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SIMULATIONS WITH A MODEL OF THE U.S. BALANCE OF PAYMENTS:
THE IMPACT OF THE SMITHSONIAN EXCHANGE RATE AGREEMENT

by

Sung Y. Kwack

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Simulations with a Model of the U.S. Balance of Payments:
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Since the realignment of exchange rates by the Smithsonian Agreement
of December 1971, substantial research has been conducted to analyze the
effect of that exchange rate change on the U.S. balance of payments.
Most of this inquiry, however, focused exclusively on the balance of
commodity trade.[1] The effect on the service and capital accounts and
the indirect effect through changes in foreign holdings of income-yielding
U.S. liquid liabilities were not examined. The exchange rate effect on
all the components of the U.S. balance of payments--with specific account
taken of the impact on trade, services, and capital flows--deserves
systematic analysis. This paper attempts such an analysis utilizing a
model of the U.S. balance of payments.

Section I outlines the model and derives theoretically the directions
of dynamic response to a change in exogenous variables. Section II pre-
sents the prediction errors of the model during the sample period and the
multipliers over time of changes in income, interest rates, and prices.
Section III assesses the impact of the Smithsonian change in exchange rates
on the balance of payments for the year 1972 and later years. Section
IV summarizes the main findings of the paper.

I. A Model of U.S. Balance of Payments

An analysis of the impact of changes in exogenously given policy
instruments on the U.S. balance of payments with an econometric model
presumes that the model is sound theoretically and empirically. This

section briefly outlines the model and theoretically identifies the direction
of its responses over time to exogenous shocks resulting from changes in
income and price levels and in interest rates.

The model consists of 118 equations including 67 identities for the
balance of payments and definitional variables. The current account
sector contains 21 behavioral equations explaining the variations in
commodity and service transactions including investment incomes. The
capital account has 12 behavioral equations describing capital flows between
the United States and the rest of the world and 13 equations generating
capital stocks. In addition, there are five term structures of interest
rate equations determining foreign rates as well as the U.S. long-term
rate. The equations of the model (estimated for the period from the third
quarter of 1960 through the fourth quarter of 1971) are presented in the
Appendix. The basis for the specification of each sector can be found in
Kwack [13]-[21] and Kwack and Schink [22].[2]

The demand for foreign goods and services excluding investment income
is assumed to depend on domestic real income, relative prices, and tariff
rates. Income from foreign investments depends on the existing stock
of holdings and interest rates. Capital outflows from the United States
are viewed as being initiated to achieve the desired level of assets. As a
first approximation, capital flows are described as a Koyck distributed
lag function of changes in desired capital stocks. For financial flows,
the desired stock is related to a weighted average of current and past
incomes, interest rates, and other variables including policy instruments.
For direct investment abroad, the desired stock depends on the level of
foreign output, the rental cost of capital at home, and the availability

of internal funds to invest. Assuming that the United States is the financial center in the world, foreign rates (including Euro-dollar rates) can be regarded as determined by money market conditions in the United States represented by the U.S. Treasury bill rate.

The present specification of the model is considered an improvement over the specifications of Kwack and Schink [22] in several respects. First, the corporate tax and duty rates enter explicitly in the sectors related to direct investment and trade. Second, prices and income in current and past periods are incorporated into the sectors of commodity and services trade to account for lagged influences. Third, a weighted average of current and past incomes is used as a scale variable in the financial capital flow equations. This is consistent with a portfolio theory which treats wealth as the scale variable. Finally, as compared with 11 equations explaining commodity trade volumes and prices at a high level of disaggregation in Kwack and Schink [22], the trade sector employed here contains only 4 equations explaining total trade volume and prices.

A priori information describing how the model as a whole operates is useful for interpreting the multipliers and forecasts generated by simulations of the model. For this purpose, we establish a very simple version of the model. The simple version can be described by the following four equations:

$$B = T*(Y, Y', P, P', E) + iA - i(A' + R) - \frac{dA}{dt} + \frac{dA'}{dt} \qquad (1)$$

$$\frac{dA}{dt} = v[A*(Y, Y', i, T*) - A], \qquad 0 \leq v \leq 1 \qquad (2)$$

$$\frac{dA'}{dt} = w[A*'(Y, Y', i, T*) - A'], \qquad 0 \leq w \leq 1 \qquad (3)$$

$$\frac{dR}{dt} = - k B, \qquad 0 \leq k \leq 1 . \qquad (4)$$

where Y and Y' represent incomes in the United States and the rest of the

world, respectively; i and P are the U.S. interest rate and prices; and

A is the level of U.S.-owned assets abroad. The U.S. overall balance of

payments and the balance of commodity trade and services excluding invest-

ment income are denoted by B and T. Primed symbols denote analogously

defined variables for foreign country, and E is the exchange rate defined

as the number of U.S. dollars per unit of foreign currency. All the

assets are assumed to be denominated in U.S. dollars. The v and w represent

the parameters for the rate of adjustment. A star (*) indicates a func-

tional relationship determining the desired level of the variable. Equation

(1) determines the balance of payments simultaneously with capital flow

equations (2) and (3). Equation (4) posits that a fraction, k, of a deficit

in the balance of payments is financed by an increase in income yielding

U.S. liquidity liabilities to foreigners, B, such as time deposits and

Treasury bills.

As in Kwack [20], the excess of investment income over capital flows

can be rewritten in terms of desired stocks.[3]

$$iA - \frac{dA}{dt} = A*(Y, Y', i, T*)(i - (v + i)e^{-vt}) \tag{5}$$

$$iA' - \frac{dA'}{dt} = A*'(Y, Y', i, T*)(i - (w + i)e^{-wt}). \tag{6}$$

Upon substituting (5) and (6) into (1), the change in the income-yielding

liquidity liabilities of the United States per unit of time can be expressed

as a differential equation:

$$\frac{dR}{dt} = k\ iR - (T* + A*(i - (v + i)e^{-vt}) - A*'(i - (w+i)e^{-wt})). \tag{7}$$

Differential equation (7) is solved with the condition R = 0 at the initial

period t = 0 to yield the following expression for the liquidity liabilities

at time t:

$$R = (1 - e^{kit})(\frac{T^* + A^*i - A^{*'}i}{i}) - (e^{kit} - e^{-vt})(\frac{k(v + i)A^{*'}}{v + ki}) \quad (8)$$

$$+ (e^{kit} - e^{-wt})(\frac{k(w + i)A^{*'}}{w + ki})$$

Differentiating (8) with respect to time and using equation (4) we derive

the balance of payments equation at period t:

$$B = e^{kit}[T^* + A^*i - A^{*'}i - ki(\frac{(v + i)A^*}{v + ki}) - \frac{(w + i)A^{*'}}{w + ki})] \quad (9)$$

$$- e^{-vt}\frac{v(v + i)A^*}{v + ki} + e^{-wt}\frac{w(w + i)A^{*'}}{w + ki}$$

For expositional purposes, we assume that the rate of adjustment of the

foreign assets by U.S. investors is identical to the rate of adjustment by

foreign investors. Then, w = v and the balance of payments equation (9)

simplifies to

$$B = e^{kit}[T^* + i(A^* - A^{*'})(\frac{v(1-k)}{v+ki})] - e^{-vt}[\frac{v(v+i)(A^*-A^{*'})}{v+ki}] \quad (10)$$

This equation describes the way in which the balance of payments condition

is generated by the model when changes in income, prices and interest

rates are initiated exogenously.

At the initial period t = 0, equation (10) shows that the balance

of payments equals a sum of the trade balance and the capital account

balance. After an infinite number of periods, the balance is determined

by the trade balance, asset positions, and the foreign preference to hold

income-yielding U.S. liabilities. Suppose that a foreign country reacts

to a U.S. payments surplus by an equivalent reduction in its non-income

yielding U.S. liabilities, such as demand deposits. In this case k = 0,

and the balance of payments worsens over time, other things being equal,

if an initial improvement comes from net capital inflows. Of course,

the payments condition remains unaffected if the initial improvement

results from a surplus in the trade balance. If k > 0, a surplus in the

payments means a reduction in income-yielding U.S. liabilities. This

reduces income payments to foreigners over subsequent periods. In turn,

the balance of payments tends to improve in later periods.

For policy analysis it is important to have information on the effects

of increases in income, prices, and interest rates over time. This in-

formation can be obtained by differentiating equation (10) totally and

determining the signs of the total derivatives. The directional signs

and the difference in magnitude at the initial and later periods (t = 0

and t = ∞) are given in Table 1 for the case k = 0. The signs for the

case k > 0 are easily conjectured from the table. However, we may note

that the sign at the initial period is independent of k and that the long

run effect is greater for k > 0. As expected, a rise in foreign income

and prices, including exchange rates, improves the balance of payments

over time, provided that the Marshall-Lerner condition holds. The reverse

is the case for an increase in U.S. income and prices. Although a rise

in the U.S. interest rate improves the payments in the short run, it even-

tually leads to a deterioration in the balance of payments.[4] Other things

being equal, the period required for reversing its effects is longer,

as the level of U.S. assets existing at the initial period is higher.

II. The Properties of the Model

This section examines the prediction errors of the model during the

sample period and presents its dynamic response to changes in income,

prices, and interest rates. Comparing the dynamic responses obtained

Table 1

With respect to rise in	Derivative of the Balance of Payments			Remarks
	$t=0$	$t=\infty$	comparison	
P	$a_0 < 0$	$a_\infty < 0$	$|a_\infty| > |a_0|$	$\dfrac{\partial A^*}{\partial T^*}\Big|_{T^*=T} - \dfrac{\partial A^{*\prime}}{\partial T^*}\Big|_{T^*=T} \lessgtr 1$
P'	$b_0 > 0$	$b_\infty > 0$	$b_\infty > b_0$	$\dfrac{\partial A^*}{\partial T^*}\Big|_{T^*=T} - \dfrac{\partial A^{*\prime}}{\partial T^*}\Big|_{T^*=T} \leq$
E	$c_0 > 0$	$c_\infty > 0$	$c_\infty > c_0$	$\dfrac{\partial A^*}{\partial T^*}\Big|_{T^*=T} - \dfrac{\partial A^{*\prime}}{\partial T^*}\Big|_{T^*=T} \geq 1$
i	$d_0 > 0$	$d_\infty < 0$	$|d_\infty| > |d_0|$	
Y	$e_0 < 0$	$e_\infty < 0$	$|e_\infty| < |e_0|$	$\dfrac{\partial A^*}{\partial Y} \gtrless \dfrac{\partial A^{*\prime}}{\partial Y}$,
Y'	$f_0 > 0$	$f_\infty > 0$	$f_\infty > f_0$	$\dfrac{\partial A^{**}}{\partial Y'} \gtrless \dfrac{\partial A^{*\prime}}{\partial Y'}$

Notes: $\dfrac{\partial T^*}{\partial Y} < 0$, $\dfrac{\partial T^*}{\partial Y'} > 0$, $\dfrac{\partial T^*}{\partial P} < 0$, $\dfrac{\partial T^*}{\partial P'} > 0$, $\dfrac{\partial T^*}{\partial E} > 0$, $\dfrac{\partial A^*}{\partial Y} > 0$, $\dfrac{\partial A^*}{\partial Y'} > 0$,

$\dfrac{\partial A^*}{\partial T^*}\Big|_{T^*=T} > 0$, $\dfrac{\partial A^*}{\partial i} < 0$, $\dfrac{\partial A^{*\prime}}{\partial i} > 0$, $\dfrac{\partial A^{*\prime}}{\partial Y} > 0$, $\dfrac{\partial A^{*\prime}}{\partial Y'} > 0$, $\dfrac{\partial A^{*\prime}}{\partial T^*}\Big|_{T^*=T} < 0$.

by dynamic simulation with the directional changes described above, one
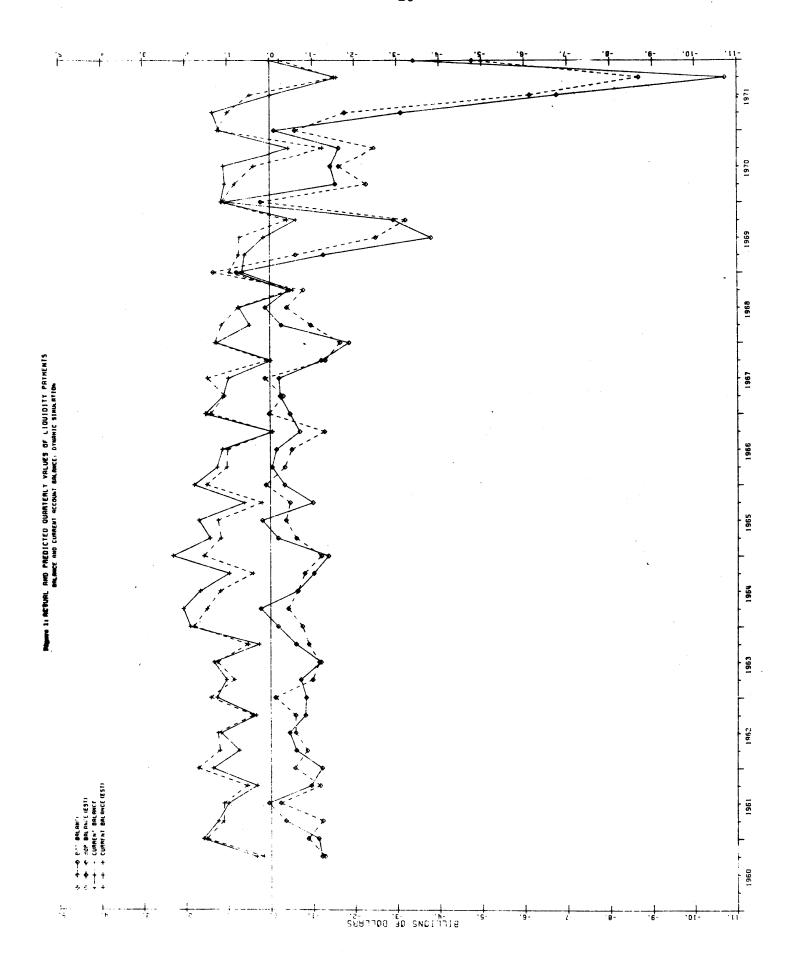can judge the adequacy of the model for policy analysis.

We ran a dynamic simulation over the sample period 1960III-1971IV
in the sense that the values of all the lagged exogenous variables used
are those generated by the simulation itself. The mean bias and root mean
squared errors are computed as the statistics representing the prediction
errors of the model, obtained when the model is run dynamically. Table 2
summarizes the statistics for major components of the model. According
to these statistics, the model as a whole performs remarkably well; most
variables have a mean bias and root mean squared error of less than $0.1
and 1.0 billions, respectively. The plus sign of the mean bias indicates
that the predicted values of variables are lower than the actual values.
According to the mean biases, the model would generate an under-prediction
of the current balance and an over-prediction of the capital balance.
Therefore, the errors of prediction in the current balance partially offset
the errors in the capital balance. There is a tendency for the trade
balance to be lower than the actual balance primarily through an over-
prediction of imports. On the other hand, the model appears to pre-
dict the U.S. and foreign interest rates reasonably well but somewhat
higher than they actually are. It is important to point out here that
the U.S. import sector seems to need further improvement in specification
because its mean bias, $0.15 billion, is the highest among those of in-
dividual sectors. In fact, this sector may be the main source of high
mean biases in the current balance as well as the liquidity payments balance.

The actual and simulated values are plotted in Figure 1 for two
aggregate measures of the condition of the U.S. balance of payments, namely,

Table 2. Prediction Errors of Balance of Payments Model: Dynamic Simulation, 1960III - 1971IV

(Billions of U.S. Dollars at Annual Rate)

Items	Mean Bias	Root Mean Square Error	Items	Mean Bias	Root Mean Square Error
Payment Balance on Official Transactions Basis	-0.246	3.487	Capital Account Balance	0.082	2.611
Payment Balance on Liquidity Basis	-0.132	2.559	Foreign Capital Inflows	0.079	2.200
Current Account Balance	-0.214	1.367	Direct Investment	0.014	0.369
Trade Balance	0.101	1.292	Corporate Securities	0.002	0.623
Exports	-0.046	1.062	Nonliquid Liabilities to Private Foreigners	0.010	0.630
Volume	-0.041	1.005	U.S. Government Nonliquid Liabilities	0.035	0.297
Price	0.000	0.015	Errors and Omissions	0.018	1.517
Imports	-0.146	1.063	U.S. Capital Outflows	-0.003	1.238
Volume	-0.140	1.069	Direct Investment	-0.039	0.733
Price	0.000	0.015	Foreign Securities and Nonbank Claims	0.023	0.745
Investment Income Balance	-0.201	0.570	Short-Term Bank Claims	0.019	0.751
Receipts	0.018	0.496	Long-Term Bank Claims	-0.006	0.331
Payments	0.220	0.341	Interest Rate Sector		
Travel Balance	-0.113	0.189	U.S.		
Exports	0.000	0.075	Prime Rate	-0.032	0.281
Imports	0.101	0.151	Industrial Bonds Rate	-0.001	0.260
Transportation Balance	0.003	0.091	Foreign		
Exports	-0.004	0.129	Euro-Dollar Deposit Rate	-0.011	0.525
Imports	-0.007	0.101	Short-Term Rate	0.010	0.252
Other Balance	0.000	0.075	Long-Term Rate	-0.015	0.156
Exports	-0.005	0.044			
Imports	-0.005	0.060			

Note: Direct Investment and Investment Income Balance includes retained earnings.

Figure 1: ACTUAL AND PREDICTED QUARTERLY VALUES OF LIQUIDITY PAYMENTS BALANCE AND CURRENT ACCOUNT BALANCE: DYNAMIC SIMULATION

the current account and the balance of payments on a liquidity basis.
The plot is designed to show whether the errors generated during the
simulation process tend to offset each other and to observe whether the
model would indicate the proper changes in direction. Figure 1 reveals
that the predicted values move in the same direction as the actual values.
Out of the 31 turning points in the current account balance, the model
predicts 30 points. On the other hand, out of 24 points in the liquidity
payments balance, only 18 points are predicted by the model. The model
is able to trace out the actual movements of the payments and components
reasonably well. Moreover, the predicted errors of the model tend to
offset each other over a long period. This indicates that the model can
be used for long-term simulations and equally well for short-term simu-
lations to analyze the impact of policy actions.

A dynamic simulation with a unit of change in a specific variable
produces predicted values that might have occurred, if the change had
taken place at the initial period of the simulation. The simulation without
the change, called the control solution, is a pseudo-actual analogue to
the period of simulation. Hence, the differences between the predicted
values with and without the particular change are the potential impacts
expected from the action. If no normalization is performed, the magnitudes
of the changes are not multiplier estimates in the usual sense. For
convenience, however, they are referred to here as multipliers.

We performed six dynamic simulations, starting from the third quarter
of 1960 through the fourth quarter of 1971. One simulation is the control
solution and the other five are for different changes in the following
variables which are assumed to be exogenous in the model: (1) a 1% rise

in U.S. real income variables, (2) a 1% rise in foreign real income, (3) a 1 percentage point rise in the U.S. Treasury bill rate, (4) a 1% increase in U.S. prices, and (5) a 1% increase in foreign prices. Then, we computed the values of the U.S. balance of payments and major components that changed from their values in the control solution. The multiplier estimates were, in general, found to have nearly stabilized by the fifth year after the initial changes were made, and to be unambiguous in direction. It is known that the variances of the multiplier estimates increase with time due to accumulation of errors. Consequently, multiplier estimates only up to five years will be examined in this paper.

Tables 3-7 summarize the results of the simulations with respect to the effects on U.S. balance of payments of each of the five cases. One important point to indicate at the outset is that foreigners increased their holding of income-yielding U.S. short-term liabilities when the U.S. payments were in a deficit. In other words, 0 < k < 1. Therefore, a deficit in the U.S. payments is expected to raise the deficit in subsequent periods through incurred income payments to foreign holders. Taking this into account, the multiplier estimates showing the direction of changes in the U.S. payments and major components for the five cases are generally in line with what we expect from the a priori analysis of Section I.

As indicated in Table 3, a 1% rise in the level of U.S. real income variables (which, for example, is a rise of $4 billion in disposable income) decreases the balance on the current account and overall payments by about $0.323 and $0.363 billion during the first year. While the decreases in balance of both current account and payments are monotonic, the balance of the capital account reaches a peak value of a deficit of $0.1 billion after 10 quarters and then starts to turn favorable. This later peak period

Table 3. Time Path of the Effects of a 1% Increase in U.S. Real Income
on the Balance of Payments: Simulation, 1960III – 1965II

(Billions of U.S. Dollars at Annual Rate)

Item\Quarter No.	1	2	3	4	6	8	10	12	16	20	24
Balance of Payments on Liquidity Basis	-0.305	-0.351	-0.375	-0.422	-0.467	-0.516	-0.538	-0.586	-0.697	-0.803	-0.967
Current Account Balance	-0.294	-0.318	-0.322	-0.361	-0.385	-0.429	-0.442	-0.501	-0.630	-0.754	-0.929
Trade Balance	-0.264	-0.272	-0.267	-0.292	-0.306	-0.324	-0.325	-0.350	-0.420	-0.475	-0.559
Exports	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Imports	0.264	0.272	0.267	0.292	0.306	0.324	0.325	0.350	0.420	0.475	0.559
Investment Income Bal.	-0.020	-0.031	-0.039	-0.045	-0.056	-0.069	-0.086	-0.106	-0.158	-0.222	-0.305
Receipts	0.000	0.001	0.002	0.003	0.005	0.008	0.011	0.014	0.020	0.026	0.031
Payments	0.020	0.032	0.040	0.047	0.061	0.077	0.097	0.120	0.178	0.248	0.336
Travel Balance	-0.005	-0.006	-0.008	-0.015	-0.014	-0.026	-0.022	-0.034	-0.041	-0.045	-0.050
Transporation	-0.003	-0.005	-0.006	-0.006	-0.006	-0.006	-0.007	-0.007	-0.008	-0.009	-0.011
Capital Account Balance	-0.011	-0.034	-0.053	-0.062	-0.082	-0.088	-0.096	-0.086	-0.067	-0.048	-0.038
Inflow	0.019	0.016	0.014	0.012	0.010	0.010	0.009	0.008	0.008	0.008	0.008
Outflow	0.030	0.050	0.067	0.074	0.092	0.097	0.104	0.094	0.075	0.057	0.047

1. U.S. Income variables are YD, GNP, ZA, DIV, CCACORP, ACBLI, and RU which are, Personal Disposable Income, Gross National Product, Corporate After-Tax Profits, Corporate Dividends, Corporate Capital Consumption Allowances, Commercial Bank Loans and Investments, and the Unemployment Rate respectively. The unemployment rate was decreased 1 percentage point.

2. Rounding Errors.

is due to the differential lags inherent in the capital flow equations. From the table, it is clear that the overall payments and current account balance in the long run move in the same direction and that a deficit of about $1.00 billion may be the impact of the rise in U.S. income over six years. By contrast to the case of U.S. income, the 1% rise in foreign real income variables (which, for example, is an increase of $0.6 billion in foreign gross national product weighted by trade shares) leads to an increase of $0.203 and $0.104 billion in the balance of current account and overall payments, respectively, for the initial year, as shown in Table 4. The balance of capital account is reduced by about $0.099 billion. This is mainly due to the rise in U.S. direct investment induced by increased economic activity abroad. As a result of a continuing decline in U.S. investment, the effect on the balance of payments and current account balance results in a rise of $0.400 billion after the fifth year.

As shown in Table 5, a 1 percentage point rise in the U.S. Treasury bill rate improves in the first year the balance of the capital account and overall payments by $1.463 and $1.380 billion, respectively. The interest rate appears to have the highest impact on the payment after 12 quarters and thereafter slowly drifts downward. This is because capital flows are merely the reflection of adjusting the stocks to desired levels and U.S. assets are larger than U.S. liabilities. Decreasing net capital outflows in the earlier periods produce a surplus in the overall payments after the fifth year. But, the level of the surplus tends to diminish over time.

Turning to Table 6, we find that the impact on the current account of a 1% rise in U.S. prices at the initial year results in an improvement

Table 4. Time Path of the Effects of a 1% Increase in Foreign Real Income
on the Balance of Payments: Simulation, 1960III - 1965II

(Billions of U.S. Dollars at Annual Rate)

Item\Quarter No.	1	2	3	4	6	8	10	12	16	20	24
Balance of Payments on Liquidity Basis	0.064	0.097	0.116	0.137	0.166	0.193	0.200	0.229	0.285	0.335	0.398
Current Account Balance	0.173	0.206	0.208	0.227	0.244	0.258	0.258	0.287	0.338	0.390	0.455
Trade Balance	0.166	0.185	0.179	0.190	0.198	0.199	0.191	0.206	0.226	0.240	0.259
Exports	0.166	0.185	0.179	0.190	0.198	0.199	0.191	0.206	0.226	0.240	0.259
Imports	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Investment Income Bal.	0.000	0.011	0.017	0.021	0.030	0.038	0.049	0.059	0.088	0.123	0.166
Receipts	0.000	0.011	0.017	0.021	0.027	0.031	0.037	0.039	0.048	0.056	0.064
Payments	0.000	0.000	0.000	-0.001	-0.003	-0.008	-0.013	-0.020	-0.041	-0.067	-0.102
Travel Balance	0.003	0.004	0.006	0.010	0.010	0.015	0.012	0.016	0.017	0.019	0.022
Transportation Balance	0.002	0.004	0.005	0.005	0.005	0.005	0.005	0.005	0.006	0.006	0.006
Capital Account Balance	-0.110	-0.109	-0.092	-0.089	-0.079	-0.065	-0.058	-0.058	-0.053	-0.055	-0.057
Inflow	0.024	0.016	0.009	0.009	0.005	0.002	0.002	0.002	0.002	0.002	0.002
Outflow	0.134	0.125	0.101	0.098	0.083	0.067	0.059	0.060	0.055	0.057	0.059

1. Foreign Income variables are GNPDCA, GNPDJA, GNPDUK, GNPDWG, GNPD63CA, GNPD63JA, GNPD63UK, GNPD63WG which are nominal and real gross national product in local currency of Canada, Japan, the United Kingdom, and West Germany.

2. Rounding Errors.

Table 5.   Time Path of the Effects of a 1 Percentage Point Rise in U. S. Treasury
Bill Rate on the Balance of Payments: Simulation, 1960III – 1965II

(Billions of U.S. Dollars at Annual Rate)

Item\Quarter No.	1	2	3	4	6	8	10	12	16	20	24
Balance of Payments on Liquidity Basis	0.535	1.367	1.679	1.940	2.348	2.630	2.747	2.813	2.709	2.352	2.234
Current Account Balance	-0.019	-0.087	-0.118	-0.108	-0.026	0.068	0.145	0.228	0.399	0.567	0.705
Trade Balance	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Exports	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Imports	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Investment Income Bal.	-0.019	-0.087	-0.118	-0.108	-0.026	0.068	0.145	0.228	0.399	0.567	0.705
Receipts	0.064	0.071	0.078	0.084	0.086	0.083	0.073	0.062	0.018	-0.042	-0.106
Payments	0.083	0.159	0.196	0.192	0.111	0.016	-0.072	-0.166	-0.381	-0.610	-0.812
Travel Balance	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Transportation Balance	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Capital Account Balance	0.554	1.454	1.796	2.049	2.374	2.562	2.602	2.585	2.309	1.784	1.528
Inflow	-0.057	0.711	0.942	1.108	1.356	1.487	1.532	1.534	1.292	1.072	0.981
Outflow	-0.611	-0.743	-0.855	-0.940	-1.028	-1.075	-1.070	-1.051	-1.017	-0.713	-0.547

1. Rounding Errors.

Table 6. Time Path of the Effects of a 1% Increase in U.S. Prices on
on the Balance of Payments: Simulation, 1960III - 1965II

(Billions of U.S. Dollars at Annual Rate)

Item \ Quarter No.	1	2	3	4	6	8	10	12	16	20	24
Balance of Payments on Liquidity Basis	-0.889	-0.872	-0.717	-0.702	-0.032	-0.129	-0.257	-0.345	-0.475	-0.578	-0.719
Current Account Balance	0.017	0.060	0.088	0.084	-0.067	-0.234	-0.349	-0.421	-0.523	-0.615	-0.747
Trade Balance	0.026	0.065	0.081	0.069	-0.069	-0.216	-0.304	-0.361	-0.417	-0.455	-0.515
Exports	0.035	0.092	0.130	0.152	0.086	0.022	-0.007	-0.010	-0.014	-0.019	-0.024
Imports	0.009	0.027	0.049	0.083	0.156	0.238	0.297	0.351	0.403	0.436	0.491
Investment Income Bal.	0.000	0.016	0.035	0.049	0.054	0.034	0.017	-0.001	-0.041	-0.090	-0.154
Receipts	0.000	0.022	0.049	0.074	0.102	0.097	0.090	0.083	0.074	0.067	0.063
Payments	0.000	0.006	0.014	0.026	0.048	0.062	0.073	0.084	0.115	0.147	0.217
Travel Balance	0.000	-0.016	-0.026	-0.031	-0.045	-0.044	-0.050	-0.047	-0.051	-0.055	-0.060
Transportation Balance	0.000	0.001	0.002	0.002	0.000	-0.003	-0.006	-0.007	-0.008	-0.009	-0.010
Capital Account Balance	-0.906	-0.931	-0.814	-0.786	-0.099	0.106	0.092	0.076	0.047	0.037	0.027
Inflow	0.019	0.016	0.014	0.012	0.010	0.010	0.009	0.008	0.008	0.008	0.008
Outflow	0.925	0.947	0.828	0.798	0.109	-0.096	-0.083	-0.068	-0.039	-0.029	-0.019

1. U.S. Price variables are PC63, WPI63, PXEAF63, and PGNP63 which are the implicit price deflator for Personal Consumption Expenditures, The Wholesale Price Index, The Price of Gross Product (Non Farm Industries), and the implicit price deflator for Gross National Product, respectively. All variables have Base Year 1963 = 1.0. YD, GNP, ZA, DIV, and CCACORP were also increased 1% in order to keep real income at the original level.

2. Rounding Errors.

Table 7. Time Path of the Effects of a 1% Increase in Foreign Prices
on the Balance of Payments: Simulation, 1960III – 1965II

(Billions of U.S. Dollars at Annual Rate)

Item \ Quarter No.	1	2	3	4	6	8	10	12	16	20	24
Balance of Payments on Liquidity Basis	-0.061	0.014	0.081	0.146	0.223	0.246	0.328	0.403	0.544	0.647	0.778
Current Account Balance	0.005	0.098	0.175	0.259	0.322	0.325	0.415	0.498	0.625	0.720	0.848
Trade Balance	0.026	0.078	0.137	0.220	0.251	0.254	0.320	0.399	0.481	0.516	0.564
Exports	0.013	0.040	0.070	0.111	0.192	0.233	0.225	0.240	0.269	0.291	0.321
Imports	-0.013	-0.038	-0.068	-0.108	-0.060	-0.021	-0.095	-0.158	-0.212	-0.224	-0.244
Investment Income Bal.	0.000	0.010	0.016	0.019	0.027	0.035	0.047	0.060	0.100	0.156	0.230
Receipts	0.000	0.011	0.017	0.020	0.027	0.031	0.037	0.040	0.050	0.059	0.068
Payments	0.000	0.001	0.001	0.001	0.000	-0.004	-0.010	-0.020	-0.051	-0.097	-0.161
Travel Balance	-0.022	0.009	0.019	0.016	0.037	0.029	0.041	0.031	0.033	0.037	0.041
Transportation Balance	0.000	0.001	0.002	0.004	0.006	0.006	0.007	0.008	0.011	0.011	0.013
Capital Account Balance	-0.066	-0.084	-0.094	-0.113	-0.099	-0.079	-0.087	-0.095	-0.081	-0.073	-0.070
Inflow	0.024	0.016	0.009	0.008	0.005	0.002	0.002	0.002	0.002	0.002	0.002
Outflow	0.090	0.100	0.103	0.121	0.104	0.081	0.089	0.097	0.083	0.075	0.072

1. Foreign Price variables are WPIBL, WPICA, WPIFR, WPIIT, WPIJA, WPINE, WPISD, WPISZ, WPIUK, WPIWG, CPI63FR, CPI63IT, CPI63ME, GNPDCA, GNPDJA, GNPDUK, GNPDWG. These variables are (1) the wholesale price index of Belgium, Canada, France, Italy, Japan, the Netherlands, Sweden, Switzerland, the United Kingdom; (2) the consumer price index of France, Italy, and Mexico; and (3) the nominal gross national products of Canada, Japan, the United Kingdom, and West Germany, respectively.

2. Rounding Errors.

of $0.062 billion. The value of U.S. exports is increased by $0.102 billion

due to the price elasticity of less than one. The value of U.S. imports

rises by $0.041 billion approximately. On the other hand, its impact on

the capital account is a reduction of $0.857 billion which is attributable

mainly to high direct investment outflows. As the reader may be aware,

the U.S. direct investment outflows are related positively to the percentage

rate of four quarter increases of the price deflator of U.S. Gross National

Product (which is a factor in the rental price of domestic capital). Since

the 1% rise in U.S. price level causes changes in the rate of inflation only for

the first year, the balance of payments effects are similar to the current

account balance effects over time. After the fifth year, consequently,

the payments impact, deficit of $0.719 billion, is roughly the sum of

a deficit of $0.515 billion in the trade account and of $0.154 billion

in the investment income balance.

The dollar prices of foreign goods and services determine the trade

and service transactions. Consequently, the effects of changes in foreign

currency prices are taken to be identical to the effects of changes in

foreign exchange rates in the model. It can be seen from Table 7 that

within one year a 1% rise in foreign prices would reduce the overall pay-

ments and current account by $0.045 and $0.134 billion, respectively.

This large initial impact is due, in part, to both an increase in the

value of U.S. exports by $0.054 billion and a decrease in the value of

U.S. imports by $0.056 billion. The effect on U.S. imports differs

noticeably from what we found for a rise in U.S. prices which increases the

value of U.S. exports initially. This is, in part, due to the prevalence of

regressive expectations on import prices in the future, which is represented in

the negative coefficient of the variable of rate of change in import prices in the model.[5] In other words, the regressive expectations on import prices affect the volume of U.S. imports, in addition to relative prices and real income. Thus, the rate of increase of U.S. import prices have had a great negative impact on the volume of U.S. imports in the first year. However, the change in price inflation induced by a rise in the foreign prices ceases after the second year. Thereby the volume of U.S. imports comes to depend only on income and relative prices. As expected, the change in the overall payments in later periods follows closely the improvements in the investment income and trade account balance. The impact on the overall payments at the fifth year is about $0.78 billion, whereas that on the trade balance is about $0.56 billion.

III. Smithsonian Exchange Rate Effects on U.S. Balance of Payments

The devaluation of the U.S. dollar accomplished by the Smithsonian Agreement of December, 1971, was about 8 percent against a trade-weighted average of exchange rates prevailing during the first quarter of 1971 for the group of 10 industrial countries excluding the United States and Switzerland. This reduction in the dollar price affects the prices of traded goods in local currency and economic activity in the world. Quantitative information on the induced changes in domestic prices and incomes are unavailable. Therefore, the effect on the balance of payments is estimated only by the change in exchange rates.

Table 8 contains a summary of the forecasts of the balance of payments for the year 1972 and the exchange rate effects derived from dynamic simulation of the model from the first quarter of 1972. A plus sign on

the forecast errors means that the predicted values are lower than the actual values. The model over-predicts the balance of current account by $5 billion and under-predicts the balance of capital account by $2 billion during 1972. Thus, the prediction on the liquidity balance of payments, a deficit of $12 billion, is more than the actual value by $3 billion. Looking at the forecast errors in detail, it is not difficult to pinpoint that the main source is the under-prediction of the import volume by about $3 billion, which will be discussed below.[6] The remaining sectors are forecast with a high degree of accuracy.

As compared with what would have been expected had the exchange rates during the first quarter of 1971 prevailed for the year 1972, the actual depreciation of U.S. dollars contributed to an improvement in the U.S. balance of payments in 1972 by about $2 billion. Its contribution to the current account balance is an increase of approximately $3.59 billion. This is made possible through improvements in the trade balance by $3.2 billion, the investment income balance by $0.17 billion, and the travel and transportation balance by $0.13 billion. Capital outflows resulting from the change in exchange rates are about $1.6 billion; the capital inflows are about $0.14 billion. The estimate covers these effects by changing the dollar value of foreign income and the U.S. trade balance and excludes the effects of induced changes in interest rates. To the extent that interest rates are sensitive to variations in rate of change in exchange rates, the estimate given here could understate the net outflows. Nevertheless, an interesting point to be noted is that the induced deterioration in the capital account is equal to about 45% of the improvement in the current account. If one accepts this finding, one could generalize that the effect of an exchange rate change on the balance of payments in the short run is smaller than the effect on the current account or trade balance.

Table 8. Impacts of the 1972 Exchange Rate Change on the Balance of Payments

(Billions of U.S. Dollars at Annual Rate, Not Seasonally Adjusted)

Item	Actual Value	Unconstrained Price Expectation Version[1]			Constrained Price Expectation Version		
		Prediction Error	Prediction Value	Exchange Rate Effect[2]	Prediction Error	Prediction Value	Exchange Rate Effect[2]
Payment Balance on Liquidity Basis	-15.266	-2.873	-12.393	2.148	1.359	-16.625	-0.636
Current Accoutn Bal.	-5.557	-4.814	-0.743	3.589	0.723	-6.280	-0.078
Trade Balance	-6.912	-4.914	-1.998	3.284	0.535	-7.447	-0.332
Exports	48.769	-0.901	49.670	1.715	-0.901	49.670	1.715
Volume	37.694	-1.221	38.915	1.342	-1.221	38.915	1.342
Price	1.294	0.018	1.276	0.0	0.018	1.276	0.0
Imports	55.681	4.014	51.667	-1.570	-1.436	57.117	2.048
Volume	41.145	3.100	38.045	-3.063	-0.893	42.037	-0.487
Price	1.353	-0.004	1.357	0.063	-0.004	1.357	0.063
Investment Income Balance[3]	11.190	0.659	10.531	0.173	0.698	10.492	0.151
Receipts	17.961	-0.031	17.992	0.170	-0.014	17.975	0.160
Payments	6.771	-0.689	7.460	-0.002	-0.714	7.485	0.013
Travel Balance	-3.037	-0.720	-2.317	0.076	-0.720	-2.317	0.076
Transportation Bal.	0.182	0.018	0.164	0.059	0.111	0.071	-0.014
Capital Account Bal.	-9.809	1.941	-11.650	-1.444	0.633	-10.342	-0.554
Inflow	2.189	0.741	1.447	0.139	0.741	1.447	0.138
Direct Investment[3]	0.160	-0.027	0.187	0.0	-0.027	0.187	0.0
Other	2.029	0.768	1.260	0.139	0.768	1.260	0.138
Outflow	11.898	-1.199	13.097	1.581	0.108	11.790	0.694
Direct Investment[3]	3.404	-0.472	3.876	0.731	-0.472	3.876	0.731
Other	8.494	-0.727	9.221	0.850	0.580	7.914	-0.037
% Change of Exchange Rate Index from 1971:I Value	1.099[4]			7.75%			7.75%

[1]The unconstrained price expectations version is the import volume equation (A.3) as presented in the model whereas the constrained price expectations version uses a coefficient of 0 for the price expectations term of the import volume equation (A.3)

[2]The exchange rate effect is the difference between the predicted value using actual exchange rates and the control value obtained when using 1971:I exchange rates.

[3]Includes retained earnings.

[4]Index value.

The trade balance is estimated to improve by $3.3 billion by the first year following the depreciation. This combines a rise of $1.7 billion in the value of U.S. exports and a fall of $1.6 billion in the value of U.S. imports. The latter is due primarily to a reduction of the import volume by $3 billion. Our estimate of the exports change is similar to others, but the estimate of the change in imports appears to contradict the argument that the change in exchange rates would increase the value of U.S. imports because of inelastic demand in the short run following the depreciation.[7] However, our estimate on imports, -$1.6 billion, consists of the initial perverse effect through changes in relative price, $2 billion, and the regressive expectation effect through changes in import price inflation, -$3.6 billion. If no price expectations are assumed to influence imports, our estimate consists only of the rise of $2 billion in the value of imports.[8] Therefore, the estimates of Clark [4] and others are consistent with ours in the sense that they examine an exchange rate effect in the absence of change in price expectations.

Contrary to past experience, the increases in the rate of inflation of import prices are followed by later decreases. An increase in the rate of inflation of import prices from the Smithsonian Agreement may lead the public to expect a further increase. This is likely to happen if the dollar devaluation is not considered to be sufficient to reduce the U.S. balance of payments deficit. Then, import price inflation has possible psychological effects modifying the directions in expected price changes. At best, import price inflation might have no temporary effect on the demand for imports because of great uncertainty about future price inflation. In this case, the exchange rate effect is equal to the relative

price effect which is given in Table 8. The resulting estimates of the
effect on exports, imports, and the trade balance in 1972 are $1.7 billion,
$2.00, and $0.3 billion. In turn, this reduction of trade balance from
$3.2 billion to $0.3 billion lowers the effect on the balance of payments
from $2 billion to $0.6 billion. The exercise suggests that the exchange
rate effect in a short period depends on the conditions which cause the
currency depreciation and whether the extrapolative expectations overcome
the regressive expectations on prices in the future.[9] In addition, the
forecast error on the volume of imports is reduced from $3 billion to $1
billion. This illustrates that a substantial improvement in the model
performance can be expected to be achieved by treating adequately the
formation of price expectations.

On the basis of our results on the balance of payments for the year
1972, one can conclude that the dollar devaluation helped to some extent
in reducing the U.S. balance of payments deficit. The effect of the
devaluation over longer periods is greater in reducing the payments deficit,
because the multipliers of the effects of foreign prices over longer periods
are greater as shown in Table 7. That is to say, the devaluation of
about 8% would have a positive effect on the trade and service account
of $4.4 and $2.2 billion, respectively, by the fifth year, 1976. The
impact on the capital account would be a reduction of $0.5 billion. As
a result, the balance of payments is $6 billion higher than the value we
would have in the absence of the depreciation. As argued before, the
estimate of the long-run effect has a large variance. As shown by Branson
[2] and Kwack [21], the rate of change in relative prices due to the
devaluation is likely to be less than the rate of the devaluation.

In a world of growing interdependence, a dollar depreciation would induce changes in income and prices at home and abroad.[10] Therefore, the estimate of the effect over longer periods may be subject to a substantial margin of error.

IV. Summary

This paper aims at providing estimates of the effects of exchange rate changes on the capital account as well as on the current account by utilizing a model of the U.S. balance of payments. Use of the model permits us to account not only for the direct effects on individual components of the balance of payments account, but also for the transmission of the changes in the balance of payments to individual components in successive periods.

The prediction errors and the direction of income, interest rates, and price multipliers over time seem very reasonable. This supports the use of the model to study the exchange rate effects. The model is still in the process of refinement, and the results reported here represent pre-liminary findings. At this stage, however, the following summary can be made of the exchange rate effects expected to hold, other things being equal.

First, the devaluation of the U.S. dollar during 1972 is estimated to be about 8% of the exchange rate prevailing during the first quarter of 1971. The devaluation seems to have reduced the U.S. balance of pay-ments deficit by $2 billion in 1972. An improvement of $3 billion in the U.S. balance of commodity trade is made by the devaluation. This estimate is higher by about $2 billion than the estimates by other studies

which obtained perverse price effects on imports in the short run. The difference in estimates depends essentially on the different view regarding the psychological effects of exchange rates on price expectations. If the dollar devaluation shifts either temporarily or permanently from the regressive expectations in the past toward neutral expectations, the balance of trade estimate is reduced by $0.3 billion, according to our results.

Second, the impact on service transactions in 1972 is a rise of $0.3 billion. The balance of capital account is estimated to be a net outflow amounting to $1.6 billion. This negative impact partially offsets the positive effect on the balance of current account, $3.6 billion. Consequently, the effect of a change in exchange rates on the balance of payments is about 55% of the effect on the current account balance. This implies that the depreciation of the U.S. dollar to reduce a given level of the payments deficit in the short run is greater than the depreciation required for reducing the equal amount of the current account deficit. According to the above, the former is about twice as large as the latter.

Third, at the fifth year, 1976, the devaluation is estimated to improve the balance of payments by $6 billion which is higher than expected in the absence of the devaluation. The commodity trade and service balance are improved by $4.4 and $2.2 billion, respectively. The exchange rate effect on capital flows can be estimated to be insignificant after five years following the devaluation. This reflects the character of the model that the long-run impact on the balance of payments of a change in an exogenous variable is dependent upon its impact on the trade and service accounts, in particular investment income.

The analysis of the effect of exchange rate changes in this paper

excludes the direct effect on capital flows through changes in wealth and the indirect effect through influencing interest rates. For a more accurate analysis, the linkage of exchange rates with interest rates and the treatment of capital gains due to changes in exchange rates deserve more attention. The effects of induced changes in income and price levels at home and abroad are also left out of consideration in order to isolate the direct effect of changes in exchange rates. Further effort should be directed to examining the influence of changes in foreign exchange rates on domestic and foreign activities, prices, and balance of payments simultaneously. These tasks are beyond the scope of this paper, however.

FOOTNOTES

*The author is an economist, Division of International Fiannce, of the Board of Governors of the Federal Reserve System. He would like to acknowledge his indebtedness to Peter Clark, Gary Fromm, Howard Howe, Lawrence Klein, Charles Schotta, Guy Stevens and Thomas Willett for helpful discussion relating to the paper and the balance of payments modeling and to thank David Coe and Sam Parrillo for skillful research assistance. A substantial portion of the work was completed while working at the U.S. Department of Treasury. The analysis and conclusions of this paper are solely those of the author and should not be interpreted as necessarily reflecting the views of either the Board of Governors of the Federal Reserve System or the Department of the Treasury.

1The works of Branson [2] and Clark [4] are notable examples.

2OASIA Technical Report [30] designed to assist the users of the model in the DRI computer system contains the list of equations. But, it does not include several revised sectoral equations reported in the Appendix.

3It is assumed in Kwack [20] that U.S. income grows at a constant and positive rate. As a result, the formula differs from equation (5), but does not change the results regarding the direction of a change of predetermined variables such as income and interest rates. To simplify our calculations, we treat income, interest rate and prices as shifting parameters.

4This result follows directly from the "new view" of capital flows given by [1], [22] and others. Even if capital flows are determined by levels of interest rates instead of the changes in interest rates, the conclusion holds. However, the length of time needed for the reversal of the interest rate effects is likely to be much longer than the period of time suggested in the new view.

5The import equation in the model is an attempt to incorporate into the standard specification of income and relative prices [15], a dynamic element of how a market responds at least in a short-run to a change in import price inflation. While the market reactions reflect both regressive and extrapolative expectations of future inflation, the estimated equation indicates that the regressive element has dominated during the decade of the 1960's.

[6]The difficulty of predicting U.S. imports in recent years is
well known. For example, Magee [21] reported that the shortfalls of
the 1970 and 1971 trade balance predicted by his trade model estimated
during 1951-1969 are attributable largely to the under-predictions of
imports by $2.75 and 2.53 billion, respectively. He explained this in
terms of purely short-run factors such as anticipation of dock strikes
and foreign revaluation in addition to some specification problems.

[7]Clark [4] reported that the increase of U.S. imports excluding
automobile imports from Canada, fuels and lubricants due to the ex-
change rate in 1972 is about $0.97 billion whereas the increase of U.S.
exports excluding aircrafts and automobile exports to Canada is about
$0.97 billion. Junz and Lowrey [10] argue that the effect on the
trade balance for the year 1972 will be very little. It is pointed
out here that the perverse effect in the short run does not necessarily
follow from the long lags in price effects on the trade volume shown
by Junz and Rhomberg [9].

[8]We also assume the existence of a money illusion at least in the
short run. Whether this constitutes a specification error is an
unresolved issue in the theoretical literature. However, Branson and
Klevorick [3] showed the presence of money illusion on U.S. aggregate
consumption.

[9]The time required for a currency depreciation to realize the
full impact on the trade balance of a country appears to differ from
one country to another and to vary from one time to another even for
the same country. This is shown by Deppler [5]. For instance, he
argued that the German revaluation of 1961 had fairly rapid effects,
but the revaluation of 1968 did not take effect until 1973.

[10]The limitations of elasticity approach are pointed out by
those who analyze a currency depreciation in terms of a general
equilibrium framework and by those using the monetarist approach to
devaluation, such as Dornbusch [6], Johnson [8] and Laffer [23].

APPENDIX

QUARTERLY MODEL OF UNITED STATES
TRADE AND CAPITAL FLOWS

Estimated from 1960:3 to 71:4
by Ordinary Least-Squares

I. BEHAVIORAL EQUATIONS

      A. Commodity Sector
      B. Service Sector Excluding Investment Income
      C. Investment Income Sector
      D. Interest Rate Sector
      E. Capital Sector
      F. Balance of Payments Identities

II. DEFINITIONS OF COMPOSITE VARIABLES

III. VARIABLE NOTATIONS AND SOURCES

APPENDIX

Kwackmodel of United States
Trade and Capital Flows: 1971 Version

Quarterly, 1960:3 to 71:4
Ordinary Least Squares

I. BEHAVIORAL EQUATIONS

A. COMMODITY SECTOR

(A.1) Export Volume

LOG (EXG63/FYDVD63) = -1.8453 + 0.0475*Q1 + 0.0555*Q2 - 0.0797*Q3
                        (3.56)   (3.01)   (3.55)   (5.26)

+ 0.0765*WPIFTARF + 0.1338*WPIFTARF(-1) + 0.1720*WPIFTARF(-2)
  (1.97)   (1.97)   (1.97)

+ 0.1912*WPIFTARF(-3) + 0.1912*WPIFTARF(-4) + 0.1720*WPIFTARF(-5)
  (1.97)   (1.97)   (1.97)

+ 0.1338*WPIFTARF(-6) + 0.0765*WPIFTARF(-7) - 0.0019*FYDVD63
  (1.97)   (1.97)   (3.47)

- 0.0629*DMYILST - 0.0544*DMYNEP
  (5.81)   (1.85)

$$\overline{R}^2 = 0.782 \qquad SEE = 0.036 \qquad DW = 2.094$$

(A.2) Export Price

LOG(PEXG63) = 1.0170 - 0.1997*(1.0/PXEAF63) - 0.2996*[1.0/PXEAF63(-1)]
               (39.18) (36.36)   (36.36)

- 0.2996*[1.0/PXEAF63(-2)] - 0.1997*[1.0/PXEAF63(-3)]
  (36.36)   (36.36)

$$\overline{R}^2 = 0.967 \qquad SEE = 0.014 \qquad DW = 0.556$$

(A.3) Import Volume

LOG(IMG63/YD63) = -6.1607 - 0.0502*Q1 - 0.0018*Q2 - 0.0228*Q3
                   (6.42)   (3.00)   (0.10)   (1.36)

- 1.3825*LOG[PIMG63/PIMG63(-4)] + 0.0709*WPI63TAR + 0.1300*WPI63STAR(-1)
  (3.73)   (2.07)   (2.07)

+ 0.1773*WPI63TAR(-2) + 0.2127*WPI63TAR(-3) + 0.2363*WPI63TAR(-4)
  (2.07)   (2.07)   (2.07)

+ 0.2482*WPI63TAR(-5) + 0.2482*WPI63TAR(-6) + 0.2363*WPI63TAR(-7)
  (2.07)   (2.07)   (2.07)

+ 0.2127*WPI63TAR(-8) + 0.1773*WPI63TAR(-9) + 0.1300*WPI63TAR(-10)
  (2.07)   (2.07)   (2.07)

+ 0.0709*WPI63TAR(-11) + 0.0026*YD63 - 0.0372*DMYILST - 0.1196*DMYSUEZ
  (2.07)   (21.04)   (3.10)   (3.98)

$\overline{R}^2$ = 0.948   SEE = 0.040   DW = 1.449

(A.4) Import Price

LOG(PIMG63) = 1.0960 - 0.2160*(1.0/WPIFMIFERIM) - 0.3240*[1.0/WPIFMIFERIM(-1)]
              (35.52) (33.23)   (33.23)

- 0.3240*[1.0/WPIFMIFERIM(-2)] - 0.2160*[1.0/WPIFMIFERIM(-3)]
  (33.23)   (33.23)

$\overline{R}^2$ = 0.961   SEE = 0.014   DW = 0.379

B. SERVICE SECTOR EXCLUDING INVESTMENT INCOME

(B.1) Travel Export

RXTVSUM/WCONF63 = 0.0765 + 0.0009*Q1 + 0.0090*Q2 + 0.0129*Q3
                  (4.20)   (1.44)   (14.27)   (21.09)

- 0.0143*RPC63 - 0.0123*RPC63(-1) - 0.0102*RPC63(-2) - 0.0082*RPC63(-3)
  (3.33)   (3.33)   (3.33)   (3.33)

- 0.0061*RPC63(-4) - 0.0041*RPC63(-5) - 0.0020*RPC63(-6)
  (3.33)   (3.33)   (3.33)

+ 0.00009*WCONF63
  (2.55)

$\overline{R}^2$ = 0.929   SEE = 0.002   DW = 0.945

(B.2) <u>Travel Import</u>

$$RMTVSUM/WYD63 = 0.0129 - 0.0003*Q1 + 0.0028*Q2 + 0.0053*Q3$$
$$\qquad\qquad\qquad (3.89)\quad (2.43)\qquad (25.61)\qquad (47.52)$$

$$- 0.0024*RPCFUS - 0.0021*RPCFUS(-1) - 0.0017*RPCFUS(-2) - 0.0014*RPCFUS(-3)$$
$$\quad (2.65)\qquad\qquad (2.65)\qquad\qquad\quad (2.65)\qquad\qquad\qquad (2.65)$$

$$- 0.0010*RPCFUS(-4) - 0.0007*RPCFUS(-5) - 0.0003*RPCFUS(-6)$$
$$\quad (2.65)\qquad\qquad\quad (2.65)\qquad\qquad\quad (2.65)$$

$$+ 0.000004*WYD63 + 0.0007*DMYEXPO67 + 0.0004*DMYEXPO70$$
$$\quad (3.82)\qquad\qquad (5.27)\qquad\qquad\quad (3.00)$$

$$\overline{R}^2 = 0.989 \qquad\qquad SEE = 0.001 \qquad\qquad DW = 2.164$$

(B.3) <u>Other Transportation Export</u>

$$ABOPEXSTROT = 0.4371 - 0.1593*Q1 + 0.1148*Q2 + 0.0987*Q3$$
$$\qquad\qquad\qquad (5.87)\quad (3.20)\qquad (2.31)\qquad (2.03)$$

$$+ 0.0629*0.5*[ABOPEXG + ABOPEXG(-1)]$$
$$\quad (27.92)$$

$$\overline{R}^2 = 0.948 \qquad\qquad SEE = 0.119 \qquad\qquad DW = 1.832$$

(B.4) <u>Other Transportation Import</u>

$$ABOPIMSTROT = 0.4833 - 0.1452*Q1 + 0.0234*Q2 + 0.0423*Q3$$
$$\qquad\qquad\qquad (3.95)\quad (3.25)\qquad (0.52)\qquad (1.00)$$

$$+ 0.0379*0.5*[ABOPEXG + ABOPEXG(-1)] + 0.0203*0.5*[ABOPIMG + ABOPIMG(-1)]$$
$$\quad (3.03)\qquad\qquad\qquad\qquad\qquad\qquad (2.09)$$

$$\overline{R}^2 = 0.960 \qquad\qquad SEE = 0.104 \qquad\qquad DW = 1.722$$

(B.5) <u>Export of Miscellaneous Services</u>

$$XMISDPC = 0.0004 + 0.0796*Q1 + 0.0176*Q2 + 0.0558*Q3$$
$$\qquad\qquad (0.01)\quad (3.38)\qquad (0.75)\qquad (2.43)$$

$$+ 0.0182*(ABOPEXG + ABOPIMG)/PC63$$
$$\quad (26.31)$$

$$\overline{R}^2 = 0.939 \qquad\qquad SEE = 0.056 \qquad\qquad DW = 1.261$$

(B.6) **Import of Miscellaneous Services**

MMISDPC = 0.2113 - 0.0312*Q1 - 0.0655*Q2 + 0.2242*Q3
$\quad$ (2.54)$\quad$(1.04)$\quad\quad$(1.62)$\quad\quad\quad$(5.63)

+ 0.0081*(ABOPEXG + ABOPIMG)/PC63 + 0.3113*MMISDPC(-1)
$\quad$(5.01)$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$(2.38)

$\quad\quad\quad$ $\overline{R}^2$ = 0.876 $\quad\quad$ SEE = 0.064 $\quad\quad$ DW = 2.139

(B.7) **Private Remittance and Other Transfers**

ABOPIMUTPRDPC = -0.1010 - .0367*Q1 + 0.0534*Q2 + 0.0290*Q3
$\quad\quad\quad\quad\quad$(2.05)$\quad$(1.80)$\quad\quad$(2.57)$\quad\quad\quad$(1.45)

+ 0.0015*YD63 + 0.1840*DMYMECPR
$\quad$(15.09)$\quad\quad\quad$(8.01)

$\quad\quad\quad$ $\overline{R}^2$ = 0.887 $\quad\quad$ SEE = 0.049 $\quad\quad$ DW = 1.241

C. INVESTMENT INCOME SECTOR

(C.1) **Exports of Fees and Royalties**

ABOPEXSFR = -0.1941 - 0.1981*Q1 + 0.0403*Q2 - 0.1299*Q3
$\quad\quad\quad\quad$(2.02)$\quad$(4.37)$\quad\quad$(0.86)$\quad\quad\quad$(3.16)

+ 0.0173*FGNPUM(-1) + 0.4245*ABOPEXSFR(-1)
$\quad$(4.28)$\quad\quad\quad\quad\quad\quad$(3.00)

$\quad\quad\quad$ $\overline{R}^2$ = 0.983 $\quad\quad$ SEE = 0.081 $\quad\quad$ DW = 2.611

(C.2) **Imports of Fees and Royalties**

ABOPIMSFR = -0.0353 + 0.0079*Q1 + 0.0001*Q2 - 0.0006*Q3
$\quad\quad\quad\quad\quad$(2.91)$\quad\quad$(1.72)$\quad\quad$(0.01)$\quad\quad\quad$(0.12)

+ 0.00017*GNP(-1) + 0.4097*ABOPIMSFR(-1)
$\quad$(4.06)$\quad\quad\quad\quad\quad$(2.90)

$\quad\quad\quad$ $\overline{R}^2$ = 0.954 $\quad\quad$ SEE = 0.011 $\quad\quad$ DW = 2.09

(C.3) Receipts of Direct Investment Interest, Dividends, Branch
       Earnings and Reinvested Earnings

ABOPEXSYPDIPRE = 0.5390 - 1.1470*Q1 - 1.0890*Q2 - 1.4262*A3
                 (1.74)   (3.67)   (4.74)   (6.55)

0.0960*NAUDINQ + 0.2611*ABOPEXSYPDIPRE(-1)
(3.99)   (1.29)

$\overline{R}^2$ = 0.946   SEE = 0.504   DW = 1.787

(C.4) Receipts of Direct Investment Interest, Dividends and
       Branch Earnings

ABOPEXSYPDI = 0.3163 - 0.2550*Q1 - 0.2850*Q2 - 0.4157*Q3
              (3.04)   (3.37)   (3.77)   (5.53)

+ 0.6887*ABOPEXSYPDIPRE
  (54.22)

$\overline{R}^2$ = 0.987   SEE = 0.178   DW = 1.220

(C.5) Payments of Direct Investment Interest, Dividends, Branch
       Earnings and Reinvested Earnings

ABOPIMSYPDIPRE = 0.0545 - 0.0790*Q1 - 0.1112*Q2 - 0.0926*Q3
                 (0.66)   (2.47)   (3.67)   (3.19)

- 0.0196*RU + 0.0474*NAFDINQ + 0.5251*ABOPIMSYPDIPRE(-1)
  (1.58)   (3.30)   (3.71)

$\overline{R}^2$ = 0.907   SEE = 0.071   DW = 2.239

(C.6) Payments of Direct Investment Interest, Dividends and
       Branch Earnings

ABOPIMSYPDI = -0.0354 - 0.0183*Q1 - 0.0399*Q2 - 0.0363*Q3
              (1.73)   (1.20)   (2.62)   (2.43)

+ 0.5694*ABOPIMSYPDIPRE
  (24.28)

$\overline{R}^2$ = 0.934   SEE = 0.036   DW = 0.848

(C.7) Receipts of Income on Nondirect Private Assets Abroad

$$\text{ABOPEXSYPFA} = 0.1151 - 0.0723*Q1 - 0.0155*Q2 - 0.1078*Q3$$
$$\qquad\qquad\quad (4.96) \qquad (3.22) \qquad\quad (0.74) \qquad\quad (5.12)$$

$$+\ 0.0035*(\text{RMFLDI*NAUPFQ}) + 0.5122*\text{ABOPEXSYPFA}(-1)$$
$$\quad (4.34) \qquad\qquad\qquad\qquad\quad (4.54)$$

$$\overline{R}^2 = 0.994 \qquad\qquad \text{SEE} = 0.050 \qquad\qquad \text{DW} = 2.024$$

(C.8) Payment to Foreigners of Income on Nondirect Private Liabilities

$$\text{ABOPIMSYPFA} = \quad -0.0303 - 0.0915*Q1 - 0.0030*Q2 + 0.0030*Q3$$
$$\qquad\qquad\qquad\quad (0.95) \qquad (2.63) \qquad\quad (0.08) \qquad\quad (0.09)$$

$$+\ 0.0045*(\text{RMGBS*NAFPFQ}) + 1.0770*\text{ABOPIMSYPFA}(-1) - 0.4560*\text{ABOPIMSYPFA}(-2)$$
$$\quad (9.44) \qquad\qquad\qquad\qquad (12.08) \qquad\qquad\qquad\qquad (6.85)$$

$$\overline{R}^2 = 0.994 \qquad\qquad \text{SEE} = 0.083 \qquad\qquad \text{DW} = 1.884$$

(C.9) Receipts of Income on U.S. Government Assets Abroad

$$\text{ABOPEXSYGFA} = 0.4930 - 0.3509*Q1 - 0.2127*Q2 - 0.3506*Q3$$
$$\qquad\qquad\qquad\quad (12.70) \quad (8.98) \qquad\quad (5.44) \qquad\quad (9.18)$$

$$+\ 0.0034*(\text{RMGBS*NAUGOVQ})$$
$$\quad (13.34)$$

$$\overline{R}^2 = 0.866 \qquad\qquad \text{SEE} = 0.094 \qquad\qquad \text{DW} = 1.762$$

(C.10) Payments of Income on Foreign Investment in U.S. Government
        Liabilities

$$\text{ABOPIMSYGFA} = -0.2489 - 0.0643*Q1 - 0.0215*Q2 + 0.0270*Q3$$
$$\qquad\qquad\qquad\quad (3.77) \qquad (2.53) \qquad\quad (0.85) \qquad\quad (1.07)$$

$$+\ 0.0318*\text{NAFGFQ} + 0.8427*\text{ABOPIMSYGFA}(-1)$$
$$\quad (2.99) \qquad\qquad\quad (6.25)$$

$$\overline{R}^2 = 0.982 \qquad\qquad \text{SEE} = 0.060 \qquad\qquad \text{DW} = 1.472$$

D. INTEREST RATE SECTOR

(D.1) U.S. Prime Rate on Short-Term Business Loans

$$LOG(RM1) = 0.1140 + 0.4017*LOG(RMGBS) - 0.1538*LOG[RMGBS(-1)]$$
$$\qquad\quad (2.22) \qquad (8.19) \qquad\qquad (2.24)$$

$$+ 0.7206*LOG[RM1(-1)] + 0.0757*DMYMIPTD$$
$$\quad (11.25) \qquad\qquad\qquad (3.43)$$

$$\overline{R}^2 = 0.977 \qquad\qquad SEE = 0.032 \qquad\qquad DW = 1.425$$

(D.2) Yield on Moody's Industrial Corporate Bonds

$$RMMBCIND = 1.1090 + 0.1232*RMGBS + 0.1066*RMBGS(-1) + 0.0947*RMGBS(-2)$$
$$\qquad\qquad (7.25) \quad (3.28) \qquad\quad (8.26) \qquad\qquad (6.27)$$

$$+ 0.0868*RMGBS(-3) + 0.0821*RMBGS(-4) + 0.0797*RMGBS(-5)$$
$$\quad (4.99) \qquad\qquad (5.33) \qquad\qquad (6.23)$$

$$+ 0.0789*RMGBS(-6) + 0.0787*RMBGS(-7) + 0.0783*RMBGS(-8)$$
$$\quad (6.31) \qquad\qquad (5.79) \qquad\qquad (5.72)$$

$$+ 0.0770*RMGBS(-9) + 0.0738*RMGBS(-10) + 0.0679*RMGBS(-11)$$
$$\quad (6.21) \qquad\qquad (6.25) \qquad\qquad (4.53)$$

$$+ 0.0585*RMGBS(-12) + 0.0446*RMGBS(-13) + 0.0254*RMGBS(-14)$$
$$\quad (2.92) \qquad\qquad (2.01) \qquad\qquad (1.48)$$

$$\overline{R}^2 = 0.960 \qquad\qquad SEE = 0.275 \qquad\qquad DW = 0.422$$

(D.3) Foreign Short-Term Interest Rate

$$RMFSBL = 1.0229 + 0.3586*RMGBS + 0.5299*RMFSBL(-1)$$
$$\qquad\quad (5.49) \quad (7.63) \qquad\quad (8.53)$$

$$\overline{R}^2 = 0.961 \qquad\qquad SEE = 0.213 \qquad\qquad DW = 2.152$$

(D.4)   <u>Interest Rate on Three-Month Euro-Dollar Deposits in London</u>

LOG(RMSEUROQ) = -0.1985 + 0.4331*LOG(RMGBS) + 0.7516*LOG(RMFSBL)
                 (1.19)   (4.08)   (4.36)

+ 0.0797*TBEURO + 0.0998*DMYCD
  (3.85)   (2.58)

$$\overline{R}^2 = 0.945 \qquad SEE = 0.078 \qquad DW = 0.953$$

(D.5)   <u>Foreign Long-Term Interest Rate</u>

LOG(RMFLDI) = 0.1909 + 0.0537*LOG(RMSEUROQ) + 0.4836*LOG(RMMBCIND)
               (2.98)   (3.28)   (6.35)

- 0.3747*LOG[RMMBCIND(-1)] + 0.7532*LOG[RMFLDI(-1)]
  (4.12)   (7.77)

$$\overline{R}^2 = 0.996 \qquad SEE = 0.012 \qquad DW = 1.906$$

E. CAPITAL SECTOR

(E.1)   <u>Flow of Foreign Direct Investment, Including Retained Earnings,
        in the U.S.</u>

IFDI = -1.2657 - 0.2933*RMSEUROQ + 0.6690*RM1
        (3.35)   (3.01)   (4.94)

+ 0.0056*[(1.0 - RTCGFS)*GNP*(1.0 + GUS)] - 0.2494*NAFDINQ
                                             (2.24)

- 0.7984*DMY66III
  (2.18)

$$\overline{R}^2 = 0.568 \qquad SEE = 0.351 \qquad DW = 2.325$$

(E.2)   <u>Flow of U.S. Direct Investment, Including Retained Earnings,
        Abroad</u>

IUDI = -0.2779 + 1.6797*PQA + 0.0725*(ZA - DIV + CCACORP) - 0.2158*NAUDINQ
        (0.46)   (4.69)   (2.50)   (2.75)

- 4.2643*DMYWD + 0.1560*Q1 - 0.2946*Q2 - 1.7156*Q3
  (7.89)   (0.40)   (0.83)   (4.79)

$$\overline{R}^2 = 0.866 \qquad SEE = 0.757 \qquad DW = 1.772$$

(E.3) Flow of Foreign Holdings of U.S. Securities Other Than
       Treasury Issues

ABOPEXAUSS = -3.1633 - 0.2553*RMSEUROQ + 0.9749*RMMBCIND
                (6.98)   (2.50)   (6.68)

+ 2.1356*DMY69IV - 1.7634*DMY71II + 3.5180*DMYFDIPA
   (2.96)   (2.54)   (9.92)

$$\bar{R}^2 = 0.840 \qquad SEE = 0.655 \qquad DW = 1.976$$

(E.4) Flow of Nonliquid Liabilities to Other Official and Private
       Foreigners Reported by U.S. Government

ABOPEXAPUSGSNL = 1.4911 - 0.2354*Q1 - 0.2376*Q2 - 0.2873*Q3
                  (5.09)   (1.61)   (1.59)   (2.01)

- 0.1322*RMCDLM - 0.2558*NAFNLIQPQ + 0.7564*DMY62IV - 0.7228*DMY67IV
   (4.64)   (3.00)   (2.18)   (2.09)

+ 1.1250*DMY69IV - 0.8026*DMY70II
   (3.28)   (2.31)

$$\bar{R}^2 = 0.544 \qquad SEE = 0.323 \qquad DW = 1.855$$

(E.5) Flow of Other U.S. Nonliquid Liabilities to Private Foreigners

ABPEXAPNL = -6.8239 - 0.3509*Q1 - 0.3026*Q2 - 0.6254*Q3
               (5.84)   (1.34)   (1.26)   (2.67)

- 0.2235*RMSEUROQ + 1.8888*RMMBCIND + 0.0471*FGNPUM - 1.2664*NAFPNL
   (2.25)   (5.46)   (3.01)   (5.43)

- 1.4415*DMY67IV
   (2.37)

$$\bar{R}^2 = 0.583 \qquad SEE = 0.557 \qquad DW = 2.315$$

(E.6) Flow of U.S. Liquid Liabilities to Private Foreigners

ABOPEXAPSLD = 15.4035 - 4.7390*RMFSBL + 5.8709*RMGBS
$\qquad$ (4.07) $\qquad$ (3.00) $\qquad$ (6.36)

- 0.5126*(ABOPEXG - ABOPIMG) - 0.7901*NAFLIQNOFQ + 17.1094*DMY69II
$\quad$ (2.12) $\qquad\qquad\qquad$ (3.59) $\qquad\qquad$ (6.23)

- 12.9551*DMYSP
$\quad$ (5.01)

$\qquad$ $\overline{R}^2 = 0.745$ $\qquad$ SEE = 2.643 $\qquad$ DW = 2.105

(E.7) Flow of U.S. Liquid Liabilities to Foreign Official Agencies

ABOPEXAGSLD = -0.5854 - 0.8933*(BOPLIQ + ABOPEXAPSLD)
$\qquad$ (2.07) $\quad$ (34.34)

+ 4.6335*DMY68IV
$\quad$ (2.62)

$\qquad$ $\overline{R}^2 = 0.963$ $\qquad$ SEE = 1.738 $\qquad$ DW = 1.709

(E.8) Flow of Errors and Omissions

ABOPEXERROR = -0.7046 - 1.0590*RMSEUROQ - 0.7947*[RMSEUROQ - RMSEUROQ(-1)]
$\qquad$ (0.97) $\quad$ (2.40) $\qquad\qquad$ (2.41)

+ 1.3193*RMGBS - 6.8220*DMY71II - 13.0906*DMYSP
$\quad$ (2.16) $\qquad$ (4.14) $\qquad\qquad$ (11.04)

$\qquad$ $\overline{R}^2 = 0.812$ $\qquad$ SEE = 1.533 $\qquad$ DW = 2.162

(E.9) Flow of Foreign Securities and Claims by U.S. Nonbanking Concerns

ABOPIMACC = -8.0091 + 0.9699*Q1 + 0.2503*Q2 + 0.3616*Q3 + 1.0108*(1.0 -
$\qquad$ (3.64) $\quad$ (2.95) $\qquad$ (0.73) $\qquad$ (1.15) $\qquad$ (2.14)

RIET)*RMFLDI - 1.0945*RMMBCIND - 0.7297*RMMBCIND(-1) - 0.3648*RMMBCIND(-2)
$\qquad\qquad$ (2.72) $\qquad\qquad$ (2.72) $\qquad\qquad$ (2.72)

+ 0.0375*WLTHGNP - 0.5480*NAUCC + 1.6329*DMY64IV + 2.1674*DMY67IV
$\quad$ (3.61) $\qquad$ (3.14) $\qquad$ (1.95) $\qquad\qquad$ (2.65)

+ 1.8324*DMY68II - 1.5147*DMYSP + 1.7255*(1.0 - VFCR)
$\quad$ (2.25) $\qquad$ (2.01) $\qquad$ (3.11)

$\qquad$ $\overline{R}^2 = 0.428$ $\qquad$ SEE = 0.735 $\qquad$ DW = 1.758

(E. 10) Flow of Long-Term Claims on Foreigners by U.S. Banks

ABOPIMAPBL = 2.9311 + 0.2120*RMSEUROQ - 0.5732*RM1 - 0.5195*NAUBLQ
              (6.40)   (2.21)   (4.07)   (5.73)

+ 1.2863*DMY63IV + 1.3864*DMY64IV + 1.9392*DMY65I + 0.00245*(ACBLI*IET63)
   (3.62)   (3.99)   (5.51)   (4.00)

$\overline{R}^2$ = 0.723   SEE = 0.336   DW = 1.972

(E.11) Flow of Short-Term Claims on Foreigners by U.S. Banks

ABOPIMAPBS = -2.3373 - 1.0020*Q1 - 0.6379*Q2 - 1.2190*Q3 - 0.3464*RMGBS
              (1.94)   (2.90)   (2.01)   (8.41)   (2.29)

+ 0.3149*(ABOPEXG - ABOPIMG) + 0.0325*ACBLI - 0.8634*NAUBSQ
   (3.51)   (5.21)   (4.62)

+ 4.0006*DMYSP + 1.7951*DMYJAPWD
   (5.28)   (3.19)

$\overline{R}^2$ = 0.756   SEE = 0.731   DW = 2.276

(E.12) Flow of Short-Term Liquid Claims on Foreigners

ABOPIMAPSLD = -0.1396 + 0.4301*Q1 - 0.2589*Q2 - 0.0433*Q3
               (0.85)   (1.76)   (0.91)   (0.19)

+ 0.5513*[RMSEUROQ - RMSEUROQ(-1)] - 0.8566*[RMGBS - RMGBS(-1)]
   (2.54)   (2.57)

+ 1.4828*DMY63II + 1.739*DMY64II + 2.0762*DMY68II + 1.8672*DMYSP
   (2.49)   (2.91)   (3.45)   (4.47)

$\overline{R}^2$ = 0.457   SEE = 0.558   DW = 1.764

(E.13) Value of Short-Term Liabilities to Foreign Official Agencies
        Reported by U.S. Banks

NAFBLOFFQ = 0.25*ABOPEXAGBL(-1) + 0.9999*NAFBLOFFQ(-1)
                                     (7129.78)

$\overline{R}^2$ = 1.000   SEE = 0.001   DW = 0.680

E. 14) <u>Value of U.S. Corporate Securities Held by Foreigners</u>

NAFCSQ = 0.25*ABOPEXAUSS(-1) + 1.0046*NAFCSQ(-1)
$$(242.11)$$

$\overline{R}^2$ = 0.991   SEE = 0.485   DW = 0.641

(E.15)   <u>Value of Direct Investment in U.S. by Foreigners</u>

NAFDINQ = 0.25*IFDI(-1) + 1.0001*NAFDINQ(-1)
$$(1921.34)$$

$\overline{R}^2$ = 1.000   SEE = 0.033   DW = 0.648

(E.16)   <u>Value of Liquid Liabilities of Private Foreigners</u>

NAFLIQNOFQ = 0.25*ABOPEXAPSLD(-1) + 1.0007*NAFLIQNOFQ(-1)
$$(2305.90)$$

$\overline{R}^2$ = 1.000   SEE = 0.049   DW = 0.404

(E.17)   <u>Value of Liquid Liabilities to Official Foreigners</u>

NAFLIQOFQ = 0.25*ABOPEXAGSLD(-1) + 0.9989*NAFLIQOFQ(-1)
$$(3200.99)$$

$\overline{R}^2$ = 1.000   SEE = 0.032   DW = 0.289

(E.18)   <u>Value of Nonliquid Liabilities to Other Official and Private
Foreigners Reported by U.S. Government</u>

NAFNLIQPQ = 0.25*ABOPEXAPUSGSNL(-1) + 0.9995*NAFNLIQPQ(-1)
$$(290.68)$$

$\overline{R}^2$ = 0.997   SEE = 0.039   DW = 0.515

(E.19) <u>Value of Nonliquid Liabilities to Foreigners Reported by the</u>
<u>U.S. Government</u>

NAFNLIQQ = 0.25*[ABOPEXAGUSGSNL(-1) + ABOPEXAPUSGSNL(-1)]

+ 1.0005*NAFNLIQQ(-1)
   (520.48)

$\bar{R}^2$ = 1.000   SEE = 0.038   DW = 0.520

(E.20) <u>Value of Other U.S. Nonliquid Liabilities to Private</u>
<u>Foreigners</u>

NAFPNLQ = 0.25*ABOPEXAPNL(-1) + 1.0006*NAFPNLQ(-1)
                                     (486.94)

$\bar{R}^2$ = 0.999   SEE = 0.063   DW = 0.824

(E.21) <u>Value of Foreign Long-Term Claims Reported by U.S. Banks</u>

NAUBLQ = 0.25*ABOPIMAPBL(-1) + 1.0037*NAUBLQ(-1)
                                     (851.55)

$\bar{R}^2$ = 0.999   SEE = 0.025   DW = 0.430

(E.22) <u>Value of Foreign Short-Term Claims Reported by U.S. Banks</u>

NAUBSQ = 0.25*ABOPIMAPBS(-1) + 1.0027*NAUBSQ(-1)
                                     (1377.42)

$\bar{R}^2$ = 1.000   SEE = 0.038   DW = 0.491

(E.23) <u>Value of Foreign Claims Reported by U.S. Nonbanks and U.S.</u>
<u>Held Foreign Securities</u>

NAUCC = 0.25*ABOPIMACC(-1) + 1.0027*NAUCC(-1)
                                   (952.22)

$\bar{R}^2$ = 0.999   SEE = 0.147   DW = 0.507

(E.24) Value of U.S. Direct Investments Abroad

$$NAUDINQ = 0.25*IUDI(-1) + 0.9998*NAUDINQ(-1)$$
$$(4820.60)$$

$$\bar{R}^2 = 1.000 \qquad SEE = 0.075 \qquad SW = 0.537$$

(E. 25) Value of U.S. Government Held Foreign Securities

$$NAUGOVQ = 0.25*ABOPIMAG(-1) + 0.9985*NAUGOVQ(-1)$$
$$(1848.55)$$

$$\bar{R}^2 = 1.000 \qquad SEE = 0.089 \qquad DW = 0.514$$

F. BALANCE OF PAYMENTS DEFINITIONS

(F.1) Merchandise Trade Balance

MERCHBAL = ABOPEXG - ABOPIMG

(F.2) Travel Balance

TRAVBAL = (RXTVSUM*PC63 - [RMTVSUM*(IFERSIMTR63*CPIIM)]

(F.3) Transportation Balance

TRANSBAL = ABOPEXSTROT - ABOPIMSTROT

(F.4) Military Transactions, Net

MILTRANSNET = ABOPEXSTMSC - ABOPIMSDDE

(F.5) Investment Income Balance

INVINCBAL = ABOPEXSFR + ABOPEXSYGFA + ABOPEXSYPFA + ABOPEXSYPDIPRE

- ABOPIMSFR - ABOPIMSYGFA - ABOPIMSYPFA - ABOPIMSYPDIPRE

(F.6) Balance on Other Services

OTHERBAL = (XMISDPC*PC63) - (MMISDPC*PC63)

F.7) <u>Balance on Goods and Services</u>

G&SBAL = MERCHBAL + TRAVBAL + TRANSBAL + MILTRANSNET + INVINCBAL

+ OTHERBAL

(F.8) <u>National Income Accounts Goods and Services Balance</u>

NIAG&SBAL = G&SBAL - REUSDIN + REFDIN

(F.9) <u>Unilateral Transfers, Net</u>

UNILATNET = ABOPIMUTGPO + ABOPIMUTGGR + (ABOPIMUTPRDPC*PC63)

(F.10) <u>Current Account Balance</u>

CURRENTBAL = G&SBAL - UNILATNET

(F.11) <u>Current Account Balance Excluding Retained Earnings</u>

SCBCURBAL = CURRENTBAL - REUSDIN + REFDIN

(F12) <u>U.S. Government Current Account Transactions</u>

GOVPAYEXOG = ABOPIMUTGPO + ABOPIMUTGGR - MILTRANSNET

(F.13) <u>Foreign Private Capital Flows</u>

FORPRIVFLOWS = ABOPEXAUSS + ABOPEXAPNL + IFDI + ABOPEXERROR

+ ABOPEXAPUSGSNL

(F.14) <u>U.S. Private Capital Flows</u>

USPRIVFLOWS = ABOPIMACC + ABOPIMAPBL + ABOPIMAPBS + IUDI

(F.15) <u>Private Capital Balance</u>

PRIVCAPBAL = FORPRIVFLOWS - USPRIVFLOWS

(F.16) U.S. Government Capital Flows

USGOVTFLOWS = ABOPEXAGBL + ABOPEXAGUSGSNL - ABOPIMAG

(F.17) Capital Account Balance

CAPBAL = FORPRIVFLOWS + USGOVTFLOWS - USPRIVFLOWS

(F.18) Capital Account Balance Excluding Retained Earnings

SCBCAPBAL = CAPBAL - REFDIN + REUSDIN

(F.19) Balance of Payments on Liquidity Basis

BOPLIQ - CURRENTBAL + CAPBAL

(F.20) Net Liquidity Balance

BOPNETLIQ = BOPLIQ + ABOPIMAPSLD - ABOPEXAGBL - ABOPEXAGUSGSNL

+ ABOPEXRSDRA

(F.21) Official Transactions Balance

BOPOFFTRANS = BOPLIQ + ABOPEXAPSLD - ABOPEXAGBL - ABOPEXAGUSGSNL

+ ABOPEXRSDRA

II. DEFINITIONS OF COMPOSITE VARIABLES

(1.) ABOPEXAPNL = ABOPEXAPNBSNL + ABOPEXAPB$_L$NL + ABOPEXAPNBLNL

       Flow of Nonliquid Liabilities to Private Foreigners
       Other than Direct Investments and Securities

(2.) ABOPEX = EXG63 *PEXG63

       Value of Exports

(3.) ABOPEXSFR = ABOPEXSFRDI + ABOPEXSFRUF

       Receipts of Fees and Royalties

(4.) ABOPEXSYPDIPRE = ABOPEXSYPDI + REUSDIN

       Receipts of Direct Investment Interest, Dividends,
       Branch Earnings and Reinvested Earnings

(5.) ABOPIMACC = ABOPIMAPFS + ABOPIMAPNBL + ABOPIMAPNBS

       Flow of Foreign Securities and Claims by U.S.
       Nonbanking Concerns

(6.) ABOPIMAPSLD = ABOPIMAPBSLD + ABOPIMAPNBSLD

       Flow of Short-Term Liquid Claims Reported by U.S. Banks

(7.) ABOPIMG = IMG63*PIMG63

       Value of Imports

(8.) ABOPIMSFR = ABOPIMSFRDI + ABOPIMSFRUF

       Payments of Fees and Royalties

(9.) ABOPIMSYPDIPRE = ABOPIMSYPDI + REFDIN

       Payments of Direct Investment Interest, Dividends,
       Branch Earnings and Reinvested Earnings

(10.)   ABOPIMUTPRDPC = ABOPIMUTPR/PC63

         Real Private Remittances and Transfers

(11.)   CONF63 = [(GNPD63CA*0.9272)**0.819]

         *[(GNPD63JA*0.002763)**0.076]*[(GNPD63UK*2.7997)**0.047]

         *[(GNPD63WG*0.2509)**0.058]

         Real Foreign Gross National Product Weighted by Travel
         Export Shares

(12.)   CPIEX = (CPI63FR**0.022)*(CPI63IT**0.016)*(CPI63ME**0.340)

         *[(GNPDCA/GNPD63CA)**0.509]*[(GNPDJA/GNPD63JA)**0.047]

         *[(GNPDUK/GNPD63UK)**0.029]*[(GNPDWG/GNPD63WG)**0.036]

         Foreign Consumer Price Index Weighted by Travel Export
         Shares, 1963 = 1.0

(13.) CP_{IIM} = (CPI63FR**0.065)*(CPI63IT**0.075)*(CPI63ME**0.285)

         *[(GNPDCA/GNPD63CA)**0.405]*[(GNPDJA/GNPD63JA)**0.032]

         *[(GNPDUK/GNPD63UK)**0.088]*[(GNPDWG/GNPD63WG)**0.050]

         Foreign Consumer Price Index Weighted by Travel Import
         Shares, 1963 = 1.0

(14.)   FGNPUM = (GNPDCA**0.568)*(GNPDJA**0.027)*(GNPDUK**0.273)

         *(GNPDWG**0.132)*(FERSCA**0.568)*(FERSJA**0.027)

         *(FERSUK**0.273)*(FERSWG**0.132)

         Foreign Gross National Product Weighted by Share
         of U.S. Manufacturing Direct Investment Stock

(15.) FYDVD63 = [(GNPD63CA*0.927208)**0.513]

*[GNPD63UK*2.79966)**0.146]*[(GNPD63JA*0.00276329)**0.202

*[(GNPD63WG*0.250921)**0.138]

Real Foreign Gross National Product Weighted by Export Shares

(16.) GUS = (0.4*[GNP - GNP(-1)] + 0.3[GNP(-1) - GNP(-2)]

+ 0.2*[GNP(-2) - GNP(-3)]

+ 0.1*[GNP(-3) - GNP(-4)])/([GNP + GNP(-3)]*0.5)

Normal Rate of Growth of the U.S. Gross National Product

(17.) IFDI = ABOPEXADI + REFDIN

Foreign Direct Investment in the U.S. Including Retained
Earnings

(18.) IFERSEXTR63 = [(FERSCA**0.509)*(FERSFR**0.022)*(FERSIT**0.016)

*(FERSJA**0.047)*(FERSME**0.340)*(FERSUK**0.029)

*(FERSWG**0.036)]/0.264045

Foreign Exchange Rate Index Weighted by Travel Export
Shares, 1963 = 1.0

(19.) IFERSIMTR63 = [(FERSCA**0.405)*(FERSME**0.285)*(FERSUK**0.088)

*(FERSFR**0.065)*(FERSIT**0.075)*(FERSWG**0.049)

*(FERSJA**0.032)]/0.222773

Foreign Exchange Rate Index Weighted by Travel Import
Shares, 1963 = 1.0

(20.) IFERSEX63 = [(FERSBL**0.042)*(FERSCA**0.373)*(FERSFR**0.057)

*(FERSWG**0.100)*(FERSIT**0.060)*(FERSJA**0.147)

*(FERSNE**0.067)*(FERSSD**0.022)*(FERSSZ**0.026)

*(FERSUK**0.106)]/0.178314

Foreign Exchange Rate Index Weighted by Export Shares,
1963 = 1.0

(21.) $IFERSIM63 = [(FERSBL**0.038)*(FERSCA** 0.399)*(FERSFR**0.042)$

$*(FERSWG**0.117)*(FERSIT**0.050)*(FERSJA**0.189)$

$*(FERSNE**0.021)*(FERSSD**0.018)*(FERSSZ**0.021)$ ·

$*(FERSUK**0.106)]/0.161950$

Foreign Exchange Rate Index Weighted by Import Shares, 1963 = 1.0

(22.) $IUDI = ABOPIMAPDI + REUSDIN$

U.S. Direct Investment Abroad Including Retained Earnings

(23.) $MMISDPC = (ABOPIMSGS + ABOPIMSPS)/PC63$

Real Miscellaneous Services Imports

(24.) $NAFGFQ = NAFNLIQQ + (0.075*NAFLIQNOFQ) + (0.612*NAFLIQOFQ)$

Value of U.S. Government Liabilities Abroad

(25.) $NAFLPRQ = NAFCSQ + NAFPNLQ$

Value of U.S. Corporate Securities and Other U.S.
Private Nonliquid Liabilities Held by Foreigners

(26.) $NAFPFQ = NAFLPRQ + NAFBLOFFQ + (0.335*NAFLIQNOFQ) + (0.255*NAFLIQOFQ)$

Value of U.S. Private Liabilities to Foreigners Except
Direct Investment

(27.) $NAFPNLQ = NAFNBSQ + NAFNBLQ + NAFBLQ - NAFBLOFFQ$

Value of Nonliquid Liabilities to Private Foreigners
Other than Direct Investments and Securities

(28.) $NAUCC = NAUFSQ + NAUNBLQ + NAUNBSQ$

Value of Foreign Securities and Claims by U.S.
Nonbanking Concerns

(29.) NAUPFQ = NAUCC + NAUBLQ + NAUBSQ

> Value of Foreign Claims Except Direct Investment Held
> by Private U.S. Residents

(30.) PQA = FGNPUM/[RMMBCIND*(1.0 - RTCGFS) + 10.0

  - [(PGNP63 - PGNP63(-4))/PGNP63(-4)]*100.0]

> Desired Stock of U.S. Direct Investment

(31.) RMFLDI = (RMLCAIBQ**0.533)*(RMLBLQ**0.023)*(RMLFRCBQ**0.052)

  *(RMLITQ**0.032)*(RMLJAQ**0.025)*(RMLNBQ**0.025)

  *(RMLSDILQ**0.011)*(RMLSZQ**0.034)*(RMLUKQ**0.176)

  *(RMLWGIBQ**0.088)

> Foreign Long-Term Interest Rate Weighted by Direct
> Investment Shares

(32.) RMFSBL = (RMSBLQ**0.022)*(RMSFRQ**0.073)*(RMSWGQ**0.161)

  *(RMLITQ**0.069)*(RMSNETBQ**0.022)*(RMLSDILQ**0.027)

  *(RMSSZQ**0.080)*(RMSUKQ**0.218)*(RMSCAQ**0.168)

  *(RMSJAQ**0.160)

> Foreign Short-Term Interest Rate Weighted by Short-Term
> Assets

(33.) RMTVSUM = (ABOPIMSTRPF + ABOPIMSTVL)/(IFERSIMTR63*CPIIM)

> Real Travel and Passenger Fare Imports

(34.) RPCFUS = (IFERSIMTR63*CPIIM)/PC63

> Relative Consumer Prices - Travel Imports

(35.) RPC63 = PC63/(IFERSEXTR63*CPIEX)

> Relative Consumer Prices - Travel Exports

(36.) RXTVSUM = (ABOPEXSTRPF + ABOPEXSTVL)/PC63

        Real Travel and Passenger Fare Exports

(37.) WCONF63 = 0.1917*CONF63 + 0.1725*CONF63(-1) + 0.1553*CONF63(-2)

        + 0.1397*CONF63(-3) + 0.1258*CONF63(-4) + 0.1132*CONF63(-5)

        + 0.1018*CONF63(-6)

        Foreign Wealth Weighted by Share of Travel Spending

(38.) WLTHCNP = 0.1259*GNP + 0.1134*GNP(-1) + 0.1020(-2) + 0.0918*GNP(-3)

        + 0.0826*GNP(-4) + 0.0744*GNP(-5) + 0.0669*GNP(-6)

        + 0.0602*GNP(-7) + 0.0542*GNP(-8) + 0.0488*GNP(-9)

        + 0.0439*GNP(-10) + 0.0395*GNP(-11) + 0.0356*GNP(-12)

        + 0.0320*GNP(-13) + 0.0288*GNP(-14)

        U.S. Wealth Measured by U.S. GNP

(39.) WPIFEX63 = (WPIBL**0.042)*(WPICA**0.373)*(WPIFR**0.057)

        *(WPIWG**0.100)*(WPIIT**0.060)*(WPIJA**0.147)

        *(WPINE**0.067)*(WPISD**0.022)*(WPISZ**0.026)

        *(WPIUK**0.106)

        Foreign Wholesale Price Index Weighted by Export Shares,
        1963 = 1.0

(40.) WPIFMIFERIM = [(WPIBL**0.038)*(WPICA**0.399)*(WPIFR**0.042)

        *(WPIWG**0.117)*(WPIIT**0.050)*(WPIJA**0.189)

        *(WPINE**0.021)*(WPISD**0.018)*(WPISZ**0.021)

        *(WPIUK**0.106)]*IFERSIM63

        Foreign Wholesale Price Index Weighted by Import Shares;
        Adjusted by Exchange Rate Index, 1963 = 1.0

(41.) WPIFTARF = (IFERSEX63*WPIFEX63)/[PEXG63*(1.0 + WTARF)]

Tariff Adjusted Relative Prices - Exports

(42.) WPI63TAR = WPI63/[PIMG63*(1.0 + RDUTYIMUS)]

Tariff Adjusted Relative Prices - Imports

(43.) WTARF = (RDUTYIMCA**0.513)*(RDUTYIMWG**0.138)

*(RDUTYIMUK**0.146)*(RDUTYIMJA**0.202)

Foreign Tariff Rates Weighted by Export Shares

(44.) WYD63 = 0.1259*YD63 + 0.1134*YD63(-1) + 0.1020*YD63(-2)

+ 0.0918*YD63(-3) + 0.0826*YD63(-4) + 0.0744*YD(-5)

+ 0.0669*YD63(-6) + 0.0602*YD63(-7) + 0.0542*YD63(-8)

+ 0.0488*YD63(-9) + 0.0439*YD63(-10) + 0.0395*YD63(-11)

+ 0.0356*YD63(-12) + 0.032*YD63(-13) + 0.0288*YD63(-14)

U.S. Wealth Measured by Disposable Income

(45.) XMISDPC = (ABOPEXSGS + ABOPEXSPS)/PC63

Real Miscellaneous Services Exports

(46.) YD63 = YD/PC63

U.S. Real Disposable Income

III. VARIABLE DEFINITIONS AND SOURCES

<u>ABBREVIATIONS</u>

a.r.   = Annual Rate

b.c.d.   = Billions of Current U.S. Dollars

b.p.   = Beginning of Period

%p.a.   = Percent per Annum

s.a.   = Seasonally Adjusted

B.L.S.   = Bureau of Labor Statistics, U.S.
               Department of Labor

B.O.P.   = Balance of Payments

D.R.I.   = Data Resources, Incorporated

I.F.S.   = <u>International Finance Statistics</u>,
               International Monetary Fund

M.E.I.   = <u>Main Economics Indicators</u>, Organization
               for Economic Co-operation and Development

S.C.B.   = <u>Survey of Current Business</u>, U.S. Department
               of Commerce

ABOPEXADI   = Foreign Capital Inflows: Direct Investment
               Flow Excluding Retained Earnings in the U.S.,
               b.c.d., a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2,
               line 48 (49 after December 1972).

ABOPEXAGBL = Foreign Capital Inflows: Other Readily Marketable
               to Foreign Official Agencies Reported by U.S.,
               Banks, b.c.d., a.r., Source: <u>S.C.B.</u>, B.O.P.
               Table 2, line 53(56).

ABOPEXAGSLD = Foreign Capital Inflows: U.S. Liquid Liabilities
               to Foreign Official Agencies, b.c.d., a.r.,
               Source: <u>S.C.B.</u>, B.O.P. Table 2, line 57 (55).

ABOPEXAGUSGSNL = Foreign Capital Inflows: Nonliquid Liabilities
Reported by U.S. Government to Foreign Official
Reserve Agencies, b.c.d., a.r., Source: S.C.B.,
B.O.P. Table 2, line 54 (57).

ABOPEXAPBLNL = Foreign Capital Inflows: Long-Term Nonliquid
Liabilities to Private Foreigners, Reported by
U.S. Banks, b.c.d., a.r., Source: S.C.B., B.O.P.
Table 2, line 53 (53).

ABOPEXAPNBLNL = Foreign Capital Inflows: Long-Term Nonliquid
Liabilities to Private Foreigners, Reported
by U.S. Nonbanks (Other than Direct Investment
and Securities), b.c.d., a.r., Source: S.C.B.,
B.O.P. Table 2, line 50 (51).

ABOPEXAPNBSNL = Foreign Capital Inflows: Short-Term Nonliquid
Liabilities to Private Foreigners, Reported
by U.S. Nonbanks (Other than Direct Investment
or Securities), b.c.d., a.r., Source: S.C.B.,
B.O.P. Table 2, line 51 (52).

ABOPEXAPSLD = Foreign Capital Inflows: U.S. Liquid Liabilities
to Private Foreigners, b.c.d., a.r., Source:
S.C.B., B.O.P. Table 2, line 56 (54).

ABOPEXAPUSGSNL = Foreign Capital Inflows: Nonliquid Liabilities
of U.S. Government to Other Official and
Private Foreigners, b.c.d., a.r., Source:
S.C.B., B.O.P. Table 2, line 55 (48).

ABOPEXAUSS = Foreign Capital Inflows: U.S. Corporate
Securities Other than Treasury Issues, b.c.d.,
a.r., Source: S.C.B., B.O.P. Table 2, line 49 (50).

ABOPEXERROR = Net Errors and Omissions, b.c.d., a.r.,
Source: S.C.B., B.O.P. Table 2, line 64.

ABOPEXG = Exports of Goods and Services: Merchandise,
Adjusted, Excluding Military Transfers, b.c.d.,
a.r., Source: S.C.B., B.O.P. Table 2, line 2.

ABOPEXRSDRA = Allocations of Special Drawing Rights (SDR)
b.c.d., a.r., Source: S.C.B., B.O.P. Table 2,
line 63.

ABOPEXSFRDI = Exports of Goods and Services: Receipts of
Direct Investment Fees and Royalties, b.c.d.,
a.r., Source: S.C.B., B.O.P. Table 2, line 10.

ABOPEXSFRUF   =   Exports of Goods and Services: Fees and Royalties from Unaffiliated Foreigners, b.c.d., a.r., Source: S.C.B., B.O.P. Table 2, line 7.

ABOPEXSGS   =   Exports of Goods and Services: U.S. Government Miscellaneous Services, b.c.d., a.r., Source: S.C.B., B.O.P. Table 2, line 9.

ABOPEXSPS   =   Exports of Goods and Services: Other Private Services, b.c.d., a.r., Source: S.C.B., B.O.P. Table 2, line 8.

ABOPEXSTMSC   =   Exports of Goods and Services: Transfers Under U.S. Military Agency Sales Contracts b.c.d., a.r., Source: S.C.B., B.O.P. Table 2, line 3.

ABOPEXSTROT   =   Exports of Goods and Services: Other Transportation, b.c.d., a.r., Source: S.C.B., B.O.P. Table 2, line 6.

ABOPEXSTRPF   =   Exports of Goods and Services: Passenger Fares, b.c.d., a.r., Source: S.C.B., B.O.P. Table 2, line 5.

ABOPEXSTVL   =   Exports of Goods and Services: Travel Spending, b.c.d., a.r., Source: S.C.B., B.O.P. Table 2, line 4.

ABOPEXSYGFA   =   Exports of Goods and Services: Receipts of Income from U.S. Government Assets, b.c.d., a.r., Source: S.C.B., B.O.P. Table 2, line 13.

ABOPEXSYPDI   =   Exports of Goods and Services: Receipts of Income from Direct Investment Interest, Dividends and Branch Earnings, b.c.d., a.r., Source: S.C.B., B.O.P. Table 2, line 11.

ABOPEXSYPFA   =   Exports of Goods and Services: Receipts of Income from Non-Direct Private Assets, b.c.d., a.r., Source: S.C.B., B.O.P. Table 2, line 12.

ABOPIMAG   =   U.S. Government Capital Flows, Net, b.c.d., a.r., Source: S.C.B., B.O.P. Table 2, line 33.

ABOPIMAPBL   =   U.S. Private Capital Outflows: Long-Term Claims Reported by U.S. Banks, b.c.d., a.r., Source: S.C.B., B.O.P. Table 2, line 41.

ABOPIMAPBS   =   U.S. Private Capital Outflows: Short-Term Claims Reported by U.S. Banks, b.c.d., a.r., Source: S.C.B., B.O.P. Table 2, lines 42 & 43.

ABOPIMAPBSLD   =   U.S. Private Capital Outflows: Liquid Short-Term Claims Reported by U.S. Banks, b.c.d., a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2, line 43.

ABOPIMAPDI   =   U.S. Private Capital Outflows: Direct Investment Flow Excluding Retained Earnings Abroad, b.c.d. a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2, line 39.

ABOPIMAPFS   =   U.S. Private Capital Outflows: Foreign Securities, b.c.d., a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2, line 40.

ABOPIMAPNBL   =   U.S. Private Capital Outflows: Long-Term Claims Reported by U.S. Nonbanking Concerns, b.c.d., a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2, line 44.

ABOPIMAPNBS   =   U.S. Private Capital Outflows: Short-Term Claims Reported by U.S. Nonbanking Concerns, b.c.d., a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2, line 45 & 46.

ABOPIMAPNBSLD   =   U.S. Private Capital Outflows: Short-Term Liquid Claims Reported by U.S. Nonbanking Concerns, b.c.d., a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2, line 46.

ABOPIMG   =   Imports of Goods and Services: Merchandise, Adjusted, Excluding Military Transfers, b.c.d., a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2, line 16.

ABOPIMSDDE   =   Imports of Goods and Services: Direct Defense Expenditures, b.c.d., a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2, line 17.

ABOPIMSFRDI   =   Imports of Goods and Services: Payments of Income on Direct Investment Fees and Royalties, b.c.d., a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2, line 24.

ABOPIMSFRUF   =   Imports of Goods and Services: Fees and Royalties to Unaffiliated Foreigners, b.c.d., a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2, line 21.

ABOPIMSGS   =   Imports of Goods and Services: U.S. Government Payments for Miscellaneous Services, b.c.d., a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2, line 23.

ABOPIMSPS   =   Imports of Goods and Services: Private Payments for Other Services, b.c.d., a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2, line 22.

ABOPIMSTROT	=	Imports of Goods and Services: Other Transportation, b.c.d., a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2, line 20.
ABOPIMSTRPF	=	Imports of Goods and Services: Passenger Fares, b.c.d., a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2, line 19.
ABOPIMSTVL	=	Imports of Goods and Services: Travel Spending Abroad, b.c.d.,a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2, line 18.
ABOPIMSYGFA	=	Imports of Goods and Services: Payments of Income of U.S. Government Liabilities, b.c.d., a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2, line 27.
ABOPIMSYPDI	=	Imports of Goods and Services: Payments of Income on Direct Investment Interest, Dividends and Branch Earnings, b.c.d., a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2, line 25.
ABOPIMSYPFA	=	Imports of Goods and Services: Payments of Income on Other Private Liabilities, b.c.d., a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2, line 26.
ABOPIMUTGGR	=	Unilateral Transfers, Net: U.S. Government Grants (Excluding Military Grants), b.c.d., a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2, line 30.
ABOPIMUTGPO	=	Unilateral Transfer, Net: U.S. Government Pensions and Other Transfers, b.c.d., a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2, line 31.
ABOPIMUTPR	=	Unilater Transfers, Net: Private Remittances and Other Transfers, b.c.d., a.r., Source: <u>S.C.B.</u>, B.O.P. Table 2, line 32.
ACBLI	=	Loans and Investments, all Commercial Banks, b.c.d., end of period, Source: <u>Federal Reserve Bulletin</u>, A-17.
CCACORP	=	Corporate Capital Consumption Allowances, b.c.d., a.r., s.a., Source: <u>S.C.B.</u>
CPI63FR	=	Consumer Price Index: France, 1963 = 1.0, Source: <u>Business Conditions Digest</u>.
CPI63IT	=	Consumer Price Index: Italy, 1973 = 1.0, Source: <u>Business Conditions Digest</u>.

CPI63ME	=	Consumer Price Index: Mexico, 1963 = 1.0, Source: I.F.S.
DIV	=	Corporate Dividends, b.c.d., a.r., s.a., Source: S.C.B.
DMYCD	=	Dummy Variable for Gap Between Maximum and actual Rate for Large Certificates of Deposits, 1.0 from 68:1 to 70:2.
DMYEXPO67	=	Dummy Variable for Expo67, 1.0 in 1967:2 and 2.0 in 1967:3.
DMYEXPO70	=	Dummy Variable for Expo70, 1.0 in 1970:2 and 2.0 in 1970:3.
DMYFDIPA	=	Dummy Variable for Foreign Direct Investment Program (U.S. Exempted Canada from Controls in 68:2), 1.0 from 68:2 to 69:1.
DMYILST	=	Dummy Variable for International Longshoremen's Strikes, 1.0 in 62:4, 64:4, 68:4, 71:4; 2.0 in 63:1, 65:1, 69:1.
DMYJAPWD	=	Dummy Variable for Window-Dressing Effect of Banks' Nonliquid Claims on Japan, 1.0 in 70:4 and -1.0 in 71:1, Source: S.C.B., 6/71, pp. 48 & 59.
DMYMECPR	=	Dummy Variable for Private Remittances During Middle-East Crisis, 1.0 in 1967:3 and 2.0 in 1967:2.
DMYMIPTD	=	Dummy Variable for Maximum Interest Payable on Official Foreign Time Deposits in the U.S., 1.0 until 62:3, Source: Federal Reserve Bulletin, A-10.
DMYNEP	=	Dummy Variable Representing Uncertainty at the Time of New Economic Policy, 1.0 from 71:3 to 71:4.
DMYSP	=	Dummy Variable to Account for Speculative Capital Flows in 1971, 1.0 for 71:3 and 71:4.
DMYSUEZ	=	Dummy Variable for Suez Canal Crisis, 1.0 from 67:2 to 67:3.

DMYWD	=	Window-Dressing Dummy Variable for Foreign Direct Investment Program, 1.0 in 4th Quarters from 68:4, Source: S.C.B., B.O.P. Table 2, line 48.
DMY62IV	=	Dummy Variable for One-Shot Effect of Elimination of Maximum Interest Payable on Time Deposits of Official Foreigners, 1.0 in 62:4, Continuing Effects Represented by DMYMIPTD.
DMY63II	=	Dummy Variable for the Anticipation of the Interest Equilization Tax, 1.0 in 63:2.
DMY63IV	=	Dummy Variable for the Initial Impact of Interest Equalization Tax, 1.0 in 63:4.
DMY64II	=	Dummy Variable for Financial Tightness Abroad, 1.0 in 64:2.
DMY64IV	=	Dummy Variable for the Anticipation of the Voluntary Foreign Credit Restraint Program, 1.0 in 64:4.
DMY65I	=	Dummy Variable for the Anticipation of the Voluntary Foreign Credit Restraint Program, 1.0 in 65:1.
DMY66III	=	Dummy Variable for the Liquidation in U.S. of an Oil Company Owned in Canada, 1.0 in 66:3, Source: S.C.B., 9/67 pp. 50 & 51, 6/67 pp. 40 & 41.
DMY67IV	=	Dummy Variable for the United Kingdom Devaluation (11/18/67), 1.0 in 67:4, Source: I.F.S.
DMY68II	=	Dummy Variable for Capital Flow into Canada (Exempted from Foreign Direct Investment Program), 1.0 in 68:2.
DMY68IV	=	Dummy Variable for Unusual Capital Outflow from Japan, 1.0 in 68:4.
DMY69II	=	Dummy Variable for Unusual Capital Outflow from Japan, 1.0 in 69:2, Source: Herring.
DMY69IV	=	Dummy Variable for the West German Revaluation (10/26/69), 1.0 in 69:4, Source: I.F.S.

DMY70II   = Dummy Variable for Financial Tightness
Abroad, 1.0 in 70:2, Source: <u>S.C.B.</u>,
9/20 p. 27.

DMY71II   = Dummy Variable for Expectation of U.S.
Devaluation, 1.0 in 71:2, Source: <u>S.C.B.</u>,
10/27 p.22.

FERSBL   = Spot Exchange Rate: Belgium, U.S. $ per
Belgium Franc, Source: <u>I.F.S</u>.

FERSCA   = Spot Exchange Rate: Canada, U.S. $ per
Canadian Dollar, Source: <u>Bank of Canada Review</u>.

FERSFR   = Spot Exchange Rate: France, U.S. $ per
Franc, Source: <u>I.F.S.</u>

FERSIT   = Spot Exchange Rate: Italy, U.S. $ per
Lire, Source: <u>I.F.S.</u>

FERSJA   = Spot Exchange Rate: Japan, U.S. $ per Yen,
Source: <u>I.F.S.</u>

FERSME   = Spot Exchange Rate: Mexico, U.S. $ per Peso,
Source: <u>I.F.S.</u>

FERSNE   = Spot Exchange Rate: Netherlands, U.S. $ per
Guilder, Source: <u>I.F.S.</u>

FERSSD   = Spot Exchange Rate: Sweden, U.S. $ per
Kroner, Source: <u>I.F.S.</u>

FERSSZ   = Spot Exchange Rate: Switzerland, U.S. $
per Swiss Franc, Source: <u>I.F.S.</u>

FERSUK   = Spot Exchange Rate: United Kingdom, U.S. $
per Pound Sterling, Source: U.K., <u>Financial
Statistics</u>.

FERSWG   = Spot Exchange Rate: West Germany,U.S. $
per Deutsche Mark, Source: <u>I.F.S</u>.

GNP   = U.S. Gross National Product, b.c.d., a.r.,
s.a., Source: <u>S.C.B.</u>

GNPDCA   = Gross National Product: Canada, Billions of
Canadian Dollars, a.r., Source: Canada, <u>National
Income and Expenditure Accounts</u>.

GNPDJA = Gross National Product: Japan, Billions of Yen, a.r., Source: Japan, Economic Planning Agency, Annual Report and Bank of Japan, Economic Statistics Monthly.

GNPDUK = Griss National Product: United Kingdom, Billions of Pounds Sterling, a.r., Source: U.K., Economic Trends.

GNPDWG = Gross National Product: West Germany, Billions of Deutsche Marks, a.r., Source: West Germany, Vierteljahrsheft zur Wirtschaftsforschung.

GNPD63CA = Gross National Product: Canada, Billions of 1963 Canadian Dollars, a.r., Source: Canada, National Income and Expenditure Accounts.

GNPD63JA = Gross National Product: Japan, Billions of 1963 Yen, a.r., Source: Japan, Economic Planning Agency, Annual Report and Bank of Japan, Economic Statistics Monthly.

GNPD63UK = Gross National Product: United Kingdom, Billions of 1963 Pounds Sterling, a.r., Source: U.K., Economic Trends.

GNPD63WG = Gross National Product: West Germany, Billions of 1963 Deutsche Marks, a.r., Source: West Germany, Vierteljahrsheft zur Wirtschaftsforschung.

IET63 = Dummy Variable for Interest Equalization Tax, 1.0 from 1963:3 to 71:4.

NAFBLOFFQ = Value of Short-Term Liabilities to Foreign Official Agencies Reported by U.S. Banks, b.c.d., b.p., Source: Treasury Bulletin and Estimates.

NAFBLQ = Value of Long-Term Liabilities to Foreigners Reported by U.S. Banks, b.c.d., b.p., Source: Treasury Bulletin and Estimates.

NAFCSQ = Value of U.S. Corporate Securities Held by Foreigners, b.d.c., b.p., Source: S.C.B. and Estimates.

NAFDINQ = Value of Direct Investment in U.S. by Foreign Firms, b.c.d., b.p., Source: S.C.B. and Estimates

NAFLIQNOFQ	=	Value of Liquid Liabilities to Private Foreigners, b.c.d., b.p., Source: <u>Federal Reserve Bulletin</u>, and Estimates.
NAFLIQOFQ	=	Value of Liquid Liabilities to Official Foreigners, b.c.d., b.p., Source: <u>Federal Reserve Bulletin</u>, and Estimates.
NAFNBLQ	=	Value of Long-Term Nonbanking Liabilities to Foreigners, b.c.d., b.p., Source: <u>S.C.B.</u> and Estimates.
NAFNBSQ	=	Value of Short-Term Nonbanking Liabilities to Foreigners, b.c.d., b.p., Source: <u>S.C.B.</u>, <u>Treasury Bulletin</u>, and Estimates.
NAFNLIQPQ	=	Value of Nonliquid Liabilities to Other Official and Private Foreigners Reported by the U.S. Government, b.c.d., b.p., Source: <u>S.C.B.</u> and Estimates.
NAFNLIQQ	=	Value of Nonliquid Liabilities to Foreigners by the U.S. Government, b.c.d., b.p., Source: <u>S.C.B.</u> and Estimates.
NAUBLQ	=	Value of Long-Term Foreign Claims Reported by U.S. Banks., b.c.d., b.p., Source: <u>Treasury Bulletin</u> and Estimates.
NAUBSQ	=	Value of Short-Term Foreign Claims Reported by U.S. Banks, b.c.d., b.p., Source: <u>S.C.B.</u> and Estimates.
NAUDINQ	=	Value of U.S. Direct Investments Abroad, b.c.d., b.p., Source: <u>S.C.B.</u> and Estimates.
NAUFSQ	=	Value of U.S. Held Foreign Securities, b.c.d., b.p., Source: <u>S.C.B.</u> and Estimates.
NAUGOVQ	=	Value of U.S. Government Held Foreign Securities, b.c.d., b.p., Source: <u>S.C.B.</u> and Estimates.
NAUNBLQ	=	Value of Long-Term Foreign Claims Reported by U.S. Nonbanks, b.c.d., b.p., Source: <u>S.C.B.</u> and Estimates.
NAUNBSQ	=	Value of Short-Term Foreign Claims Reported by U.S. Nonbanks, b.c.d., b.p., Source: <u>S.C.B.</u>, <u>Treasury Bulletin</u> and Estimates.

PC63	=	U.S. Implicit Price Deflator for Personal Consumption Expenditures, 1963 = 1.0, s.a., Source: <u>S.C.B.</u>
PGNP63	=	Implicit Price Deflator for Gross National Product, 1963 = 1.0, s.a., Source: <u>S.C.B.</u>
PIMG63	=	Unit Value Index of Imports of Merchandise, 1963 = 1.0, Source: <u>S.C.B.</u>
PXEAF63	=	U.S. Price of Gross Product (Nonfarm Industries), 1963 = 1.0, %p.a., s.a., Source: D.R.I., B.E.A.
Q1	=	Seasonal Dummy Variable, 1.0 in First Quarters.
Q2	=	Seasonal Dummy Variable, 1.0 in Second Quarters.
Q3	=	Seasonal Dummy Variable, 1.0 in Third Quarters.
RDUTYIMCA	=	Ratio of Duty Collected to Total Imports: Canada, Source: <u>Canadian Statistical Review</u> and Estimates.
RDUTYIMJA	=	Ratio of Duty Collected to Total Imports: Japan, Source: Japan, <u>Economic Statistics Annual 1970</u> and <u>Economic Statistics Monthly</u> and Estimates.
RDUTYIMUK	=	Ratio of Duty Collected to Total Imports: United Kingdom, Source: U.K., <u>Monthly Digest of Statistics</u> and Estimates.
RDUTYIMUS	=	Ratio of Duty Collected to Total Imports: United States, Source: <u>U.S. Statistical Abstract</u>, and <u>FT990</u> and Estimates.
RDUTYIMWG	=	Ratio of Duty Collected to Total Imports, West Germany, Source: <u>Monthly Report of the Duetsche Bundesbank</u> and Estimates.
REFDIN	=	Retained Earnings of Foreign Investment in the U.S., b.c.d., a.r., Source: <u>S.C.B.</u> and Estimates.
REUSDIN	=	Retained Earnings of U.S. Direct Investments Abroad, b.c.d., a.r., Source: <u>S.C.B.</u> and Estimates
RIET	=	Rate of Interest Equalization Tax, Source: Estimates.
RMCDLM	=	Maximum Interest Rate Payable on Large Certificates of Deposit, %p.a., Weighted Average, Source: D.R.I., <u>Federal Reserve Bulletin</u>, A-10.

RMGBS	=	Average Market Yield on Three-Month U.S. Treasury Bills, %p.a., Average of Daily Closing Bid Prices, Source: D.R.I., B.E.A.
RMLBLQ	=	Government Bond Yield: Belgium, %p.a., Source: Bulletin de la Banque Nationale de Belgique.
RMLCAIBQ	=	Industrial Bond Yield: Canada, %p.a., Source: Bank of Canada Review.
RMLFRCBQ	=	Corporate Bond Yield: France, %p.a., Source: France, Bulletin Mensuel de Statistique.
RMLITQ	=	Industrial Bond Yield: Italy, %p.a., Source: Banca d'Italia, Bollettino.
RMLJAQ	=	Industrial Bond Yield: Japan, %p.a., Source: Economic Statistics of Japan.
RMLNEQ	=	Government Bond Yield: Netherlands, %p.a., Source: Netherlands Bank and Central Bureau of Statistics, Maandstatistiek Van Het Financiewezen.
RMLSDILQ	=	Industrial Loans Yield, Sweden, %p.a., Source: Skandinaviska Banken Quarterly Review.
RMLSZQ	=	Swiss Confederation Bond Yield, %p.a., Source: Switzerland, National Bank, Monatsbencht Bulletin Mensuel.
RMLUKQ	=	3 1/2% War Loan Rate: United Kingdom, %p.a., Source: U.K., Financial Statistics.
RMLWGIBQ	=	Industrial Bonds Yield (Yields on Bonds Outstanding): West German, %p.a., Source: Monthly Report of the Deutsche Bundesbank.
RMMBCIND	=	Yield on Moody's Corporate Bonds (Industrials), %p.a., Average of Daily Figures, Source: Federal Reserve Bulletin, D.R.I.
RMSBLQ	=	Yield on Three Month Treasury Certificates: Belgium, %p.a., Source: Bulletin de la Banque Nationale de Belgique.
RMSCAQ	=	Three Month Treasury Bill Rate: Canada, %p.a., Source: Bank of Canada Review.

RMSEUROQ	=	Rate on Three Month Euro-Dollar Deposits in London, %p.a., Source: U.K., <u>Financial Statistics</u>.
RMSFRQ	=	Day to Day Money Rate: France, %p.a., Source: France, <u>Bulletin Mensuel de Statistique</u>.
RMSJAQ	=	Loans and Discount Rate (all Banks): Japan, %p.a., Source: Economic Statistics of Japan.
RMSNETBQ	=	Rate on Three Month Treasury Papers: Netherlands, %p.a., Source: Amsterdam-Rotterdam Bank, <u>Quarterly Review</u>.
RMSSZQ	=	Three Month Bank Time Deposit Rate: Switzerland, %p.a., Source: Switzerland National Bank, <u>Monatsbencht Bulletin Mensuel</u>.
RMSUKQ	=	Treasury Bill Rate: United Kingdom. %p.a., Source: U.K., <u>Financial Statistics</u>.
RMSWGQ	=	Three Month Loan Rate: West Germany, %p.a., Source: <u>Monthly Report of the Deutsche Bundesbank</u>.
RM1	=	Prime Rate on U.S. Short-Term Business Loans, %p.a., Source: D.R.I., B.E.A.
RTCGFS	=	Statutory Corporate Tax Rate, Source: D.R.I.
RU	=	U.S. Unemployment Rate for all Civilian Workers, %p.a., s.a., Source: D.R.I., <u>B.L.S.</u>
TBEURO	=	U.S. Treasury Certificates, Euro-Dollar Series and Special Export-Import Bank Securities Held by Foreign Branches of U.S. Banks, b.c.d., only 71:1 to 71:4, Source: <u>Federal Reserve Bulletin</u>, A-90.
VCFR	=	Dummy Variable for Voluntary Foreign Credit Restraint Program, 10. from 1965:1 to 71:4.
WPIBL	=	Wholesale Price Index (Manufactured Goods): Belgium, 1963 = 1.0, Source: <u>M.E.I.</u>
WPICA	=	Wholesale Price Index (Manufactured Goods): Canada, 1963 = 1.0, Source: <u>M.E.I.</u>
WPIFR	=	Wholesale Price Index (Intermediate Goods): France, 1963 = 1.0 Source: <u>M.E.I.</u>

WPIIT	=	Wholesale Price Index (Consumer Goods): Italy, 1963 = 1.0, Source: M.E.I.
WPIJA	=	Wholesale Price Index (Manufactured Consumer Goods): Japan, 1963 = 1.0, Source: M.E.I.
WPINE	=	Wholesale Price Index (Manufactured Goods): Netherlands, 1963 = 1.0, Source: M.E.I.
WPISD	=	Wholesale Price Index (Manufactured Goods): Sweden, 1963 = 1.0, Source: M.E.I.
WPISZ	=	Wholesale Price Index (All Items): Switzerland, 1963 = 1.0, Source: M.E.I.
WPIUK	=	Wholesale Price Index (Manufactured Goods for the Home Market): United Kingdom, 1963 = 1.0, Source: M.E.I.
WPIWG	=	Wholesale Price Index (Consumer Goods): West Germany, 1963 = 1.0, Source: M.E.I.
WPI63	=	Wholesale Price Index (All Commodities): United States, 1963 = 1.0, s.a., Source: S.C.B., D.R.I.
YD	=	U.S. Personal Disposable Income, b.c.d., a.r., s.a., Source: D.R.I., B.E.A.
ZA	=	Corporate Profits After Tax Excluding IVA, b.c.d., a.r., s.a., Source: S.C.B., D.R.I.

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