10321 * LOG(US IFR) - 0.04399 * DB4
(7.06481) (9.23264) (5.68690) (4.35552)
SUM SQ = 0.0012 STD ERR = 0.0095 LHS MEAN = 4.2188
R SQ = 0.9996 R BAR SQ = 0.9994 F = 6, 13 5634.46
D.W.(1) = 1.9639 D.W.(2) = 3.0705 H = 0.0366

[G-11]: US: PIFRN (DEF LATOR FOR GROSS PRIVATE INVESTMENT (NONRESIDENTIAL))
COCHRAN-D'ORCUTT
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
LOG(US PIFR) = 0.97177 * LOG(US PPI) + 0.05195
(29.0543) (0.34948)
SUM SQ = 0.0089 STD ERR = 0.0222 LHS MEAN = 4.3102
R SQ = 0.9965 R BAR SQ = 0.9961 F = 2, 18 2585.82
D.W.(1) = 1.4138 D.W.(2) = 2.4049 AR D = + 0.02735 * AR L
(2.29575)

[G-12]: US: PEX (DEF LATOR FOR EXPORTS)
ANNUAL DATA FOR 20 PERIODS FROM 1972 TO 1991
LOG(US PEX) = 0.69969 * LOG(US PPI) + 0.25737 * LOG(TR PUCELL) + 0.03257 * DB4 - 0.05330 * D90 - 0.04803 * D91 + 0.12436
(17.9821) (7.44221) (2.03736) (3.47369) (3.12038) (2.59272)
SUM SQ = 0.0028 STD ERR = 0.0142 LHS MEAN = 4.3771
R SQ = 0.9988 R BAR SQ = 0.9984 F = 5, 14 1941.50
D.W.(1) = 1.4467 D.W.(2) = 1.8391

[G-13]: US: PIM (DEF LATOR FOR IMPORTS)
ANNUAL DATA FOR 22 PERIODS FROM 1970 TO 1991
LOG(US PIM) = 0.89300 * LOG(TR PUUM) - 0.18650 * LOG(US RATE) - 0.02756 * D91 + 0.03984 * D77 + 1.32014
(148.491) (6.58689) (1.87737) (2.88972) (9.5381)
SUM SQ = 0.0031 STD ERR = 0.0134 LHS MEAN = 4.2847
R SQ = 0.9993 R BAR SQ = 0.9991 F = 4, 17 5996.59
D.W.(1) = 0.8997 D.W.(2) = 1.1766
[G-14]: USA: US PGFD (Deflator for Government Purchases (Federal Defense))
COCHRAN-O'ORCUTT
ANNUAL DATA FOR 19 PERIODS FROM 1973 TO 1991
LOG(US PGFD) = 0.29684 * LOG(US PPI) + 0.50522 * LOG(US WAGE) + 1.74265
(1.76748) (2.06198) (3.45254)
SUM SQ 0.0023 STD ERR 0.0123 LHS MEAN 4.3359
R SQ 0.9969 R BAR SQ 0.9967 F 3, 15 4503.07
D.W.(1) 0.9508 D.W.(2) 1.3493
AR_0 = + 0.89961 * AR_1
(12.7281)

[G-15]: USA: US PGFND (Deflator for Government Purchases (Federal Nondefense))
ANNUAL DATA FOR 20 PERIODS FROM 1972 TO 1991
LOG(US PGFND) = 0.42551 * LOG(US PPI) + 0.56195 * LOG(US WAGE) + 0.03019 * D86 - 0.03310 * D74 - 0.02902 * D80 + 0.92230
(9.9829) (14.1531) (2.67368) (2.83735) (2.47621) (10.7829)
SUM SQ 0.0016 STD ERR 0.0108 LHS MEAN 4.3110
R SQ 0.9993 R BAR SQ 0.9990 F 5, 14 3915.48
D.W.(1) 2.4759 D.W.(2) 1.6200

[G-16]: USA: US PSGL (Deflator for Government Purchases (State and Local))
COCHRAN-O'ORCUTT
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
LOG(US PSGL) = 0.12496 * LOG(US PPI) + 0.62023 * LOG(US WAGE) + 2.23482
(1.65404) (4.29654) (7.16913)
SUM SQ 0.0008 STD ERR 0.0069 LHS MEAN 4.2434
R SQ 0.9997 R BAR SQ 0.9997 F 3, 17 21976.0
D.W.(1) 1.5566 D.W.(2) 2.0603
AR_0 = + 0.90871 * AR_1
(31.7982)

[G-17]: USA: US PDD (Identity) (Deflator for Gross Domestic Purchases)
US PDD = US GDP/US GDP*100

[G-18]: USA: US PKJ (Deflator for Business Inventory)
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
LOG(US PKJ) = 1.84678 * LOG(US PPI) - 0.94530 * LOG(US PPI)[-1] + 0.20122 * LOG(US CUM) - 0.06752 * D90 - 0.07129 * D91
(16.9527) (9.07465) (2.28929) (3.53498) (3.74451)
SUM SQ 0.0039 STD ERR 0.0174 LHS MEAN 4.4206
R SQ 0.9979 R BAR SQ 0.9967 F 7, 13 862.026
D.W.(1) 2.1765 D.W.(2) 2.2440

ANNUAL DATA FOR 22 PERIODS FROM 1970 TO 1991
US PQDPG = 101.906 * (US WAGE/28.14) - 1.15714
(96.6221) (1.43470)
SUM SQ 37.4807 STD ERR 1.3690 LHS MEAN 71.4909
R SQ 0.9979 R BAR SQ 0.9978 F 1, 20 9335.76
D.W.(1) 0.2061 D.W.(2) 0.6242

[G-20]: USA: US PQDP (Identity) (Deflator for Gross Domestic Product)
US PQDP = US GDP/US GDP*100

[G-21]: USA: US WAGE (Wage and Salary Disbursement per Worker)
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
PCH(US WAGE) = 0.97972 * PCH(US PCP) + 0.51566 * PCH(US LP) - 0.33112 * US UR
(16.5291) (3.16455) (2.40934)
+ 3.44942 * D82 - 1.91347 * D83 + 1.41283 * D85 - 1.40232 * D89 + 2.05182
(4.06407) (2.36213) (2.42049) (2.25433)
SUM SQ 3.7227 STD ERR 0.5351 LHS MEAN 5.9677
R SQ 0.9670 R BAR SQ 0.9492 F 7, 13 54.3357
D.W.(1) 1.6090 D.W.(2) 1.6719
[G-22]: USA: US WAGE (WAGE AND SALARY DISBURSEMENT PER GOVERNMENT WORKER)
ANNUAL DATA FOR 22 PERIODS FROM 1970 TO 1991
US_WAGE
   = 1.43611 * US_WAGE - 1.28480
      (57.8271)    (3.27099)
SUM SQ  7.9315  STD ERR  0.6297  LHS MEAN  20.0608
R SQ  0.9941  R BAR SQ  0.9938  F 1, 20  3343.95
D.W. (1) 0.3985  D.W. (2) 0.8991

[G-23]: USA: US ULC (IDENTITY) (UNIT LABOR COST)
US_ULC = (US_YW + US_YOL + US_SSCP) / US_GDP * 100

[G-24]: USA: US LP (IDENTITY) (LABOR PRODUCTIVITY)
US_LP = US_GDP / (US_N / US_HOUR / 41.02) * 100

H. MONETARY BLOCK

[H-01]: USA: US CUR (CURRENCY)
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
LOG(US_CUR / US_PDD * 100)
   = 0.77269 * LOG(US_CUR / US_PDD * 100)[-1] + 0.25260 * LOG(US_DD) - 0.00659 * US_INRTB - 0.89324
      (9.91207)    (4.48045)    (3.55108)    (4.39255)
SUM SQ  0.3073  STD ERR  0.0219  LHS MEAN  5.1236
R SQ  0.9907  R BAR SQ  0.9891  F 3, 17  606.537
D.W. (1) 1.8787  D.W. (2) 2.2179  H 0.1893

[H-02]: USA: US DDT (DEMAND DEPOSITS: M1-CUR)
COCHRAN-ORCUTT
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
LOG(US_DDT / US_PDD * 100)
   = 0.81995 * LOG(US_DD) - 0.01698 * US_INRTB - 0.58767
      (2.83347)    (3.76545)    (0.23909)
SUM SQ  0.0214  STD ERR  0.0244  LHS MEAN  6.1449
R SQ  0.9151  R BAR SQ  0.9001  F 3, 17  61.1000
D.W. (1) 1.2440  D.W. (2) 2.3856
AR.0 = + 0.83307 * AR.1
      (9.12066)

[H-03]: USA: US M1 (IDENTITY) (MONEY SUPPLY (M1))
US_M1 = US_CUR + US_DDT

[H-04]: USA: US TD (TIME DEPOSITS: M2-M1)
COCHRAN-ORCUTT
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
LOG(US_TD / US_PDD * 100)
   = 0.80179 * LOG(US_DD) + 0.02255 * US_INRTB - 0.02779 * US_INRCD + 0.94300
      (7.41552)    (2.56400)    (1.03524)
SUM SQ  0.0031  STD ERR  0.0138  LHS MEAN  7.4845
R SQ  0.9948  R BAR SQ  0.9935  F 4, 16  761.236
D.W. (1) 1.2770  D.W. (2) 1.9384
AR.0 = + 0.74555 * AR.1
      (9.27409)

[H-05]: USA: US M2 (IDENTITY) (MONEY SUPPLY (M2))
US_M2 = US_M1 + US_TD

[H-06]: USA: US BRM (IDENTITY) (BORROWED RESERVES)
US_BRM = US_TRMS - US_UBRM

[H-07]: USA: US ERM (EXCESS RESERVES)
ANNUAL DATA FOR 22 PERIODS FROM 1970 TO 1991
US_ERM
   = - 0.00081 * US_INRFF - 0.03137 * US_RRM - 0.17204 * D04 + 0.17486 * D05 - 0.26311 * D91 - 0.13467 * D78 - 0.32806
      (1.97247)    (26.3521)    (3.00282)    (3.04681)    (4.09636)    (2.35376)    (6.57860)
SUM SQ  0.0459  STD ERR  0.0553  LHS MEAN  0.5427
R SQ  0.0828  R BAR SQ  0.9759  F 6, 15  142.559
D.W. (1) 1.9772  D.W. (2) 1.3361

[H-08]: USA: US RRM (IDENTITY) (REQUIRED RESERVES)
US_RRM = US_RRM * US_DDT / US_TD / 100

[H-09]: USA: US TRMS (IDENTITY) (TOTAL RESERVES)
US_TRMS = US_RRM * US_ERM
[H-10]: USA: US INRFF (FEDERAL FUNDS RATE)

ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991

US_INRFF-PCH(US_PPI)

= 0.94403 * US_OHR-PCH(US_PPI) - 0.14268 * (US_VBRM/US_TRMS)*100

+(2.88116) (22.3988)

+ 2.02089 * D89 + 2.49392 * D81 + 1.07358 * D82 + 14.5439

(2.65305) (3.03999) (1.36534) (3.05361)

SUM SQ 7.8871 STD ERR 0.7251 LHS MEAN 2.8266
R SQ 0.9762 R BAR SQ 0.9683 F 5, 15 123.115
D.W.( 1) 1.4742 D.W.( 2) 2.0704

[H-11]: USA: US INRFT (TREASURY BILL RATE (3 MONTH))

ANNUAL DATA FOR 22 PERIODS FROM 1970 TO 1991

US_INRFT

= 0.82628 * US_INRFF - 0.10676 * (US_SF/US_GDPN*100) - 1.22399 * D74 + 0.29132

(42.1177) (2.52472) (4.23095) (1.35289)

SUM SQ 1.2874 STD ERR 0.2674 LHS MEAN 7.4551
R SQ 0.9900 R BAR SQ 0.9883 F 3, 18 591.987
D.W.( 1) 1.3735 D.W.( 2) 2.1105

[H-12]: USA: US INRTN (TREASURY NOTE RATE (3 YEARS))

RESTRICTED ORDINARY LEAST SQUARES
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991

US_INRTN

= 0.54888 * US_INRFT + 0.27444 * US_INRFB[-1]

(15.2506) (15.2506)

- 0.32034 * (US_SF/US_GDPN*100) + 1.56250 * D84 - 1.64971 * D86 - 1.25256 * D91 + 1.87092

(3.37194) (2.67166) (2.75244) (2.17781) (4.15690)

POLYNOMIAL LAGS:
US INRFB

FROM 0 TO 1 DEGREE 1 FAR

SUM SQ 4.3867 STD ERR 0.5408 LHS MEAN 8.8946
R SQ 0.9582 R BAR SQ 0.9443 F 5, 15 68.8362
D.W.( 1) 1.5630 D.W.( 2) 2.2675

[H-13]: USA: US INRGR (GOVERNMENT BOND YIELD (10 YEARS))

RESTRICTED ORDINARY LEAST SQUARES
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991

US_INRGR

= 0.53570 * US_INRFT + 0.26685 * US_INRFB[-1] - 0.34762 * US_SF/US_GDPN*100 + 1.34062 * D84

(17.0240) (17.0240) (17.0240)

- 1.32365 * D86 - 0.95503 * D74 - 0.88253 * D75 - 0.84239 * D90 + 2.18223

(3.83836) (2.61010) (2.50389) (1.86711) (1.71377) (1.72991) (5.49208)

POLYNOMIAL LAGS:
US INRFB

FROM 0 TO 1 DEGREE 1 FAR

SUM SQ 2.8839 STD ERR 0.4710 LHS MEAN 9.0475
R SQ 0.9704 R BAR SQ 0.9545 F 7, 13 60.9336
D.W.( 1) 1.9622 D.W.( 2) 1.7857

[H-14]: USA: US INRCB (CORPORATE BOND YIELD (AAA))

ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991

US_INRCB

= 0.15378 * US_INRBC[-1] + 0.80785 * US_INRBF + 0.98614

(4.46728) (24.8908) (4.78463)

SUM SQ 0.6577 STD ERR 0.1911 LHS MEAN 9.7963
R SQ 0.9992 R BAR SQ 0.9914 F 2, 18 1149.74
D.W.( 1) 1.4510 D.W.( 2) 2.2690 H 1.1485

[H-15]: USA: US INRMG (NEWHOME MORTGAGE YIELD)

ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991

US_INRMG

= 0.59178 * US_INRMG[-1] + 0.44446 * US_INRFT + 0.79746 * D82 - 1.02384 * D83 + 0.94635

(11.2841) (13.0827) (2.09526) (2.52716) (2.19109)

SUM SQ 1.4333 STD ERR 0.2992 LHS MEAN 10.4005
R SQ 0.9852 R BAR SQ 0.9815 F 4, 16 266.054
D.W.( 1) 1.5923 D.W.( 2) 1.9618 H 0.9282
[H-16]: USA: US INRSL (HIGH GRADE MUNICIPAL BOND YIELD)
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
US INRSL
   =  0.20765 * US INRSL[-1] + 0.74973 * US INRCB - 1.36345
      (3.61540) - (14.1897) - (3.83691)
SUM SQ  1.8925  STD ERR  0.3242  LHS MEAN  7.5416
R SQ    0.9732  R BAR SQ  0.9702  F  2, 18  326.992
D.W.( 1) 1.4237  D.W.( 2) 2.3365  H    1.3471

[H-17]: USA: US INRCD (THREE MONTH CD INTEREST RATE)
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
US INRCD
   =  0.02973 * US INRCD[-1] + 0.92413 * US INRFF + 0.42061
      (1.52650) - (51.2196) + (3.02779)
SUM SQ  0.6319  STD ERR  0.1874  LHS MEAN  8.4771
R SQ    0.9963  R BAR SQ  0.9958  F  2, 18  2399.98
D.W.( 1) 2.0140  D.W.( 2) 2.7995  H   -0.0650

I. INTERNATIONAL TRANSACTION BLOCK

[1-01]: USA: US EXMIN (IDENTITY) (EXPORTS OF MERCHANDISE, EXCLUDING MILITARY)
US EXMIN = US REXMN * TR EXMN U/100

[1-02]: USA: US EOS (EXPORTS OF OTHER SERVICES)
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
LOG (US EOS)
   =  1.30358 * LOG (US EXMIN) - 0.73586 * LOG (US RATE)
      (31.6197) - (2.50089)
   - 0.35334 * D79 - 0.41649 * D80 + 0.63886 * D71 + 0.52461 * D72
      - 0.23202 * D81 - 4.87494
      (4.04520)  (4.74848)  (5.98299)  (4.98761)  (2.47607)
SUM SQ  0.9933  STD ERR  0.0847  LHS MEAN 10.8392
R SQ    0.9990  R BAR SQ  0.9959  F  7, 13  201.334
D.W.( 1) 1.9987  D.W.( 2) 1.8012

[1-03]: USA: US FAR (RECEIPTS OF INCOME ON U.S. ASSETS ABROAD)
ANNUAL DATA FOR 15 PERIODS FROM 1977 TO 1991
LOG (US FAR)
   =  0.87393 * LOG (US INRMB * US KRPA / 100) + 0.17313 * D79
      (18.2329) + (2.22986)
   - 0.17728 * D82 + 0.21949 * D89 + 0.18693 * D90 - 0.13581 * D81 + 1.33742
      (2.27597)  (2.04755)  (2.40097)  (1.79646)  (2.44994)
SUM SQ  0.0405  STD ERR  0.0711  LHS MEAN 11.3666
R SQ    0.9830  R BAR SQ  0.9702  F  6, 8  77.0361
D.W.( 1) 1.6646  D.W.( 2) 1.3562

[1-04]: USA: US EXIN (IDENTITY) (EXPORTS OF GOODS AND SERVICES)
US EXIN = US EXMIN + US EOS + US FAR

[1-05]: USA: US IMM (IDENTITY) (IMPORTS OF MERCHANDISE, EXCLUDING MILITARY)
US IMM = US RIMMIN * TR IMMN U/100

[1-06]: USA: US IOS (IMPORTS OF OTHER SERVICES)
ANNUAL DATA FOR 21 PERIODS FROM 1971 TO 1991
LOG (US IOS)
   =  0.84669 * LOG (US IOS)[-1] + 0.11769 * LOG (US IMM)
      (33.7327) + (5.13331)
   - 0.07527 * D75 + 0.19027 * D84 + 0.00689 * D90 + 0.05477 * D87 + 0.27673
      (3.53148)  (5.31955)  (4.06354)  (2.63521)  (3.44449)
SUM SQ  0.0053  STD ERR  0.0195  LHS MEAN 10.7106
R SQ    0.9994  R BAR SQ  0.9992  F  6, 14  3984.11
D.W.( 1) 2.6903  D.W.( 2) 1.7231  H   -1.8228

[1-07]: USA: US FAO (PAYMENT OF INCOME ON FOREIGN ASSETS IN U.S.)
ANNUAL DATA FOR 15 PERIODS FROM 1977 TO 1991
LOG (US FAO)
   =  0.73022 * LOG (US INRCD * US KRPL / 100)
      (24.6285)
   + 0.27707 * LOG (US INRBT * US KROL / 100) + 0.15433 * D79
      - 0.10014 * D82 - 0.10644 * D83 + 0.08922
      (4.26575)  (2.50037)  (1.77397)  (1.90376)  (0.20104)
SUM SQ  0.0259  STD ERR  0.0536  LHS MEAN 10.9863
R SQ    0.9954  R BAR SQ  0.9928  F  5, 9  387.382
D.W.( 1) 1.7739  D.W.( 2) 1.8161
[I-08]:USA: US IMIN(IDENTITY)(IMPORTS OF GOODS AND SERVICES)
US IMIN = US IMMIN + US IOS + US FAO

[I-09]:USA: US MTB(IDENTITY)(BALANCE ON MERCHANDISE TRADE)
US MTB = US EXMIN - US IMMIN

[I-10]:USA: US CBI(BALANCE ON CURRENT ACCOUNT)
US CBI = US EXIN - US IMIN + US TRN

[I-11]:USA: US KRPA(U.S. PRIVATE ASSETS ABROAD)
ANNUAL DATA FOR 14 PERIODS FROM 1978 TO 1991

\[
\text{LOG(US KRPA)} = 0.13461 \times \text{LOG(US KRPA)}[-1] + 1.22917 \times \text{LOG(US KNW)} \\
\quad (0.51643) \quad (2.96260) \\
- 0.73233 \times \text{LOG((100+US INRB)/(100+JP INRB)))} - 0.05394 \times DB - 0.87290 \quad (1.56573) \quad (2.19498) \quad (3.15450)
\]

SUM SQ 0.0045  STD ERR 0.0223 LHS MEAN 13.8425
R SQ 0.9976 R BAR SQ 0.9965 F 4, 9 933.213
D.W.( 1) 1.5692 D.W.( 2) 1.7725 H 2.7591

[I-12]:USA: US KRPL(OTHER FOREIGN ASSETS IN U.S.)
ANNUAL DATA FOR 14 PERIODS FROM 1978 TO 1991

\[
\text{LOG(US KRPL)} = -0.66678 \times \text{LOG(US KRPL)}[-1] + 0.62200 \times \text{LOG(US GDPN)} \\
\quad (3.12285) \quad (1.12768) \\
+ 1.29717 \times \text{LOG((100+US INRB)/(100+JP INRB)))} + 0.10078 \times DB - 0.80240 \quad (1.71281) \quad (2.62714) \quad (0.49915)
\]

SUM SQ 0.0120  STD ERR 0.0365 LHS MEAN 13.5786
R SQ 0.9982 R BAR SQ 0.9974 F 4, 9 1243.62
D.W.( 1) 2.2519 D.W.( 2) 2.1172 H -1.2222
### APPENDIX 2. VARIABLE LIST OF THE ICSEAD US MODEL

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<td>SURVEY OF CURRENT BUSINESS</td>
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### ENDOGENOUS VARIABLE LISTING

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