BALANCE OF PAYMENTS -- Project Team Docs. 1

Under Secretary Volcker January 16, 1973

Thomas D. Willett

Mundell's Review of The Monetary Sin of the West by Jacques Rueff

Attached is the paper by Bob Mundell which you asked about. It is a review of Jacques Rueff, The Monetary Sin of the West.

Mundell differs with Rueff's interpretation of 20th century monetary experience and argues that "gold is no longer credible as an alternative to the dollar" (p.17). He argues that the 1971 crisis was more psychological than economic and °that it has helped officials to understand the 1944-71 system better than before, and to learn that exchange rate changes now have less effects on real output and trade balances than on price level movements. The world economy is now more securely on the dollar standard than it ever was before" (p. 17).

Mundell favors the creation of a single world currency for international use. He would allow both central banks and private citizens to buy and sell gold freely.

With respect to the official price of gold, he argues that in an inflationary world such as today's, an increase would be correct only if it were to accomplish a change in the system itself (p. 12). Rueff envisions such a coupling, but Mundell warns that "the drawback of his recommendation is that countries could be tempted to accept the increase in the price of gold while rejecting the change in the system that must accompany it in order to justify it" (p. 12).

Mundell also argues that Rueff does not carry far enough the logic of his theory of monetary sin. "The pure gold standard was 'corrupted' first by the sin of banking, then by the establishment of central banks, and then by the acquisition by the latter of government bonds in their assets" (p. 14). To restore "sound money" would require ending not just the currency component of international reserves, but all paper currencies. To reintroduce such a pure gold specie system, Mundell estimates, "would require a fantastic increase in the price of gold to over $1000 an ounce!" (p. 15)

cc - Messrs. Bennett, Hennessy, Cross, Willis, Dale, Widman, Reddy

OASIA:TDWillett:rcw 1/16/73

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BOP Project Team Documents

(Unclassified)

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MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : Under Secretary Designate Bennett DATE: February 13, 1974

Through: Assistant Secretary Hennessy

FROM : Sam Y. Cross syc

SUBJECT: Revision of Calculations of Trade-Weighted Average Exchange Rate Changes

In response to your interest in seeing trade-weighted exchange rate changes calculated on the basis of trade coverage broader than that used in our "OECD" calculations, Mr. Leddy and Mr. Swofford have enlarged the model to cover an additional 26 countries outside the OECD (now 23), for a total coverage of 49 countries. (As you know, our previous estimates of trade-weighted changes against the "world" have been based on highly imprecise calculations of the non-OECD group's exchange rate change against the dollar.) With this enlargement, our new model covers countries accounting for approximately 90 percent of U.S. trade and an average of approximately 94 percent of the trade of each of the other OECD countries. In addition, calculations can now be made to show trade-weighted exchange rate changes for a number of the more important non-OECD countries, e.g., Brazil, Mexico, India, South Africa. The trade data base has been updated from 1970 to 1972.

In the process of expanding the country coverage, we have also made changes in the averaging technique which we believe improve the calculations considerably.

a) The calculation technique has been revised to produce a single figure for "effective" exchange rate change, in contrast to the ambiguous and awkward reciprocal figures produced by the earlier version. (Depending on the measurement of nominal exchange rate changes used--i.e., local currency per unit of foreign currency versus foreign currency per unit of local currency--the earlier model would produce either 1) an average change for the currency concerned vis-a-vis other currencies or 2) the reciprocal, an average change for other currencies vis-a-vis the currency concerned.) The differences between the alternative reciprocal measurements have become quite large since the Smithsonian realignment.

b) The revision involves separate calculation of an import-weighted average change in the home currency cost of foreign exchange and an export-weighted average change in the foreign exchange cost of home currency.1/ The separate calculations are then weighted by the importance of exports and imports respectively in the home country's total trade, and averaged to produce a single figure for "effective" change for the home currency. In addition to matching appropriate measures of exchange rate change and trade shares, this revised technique takes into account differences between the geographical distribution of a country's exports and that of its imports. (The earlier version used total trade as the weighting pattern regardless of the measure of exchange rate change used.) The revised technique is similar to that used by Morgan Guaranty.

c) The program has been made considerably more flexible. It can accommodate up to nine separate country groupings as desired (e.g., OECD, world, EC, G-10, etc.) simultaneously, and can be changed easily to cover any time periods and alternative base dates desired.

In addition, we have extended the calculations back to 1960 to provide a consistent historical series. Historical charts and tables for the U.S. and several other major countries--utilizing May 1970, prior to the Canadian float, as the base date--are attached at Tab A.

Also attached (Tab B) is a comparison of calculations for the dollar produced by the new and old models. You will

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1/ The logic of the new technique is that for each country, it applies the pattern of its imports to changes in the cost of foreign exchange and the pattern of its exports to changes in the cost of its currency to foreigners. Assuming exchange rate changes are immediately and fully reflected in the prices at which trade is conducted, a 10 percent devaluation by the U.S. reduces the cost of U.S. exports to foreigners by 10 percent, and the pattern of U.S. exports is the appropriate weighting pattern to apply to this 10 percent figure. The same change, however, causes an increase of 11.1 percent in the cost of foreign exports to the U.S., and the pattern our imports is the appropriate weighting pattern to apply to the 11.1 percent figure.

note that there is very little difference between the new figures and the old calculations of "average foreign currency movements against the dollar"--that is, appreciation of other currencies relative to the dollar--which is the series we have used most of the time.

A more detailed technical explanation of these revisions is attached at Tab C.

Attachments

cc: Messrs. Volcker, Worthington, Willett, Larsen, Willis, Widman
Syvrud, Auten, Nelson, Klock, Fauver, Dale (IMF)

A

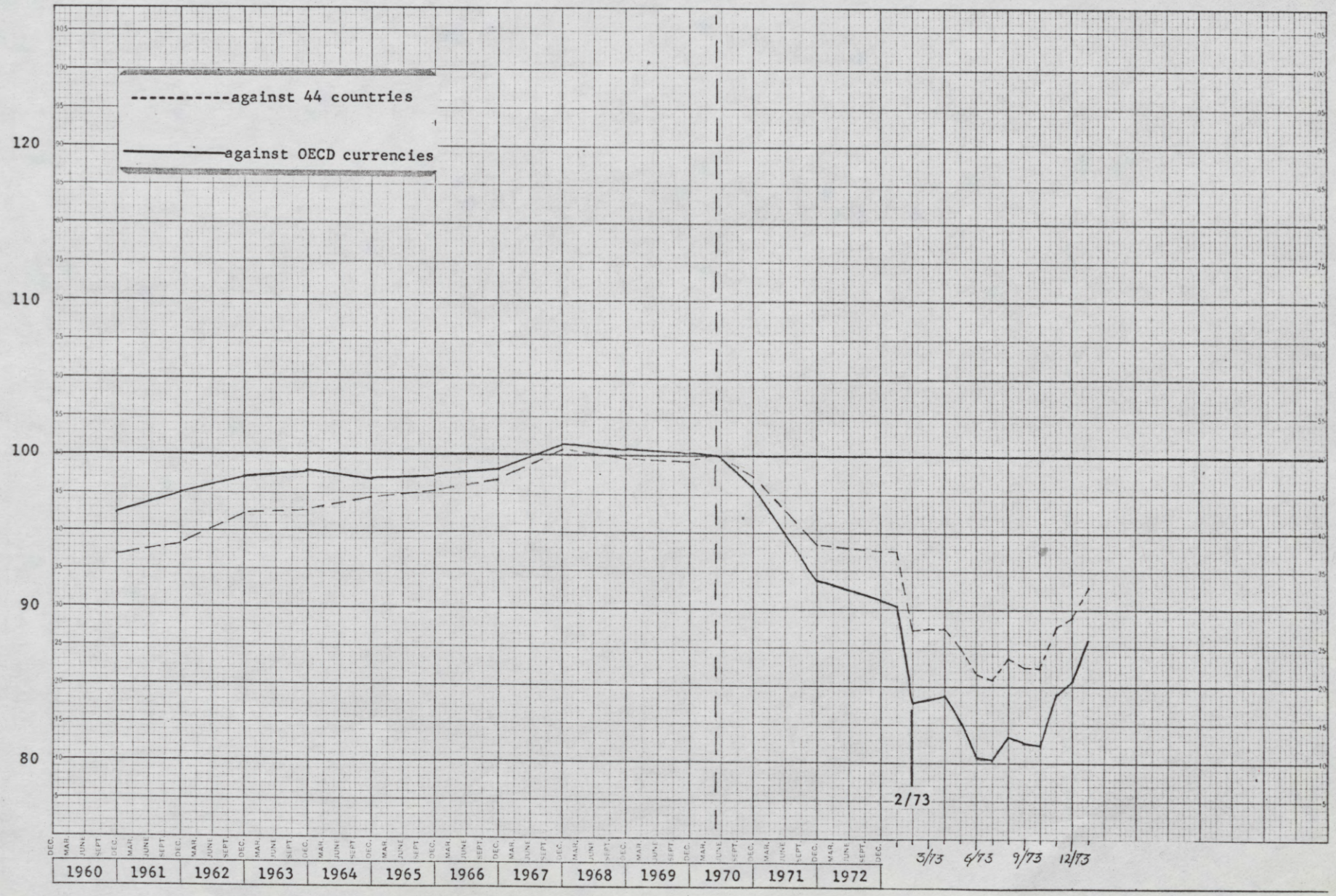
Graphic Presentation of Trade-Weighted Exchange Rate Changes

The attached charts are a historic presentation of the trade-weighted exchange rate changes of the seven major industrial countries. Although the model employed in producing these calculations contains 49 countries, only 44 were included for the following reasons:

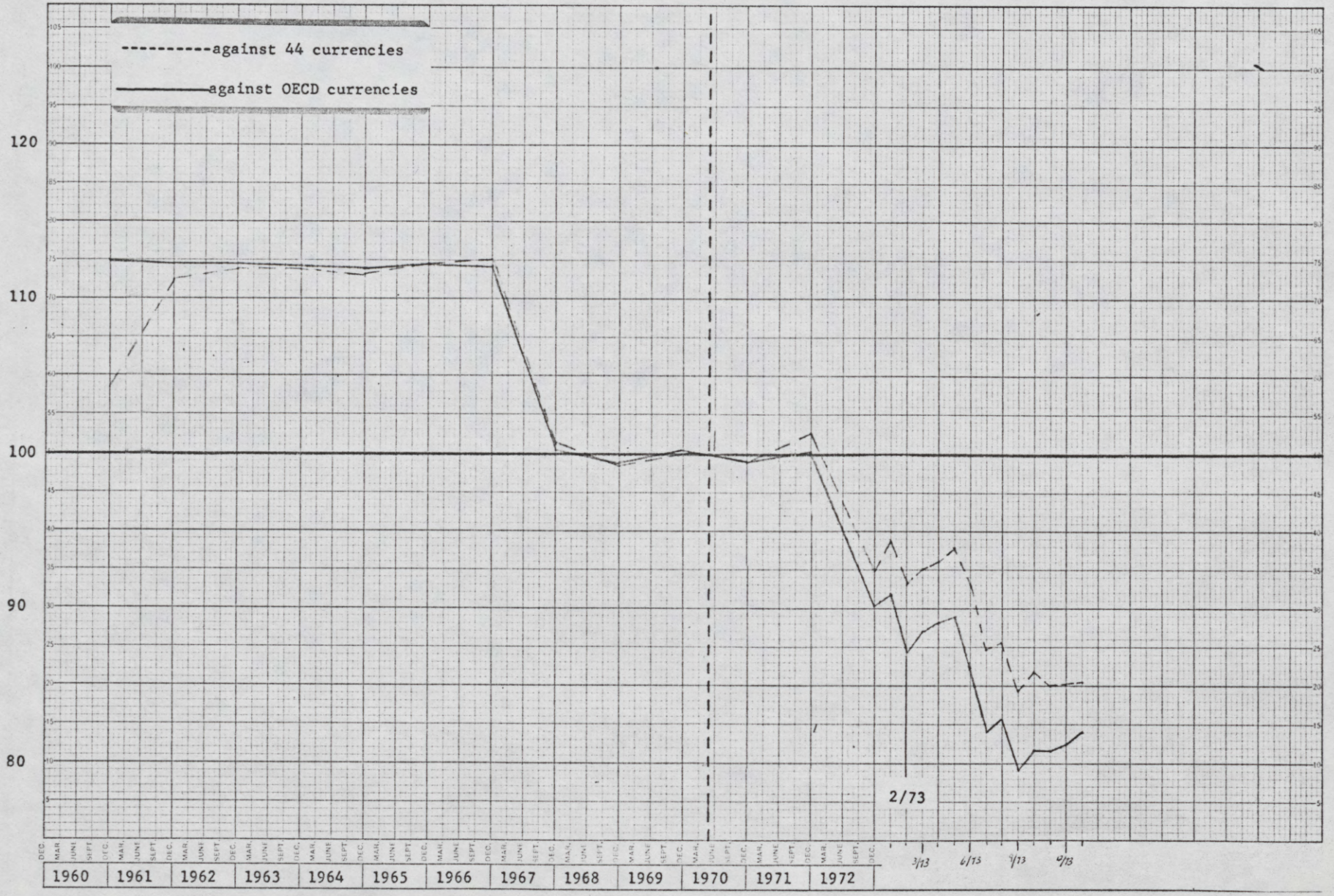
1) Hong Kong and Indonesia were excluded for the lack of complete and consistent data.

2) Argentina, Brazil and Chile were excluded to eliminate the effects of extreme fluctuations in their exchange rates during the earlier periods.

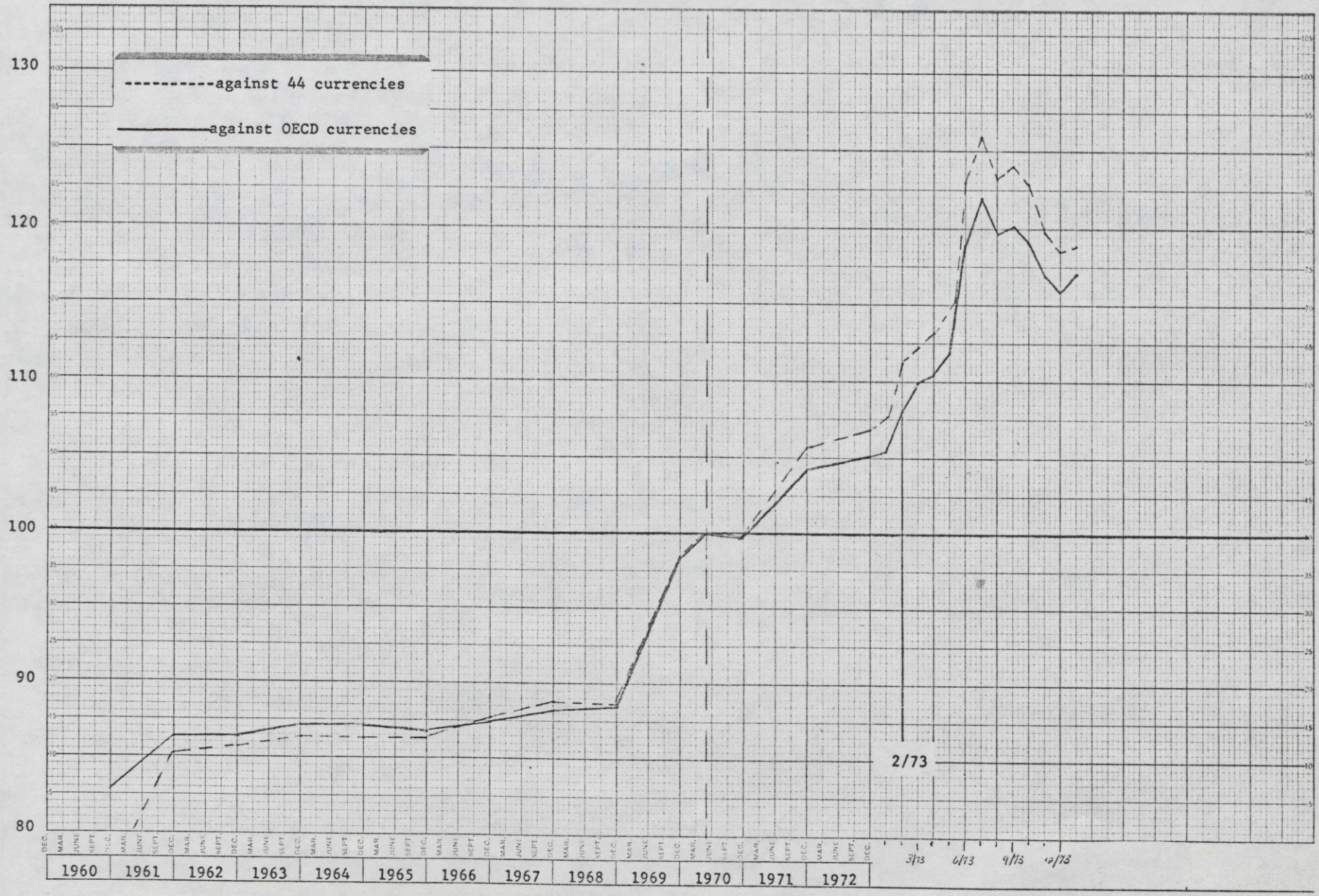
TRADE-WEIGHTED APPRECIATION or DEPRECIATION
OF THE U.S. DOLLAR : MAY 29, 1970=100



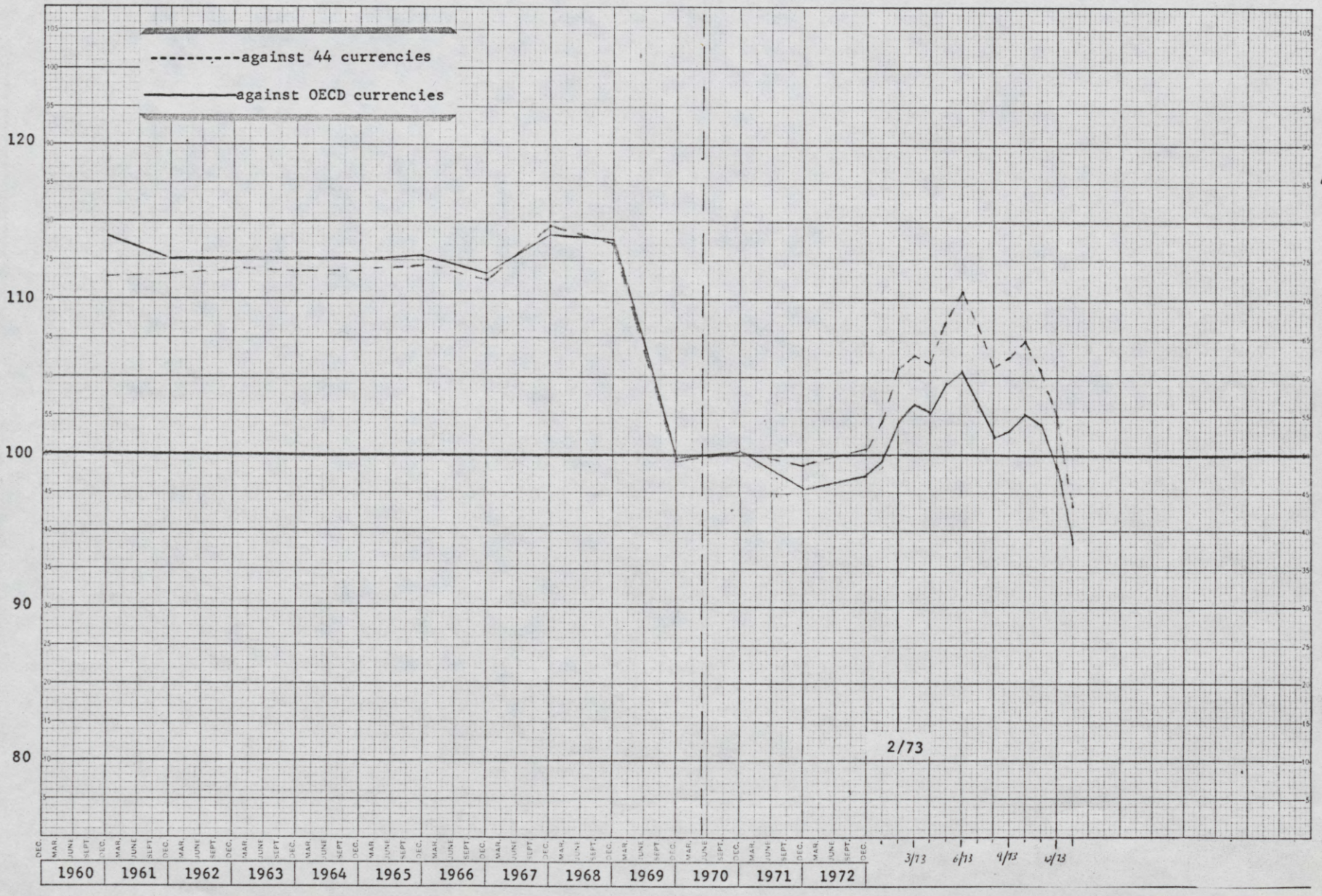
TRADE-WEIGHTED APPRECIATION or DEPRECIATION
OF THE U.K. POUND : MAY 29, 1970=100



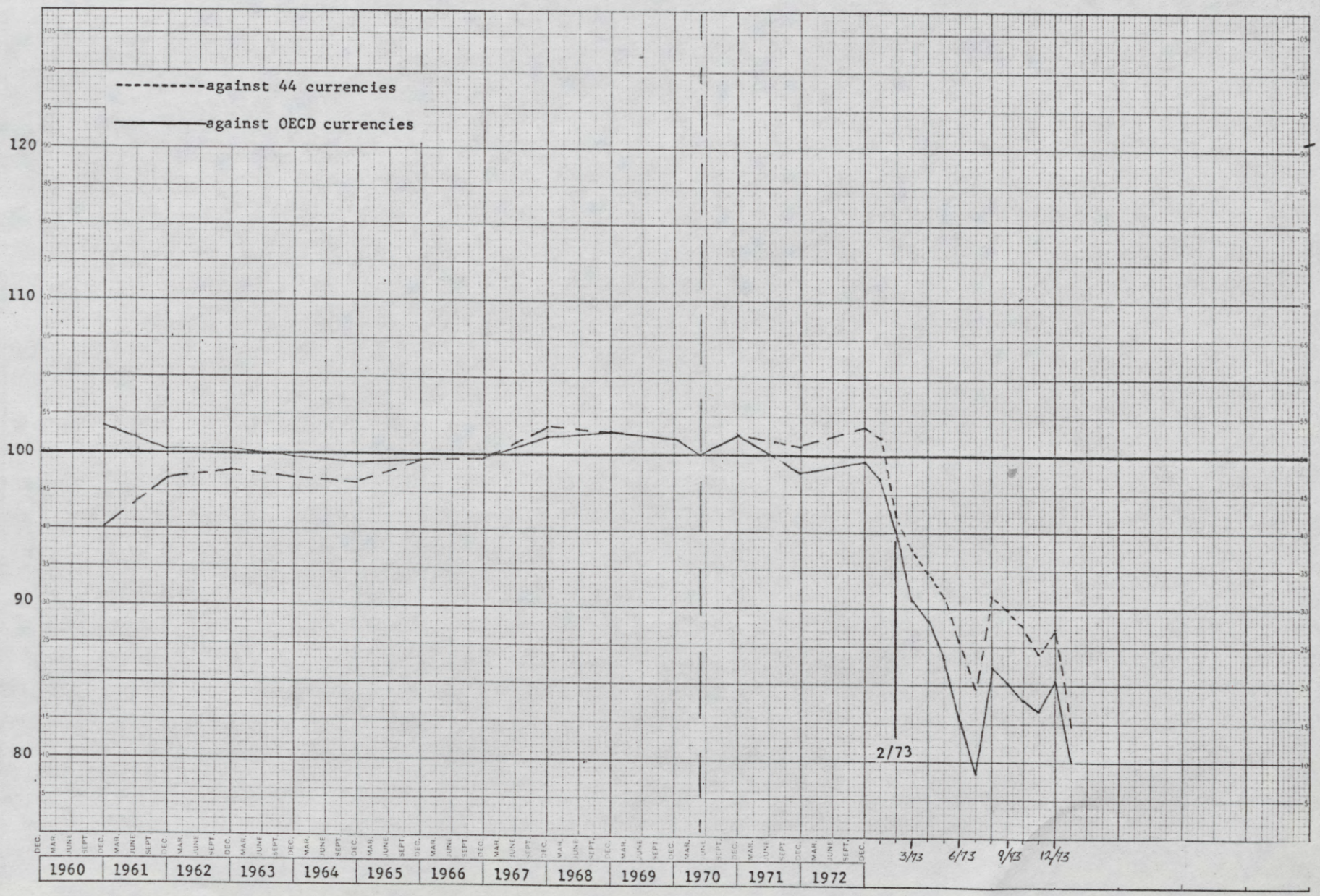
TRADE-WEIGHTED APPRECIATION or DEPRECIATION
OF THE GERMAN MARK : MAY 29, 1970=100



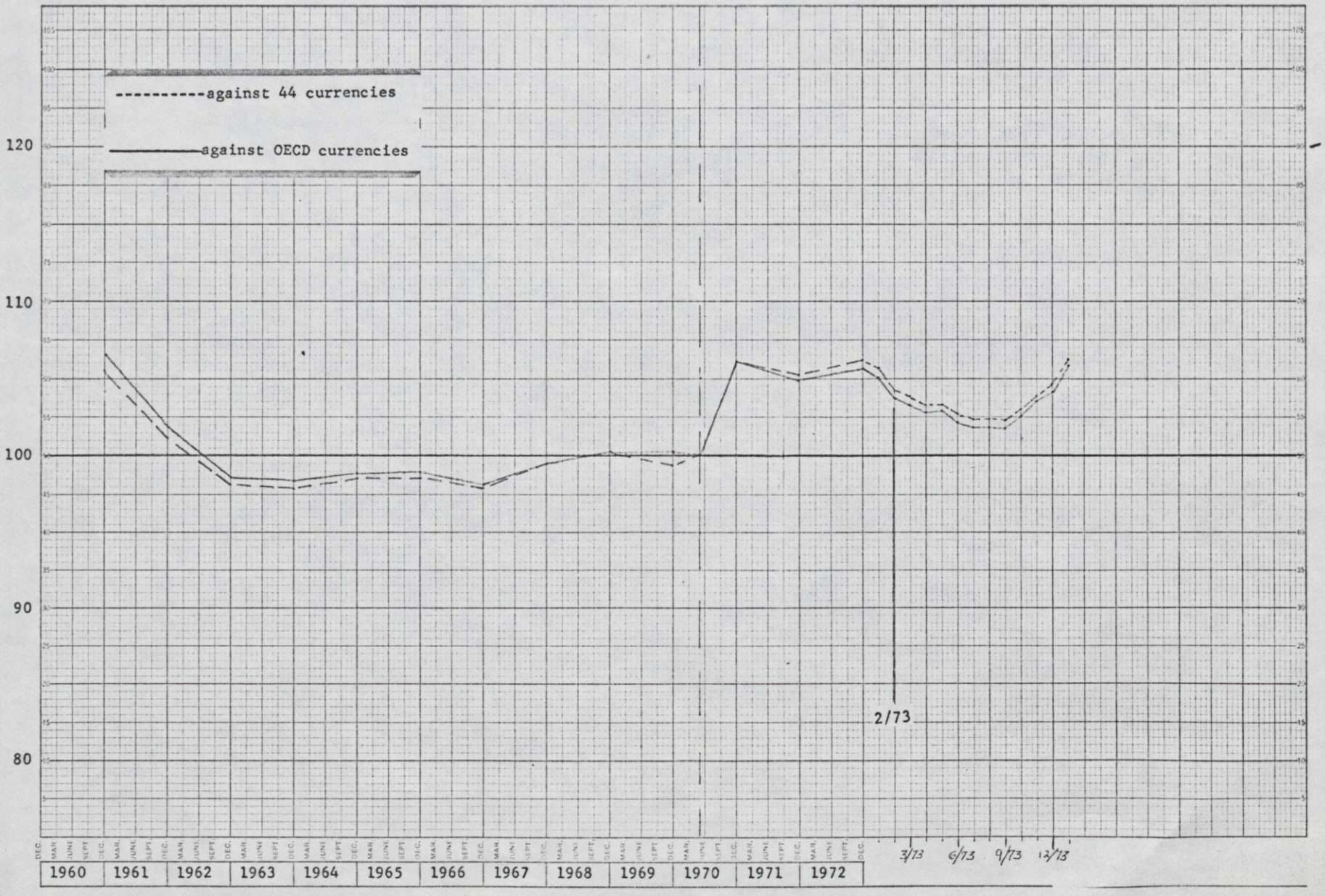
TRADE-WEIGHTED APPRECIATION or DEPRECIATION
OF THE FRENCH FRANC : MAY 29, 1970=100



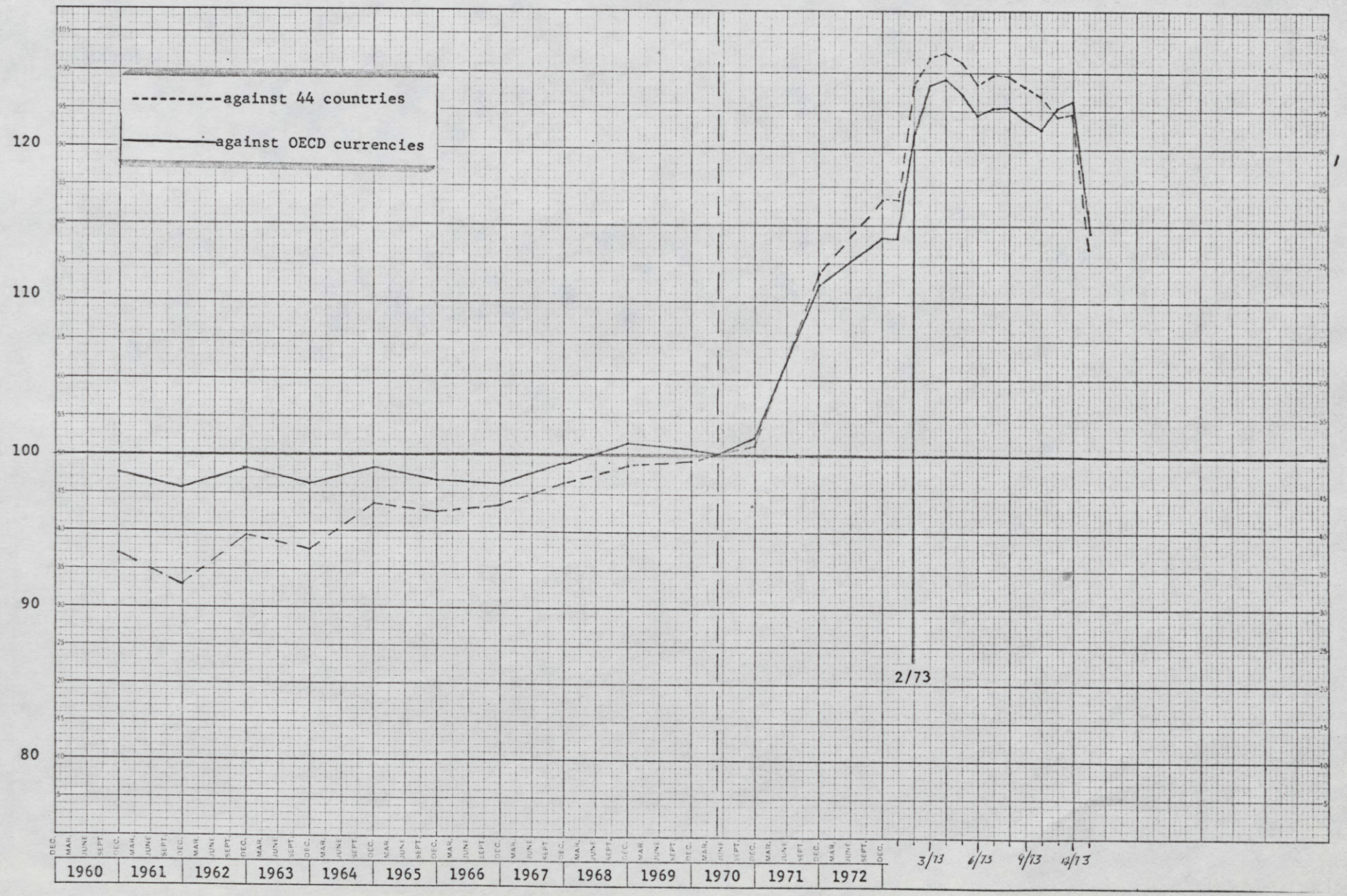
TRADE-WEIGHTED APPRECIATION or DEPRECIATION
OF THE ITALIAN LIRA : MAY 29, 1970=100



TRADE-WEIGHTED APPRECIATION or DEPRECIATION
OF THE CANADIAN DOLLAR : MAY 29, 1970=100



TRADE-WEIGHTED APPRECIATION or DEPRECIATION
OF THE JAPANESE YEN : MAY 29,1970=100



TRADE-WEIGHTED AVERAGE APPRECIATION (+)
OR DEPRECIATION (-) OF CURRENCY CONCERNED
VIS-A-VIS OTHER OECD CURRENCIES
(Percent Change Relative to Base Rates as of May 29, 1970)

AS OF: (END OF PERIOD)	U.S. DOLLAR	U.K. POUND	FRENCH FRANC	GERMAN MARK	ITALIAN LIRA	CANADIAN DOLLAR	JAPANESE YEN
1960	-3.9	+12.5	+14.0	-17.2	+ 1.7	+ 6.6	- 1.2
1961	-2.5	+12.3	+12.6	-13.6	+ 0.2	+ 1.8	- 2.2
1962	-1.5	+12.3	+12.6	-13.6	+ 0.2	- 1.4	- 0.9
1963	-1.2	+12.1	+12.5	-12.9	- 0.2	- 1.6	- 1.9
1964	-1.6	+11.8	+12.5	-13.0	- 0.6	- 1.1	- 0.9
1965	-1.4	+12.3	+12.7	-13.7	- 0.4	- 1.1	- 1.6
1966	-1.0	+12.1	+11.7	-12.6	- 0.2	- 1.8	- 1.9
1967	+0.7	+ 0.1	+14.3	-11.9	+ 1.2	- 0.5	- 0.5
1968	+0.4	- 0.6	+13.8	-11.6	+ 1.5	+ 0.2	+ 0.8
1969	+0.1	+ 0.1	- 0.3	- 1.6	+ 1.1	+ 0.1	+ 0.4
1970	-2.0	- 0.5	+ 0.1	- 0.4	+ 1.4	+ 6.1	+ 0.6
1971	-8.2	+ 0.1	- 2.3	+ 4.2	- 1.1	+ 4.9	+10.6
1972	-9.4	- 9.9	- 1.4	+ 5.1	- 0.4	+ 5.7	+14.3
1973-Jan.	-9.8	- 9.1	- 0.4	+ 5.4	- 1.5	+ 5.0	+14.2
1973-Feb.	-16.1	-12.9	+ 2.0	+ 8.0	- 7.4	+ 3.7	+22.0
1973-Mar.	-15.8	-11.5	+ 3.1	+ 9.8	- 9.5	+ 3.3	+24.2
1973-Apr.	-15.6	-10.8	+ 2.7	+10.4	-10.8	+ 2.8	+24.5
1973-May	-17.4	-10.6	+ 4.6	+11.8	-13.3	+ 2.9	+23.5
1973-June	-19.6	-13.7	+ 5.4	+18.9	-17.4	+ 2.1	+22.1
1973-July	-19.8	-18.0	+ 3.2	+21.9	-20.7	+ 1.8	+22.7
1973-Aug.	-18.3	-17.1	+ 1.1	+19.6	-13.9	+ 1.9	+22.8
1973-Sept.	-18.6	-20.4	+ 1.5	+20.1	-14.9	+ 1.8	+21.8
1973-Oct.	-18.9	-19.1	+ 2.6	+19.1	- 6.0	+ 2.5	+21.3
1973-Nov.	-15.5	-19.2	+ 1.8	+16.9	-16.6	+ 3.5	+17.6
1973-Dec.	-14.7	-18.7	- 0.8	+15.9	-14.7	+ 4.1	+18.2
1974-Jan.	-12.0	-18.0	- 5.9	+17.0	-19.9	+ 5.9	+12.0

See later calculations
attached at end of this doc.

TRADE-WEIGHTED AVERAGE APPRECIATION (+)
OR DEPRECIATION (-) OF CURRENCY CONCERNED
VIS-A-VIS 44 OTHER CURRENCIES
(Percent change relative to Base Rates as of May 29, 1970)

AS OF: (END OF PERIOD)	U.S. DOLLAR	U.K. POUND	FRENCH FRANC	GERMAN MARK	ITALIAN LIRA	CANADIAN DOLLAR	JAPANESE YEN
1960	-6.6	4.3	11.4	-22.8	-5.0	5.5	-6.5
1961	-5.9	11.2	11.6	-14.8	-1.7	1.2	-8.5
1962	-3.9	11.8	11.9	-14.3	-1.2	-1.9	-5.2
1963	-3.7	11.7	11.8	-13.6	-1.6	-2.1	-6.2
1964	-2.8	11.5	11.9	-13.7	-1.9	-1.4	-3.2
1965	-2.4	12.2	12.3	-13.6	-0.5	-1.4	-3.7
1966	-1.7	12.5	11.4	-12.4	-0.2	-2.0	-3.3
1967	0.3	0.5	14.7	-11.2	1.7	-0.5	-1.8
1968	-0.2	- 0.7	13.2	-11.4	1.4	0.2	-0.6
1969	-0.4	0.0	- 0.4	- 1.7	1.0	-0.6	-0.4
1970	-1.4	- 0.5	0.1	- 0.4	1.3	6.1	0.7
1971	-5.7	1.4	- 0.8	5.6	0.6	5.1	11.9
1972	-6.1	- 7.6	0.4	6.9	1.8	6.1	16.6
1973-Jan.	-6.1	- 5.6	2.1	7.8	1.2	5.6	16.6
1973-Feb.	-11.4	- 8.5	5.6	11.1	-4.0	4.2	24.1
1973-Mar.	-11.2	- 7.6	6.4	12.6	-6.2	3.8	26.0
1973-Apr.	-11.1	- 7.0	5.9	13.1	-7.6	3.3	26.2
1973-May	-12.5	- 6.1	8.6	15.1	-9.3	3.4	25.6
1973-June	-14.2	- 8.6	10.5	23.0	-12.2	2.7	24.4
1973-July	-14.5	-12.7	8.4	25.9	-15.3	2.4	24.9
1973-Aug.	-13.2	-12.3	5.7	23.2	- 9.2	2.4	24.8
1973-Sept.	-13.7	-15.3	6.3	24.0	-10.1	2.4	24.0
1973-Oct.	-13.7	-14.1	7.4	22.9	-11.2	3.0	23.5
1973-Nov.	-11.1	-15.0	5.5	19.9	-12.9	3.9	19.5
1973-Dec.	-10.5	-15.0	2.5	18.5	-11.4	4.6	19.8
1974-Jan.	-8.5	-14.9	-3.4	18.9	-17.7	6.2	13.5

See later calculations to end of this all attached doc-

B

OECD Currencies
Comparison of Alternative Methods
of Calculating Trade-Weighted
Exchange Rate Change of the U.S. Dollar
(Percent Change Since May 29, 1970)

	Old Method		Revised Method
	Average Appreciation (+) or Depreciation (-) of Other (OECD) Currencies Against the Dollar 1/	Average Appreciation (+) or Depreciation (-) of the Dollar Against Other (OECD) Currencies 2/	Effective Appreciation (+) or Depreciation (-) of the Dollar Against Other (OECD) Currencies
AS OF: (End of Period)			
Jan 1973	+ 10.4	- 9.0	- 9.8
Feb 1973	+ 17.7	- 14.1	- 16.1
Mar 1973	+ 17.3	- 13.8	- 15.8
Apr 1973	+ 17.1	- 13.5	- 15.6
May 1973	+ 19.3	- 15.1	- 17.4
Jun 1973	+ 22.0	- 16.5	- 19.6
Jul 1973	+ 22.5	- 16.6	- 19.8
Aug 1973	+ 20.5	- 15.5	- 18.3
Sep 1973	+ 21.3	- 15.9	- 18.9
Oct 1973	+ 21.3	- 16.0	- 18.9
Nov 1973	+ 17.2	- 13.5	- 15.5
Dec 1973	+ 16.1	- 12.8	- 14.7
Jan 1974	+ 13.2	- 10.7	- 12.0

1/ Average of the percentage change in the dollar cost of foreign currencies weighted by total trade shares.

2/ Average of the percentage change in the foreign currency cost of dollars weighted by total trade shares.

All (49) Currencies
Comparison of Alternative Methods
of Calculating Trade-Weighted
Exchange Rate Change of the U.S. Dollar
(Percent Change Since May 29, 1970)

	Old Method		Revised Method
AS OF: (End of Period)	Average Appreciation (+) or Depreciation (-) of Other Currencies Against the Dollar 1/	Average Appreciation (+) or Depreciation (-) of the Dollar Against Other Currencies 2/	Effective Appreciation (+) or Depreciation (-) of the Dollar Against Other Currencies
Jan 1973	+ 5.8	- 3.8	- 4.8
Feb 1973	+11.8	- 8.3	-10.1
Mar 1973	+11.5	- 8.0	- 9.9
Apr 1973	+11.3	- 7.8	- 9.7
May 1973	+12.9	- 8.9	-11.0
Jun 1973	+15.0	-10.1	-12.7
Jul 1973	+15.3	-10.1	-12.9
Aug 1973	+13.8	- 9.3	-11.7
Sep 1973	+14.4	- 9.3	-11.9
Oct 1973	+14.4	- 9.4	-12.0
Nov 1973	+11.4	- 7.6	- 9.5
Dec 1973	+10.7	- 7.1	- 8.9
Jan 1974	+ 8.6	- 5.5	- 6.9

1/ Average of the percentage change in the dollar cost of foreign currencies weighted by total trade shares.

2/ Average of the percentage change in the foreign currency cost of dollars weighted by total trade shares.

Revision of Method for Calculating Effective Exchange Rate Changes

I. Summary

During the negotiations leading to the Smithsonian realignment, OASIA staff developed calculations of "weighted average" or "effective" exchange rate changes, in which changes in individual countries' exchange rates were weighted on the basis of bilateral trade patterns. The method of calculation utilized produced two alternative measurements of percentage change: (1) the average appreciation or depreciation of currencies in the model against the local currency; and (2) the reciprocal--the average appreciation or depreciation of the local currency against all other currencies in the model. This method yielded satisfactory results as long as the nominal changes in exchanges rates were relatively small. However, if the nominal changes become large, as has been the case in recent months, the difference between the reciprocal measurements cited above also becomes quite large. The revised method described in this paper calculates a single number representing a currency's effective exchange rate change.

The weighting technique described below takes into account not only the distribution of total trade among the countries in the model--as did the earlier version--but also any differences between the geographic distribution of countries' exports and that of their imports. This approach (which is similar in many respects to that used by Morgan Guaranty) permits calculation of a single average exchange rate change for each country, thereby avoiding the ambiguity inherent in the earlier version (and in some other models in use outside Treasury).

In addition to respecification of the estimating equations, the country coverage in the model has been expanded from 22 OECD countries to a total of 49 countries. These countries account for about 90 percent of total U.S. trade (as compared to about 69 percent in the earlier version) and for more than 90 percent of the trade of most other OECD countries. Finally, the trade data base has been updated from 1970 to 1972.

II. Country Coverage

The earlier version of the model covered 22 OECD countries. Estimates of average exchange rate changes against the "world" were based on highly arbitrary assumptions about "rest of world" exchange rate changes. In order to provide a more comprehensive estimate of effective exchange rate changes, the country coverage has been expanded to include 26 additional countries as well as the OECD countries (now 23). Selection of the 26 additional countries was based on their share of total world trade in 1972. This expansion of country coverage not only

reduces the need for arbitrary assumptions about exchange rate movements for the excluded countries but also allows calculation of effective exchange rate changes for the major non-industrialized countries.

As a result of the increase in the number of countries included in the model, the trade coverage is greatly expanded. Countries now included account, on average, for 94.5 percent of the imports and 93.7 percent of the exports of OECD countries (1972 trade). The countries included and the proportion of OECD countries' trade covered are listed at Attachment A.

III. Trade Weights

The trade weights have been updated to utilize the 1972 bilateral trade data reported in the International Monetary Fund publication, Direction of Trade. The application of the trade weights is described in the following section.

IV. Weighting Procedures and Estimating Equations

The model uses three separate weighting steps--based on import shares, export shares and total trade respectively.

A. Average Exchange Rate Change Based on Import Shares

Of interest is the effect of an exchange rate change on the average local currency cost of foreign exchange needed for a country's imports. The equation for calculating this average is as follows:

$$\text{EQ 1:} \quad EFFXRM_i = \sum_{j=1}^{n} \Delta LCU_i/FCU_j * M_{ij}/\sum_{j=1}^{n} Mij$$

where: $EFFXRM_i$ is the average local currency cost of foreign exchange.

$\Delta LCU_i/FCU_j$ is the percent change in the local currency cost of foreign currency j.

$M_{ij}/\sum_{j=1}^{n} M_{ij}$ is the proportion of country i's total imports purchased from country j.

B. Average Exchange Rate Change Based on Export Shares

The obverse of Equation 1 is the effect of an exchange rate change on the average foreign exchange cost of the local currency needed by foreigners to pay for their imports from the country concerned. The equation for calculating this average is as follows:

$$\text{EQ 2:} \quad EFFXRX_i = \sum_{j=1}^{n} \Delta FCU_{j}/LCU_i * X_{ij}/\sum_{j=1}^{n} X_{ij}$$

where: $EFFXRX_i$ is the average foreign currency cost of local currency i.

$\Delta FCU_j/LCU_i$ is the percent change in the foreign currency (j) cost of local currency.

$X_{ij}/\sum_{j=1}^{n} X_{ij}$ is the proportion of country i's total exports sold to country j.

C. Average Exchange Rate Change Based on Overall Trade Shares

In the earlier version of the model, estimates were obtained by measuring the change in the local currency cost of foreign currencies, weighting each individual change by the foreign country's share of the total trade of the "home" country, and averaging the results. This yielded a weighted average appreciation or depreciation of all other currencies in the model against the currency concerned. The reciprocal of this is the change in the foreign currency cost of the local currency, weighted and averaged in the same way. This alternative yielded an estimate of the effective appreciation or depreciation of the currency concerned against all other currencies in the model.

This approach did not raise major difficulties so long as the percentage changes in exchange rates were relatively small. However, the greater the exchange rate change the greater is the difference between the reciprocal measurements and the ambiquity inherent in this formulation.

In addition, this technique utilized total trade shares for weights, regardless of which measurement of exchange rate change was used. It seemed preferable to calculate the import and export averages separately, using the appropriate measure of exchange rate change in each case, and to combine these two averages in a subsequent step to obtain a single estimate of the overall effective exchange rate change.

In order to combine the import and export calculations and to overcome the reciprocal problem, the following equation is utilized in the revised model for estimating the overall effective exchange rate change:

$$EQ\ 3:\quad EFFXR_i = \left[\left(\sum_{j=1}^{n} \left[\Delta LCU_i / FCU_j * M_{ij} / \sum_{j=1}^{n} M_{ij} \right] * -1 \right) * M_i / M_i + X_i \right] + \left[\left(\sum_{j=1}^{n} \left[\Delta FCU_j / LCU_i * X_{ij} / \sum_{j=1}^{n} X_{ij} \right] \right) * \frac{X_i}{M_i + X_i} \right]$$

where: M_i/M_i+X_i is country i's imports as a percent of its total trade.

X_i/M_i+X_i is country i's exports as a percent of its total trade.

This equation weights the import effect (Equation 1) and the export effect (Equation 2) according to the size of a country's imports and exports respectively in relation to its total trade, and combines the two to produce a single figure for effective change.

V. Model Capabilities

The model is constructed so that an effective exchange rate change can be estimated for any desired time period and against any base date. The model also has a subroutine for calculating effective changes on the basis of par value changes relative to the SDR (in percentage terms) rather than changes in actual market rates.

Up to eight separate country groupings can be specified in each run in addition to the entire 49 country grouping, e.g. effective exchange rate change against the OECD, against the EC, against the G-10, etc.

The model has several option statements which control the output of each run. Generally, tables are printed showing the nominal and effective exchange rate change for each of the countries specified. Trade shares and values can also be printed at the user's option. A separate memorandum covering the program documentation provides a complete description of the options available and the specification of country inclusion.

Attachment B lists effective exchange rate changes for each country against all of the remaining 48 countries covered, and, for the OECD countries, changes against that smaller group, over the period May 1970 to January 31, 1974.

L. Britt Swofford
Treasury/OASIA
Office of International
Monetary Affairs
February 12, 1974

ATTACHMENT A

COUNTRY COVERAGE IN THE REVISED EFFECTIVE EXCHANGE RATE MODEL

OECD Countries	Other Countries
United States	Yugoslavia
United Kingdom	South Africa
Austria	Argentina
Belgium-Lux	Brazil
Denmark	Chile
France	Mexico
Germany	Peru
Italy	Egypt
Netherlands	Iran
Norway	Iraq
Sweden	Israel
Switzerland	Kuwait
Canada	Saudi Arabia
Japan	Taiwan
Finland	Hong Kong
Greece	India
Iceland	Indonesia
Ireland	Korea
Portugal	Malaysia
Spain	Pakistan
Turkey	Philippines
Australia	Singapore
New Zealand	Thailand
	Libya
	Nigeria
	Zambia
	Rest of World

Trade Coverage in the Revised Effective Exchange Rate Model

(percent)

	Percent of Imports	Percent of Exports
U.S.	90.4	89.0
U.K.	93.1	90.6
Austria	98.0	97.4
Bel-Lux	95.2	96.4
Denmark	96.4	92.8
France	90.0	84.4
Germany	95.2	94.3
Italy	94.2	92.7
Netherlands	96.1	94.4
Norway	96.5	94.1
Sweden	95.6	95.9
Switzerland	98.3	95.7
Canada	95.1	97.3
Japan	93.4	90.8
Finland	97.3	98.2
Greece	98.6	92.4
Iceland	96.3	99.0
Ireland	97.0	98.8
Portugal	82.3	79.5
Spain	91.2	87.6
Turkey	93.6	92.9
Australia	98.0	99.7
New Zealand	88.5	87.7

ATTACHMENT B

TRADE-WEIGHTED AVERAGE APPRECIATION (+) OR DEPRECIATION (-) OF CURRENCY CONCERNED VIS-A-VIS OTHER CURRENCIES

FROM MAY 29, 1970 TO JANUARY 31, 1974

Country	Against All Currencies	Against OECD Currencies
United States	-6.94	-12.04
United Kingdom	-13.95	-17.99
Austria	10.26	7.60
Belgium-Lux	2.88	0.97
Denmark	4.20	2.38
France	-2.44	-5.86
Germany	20.12	16.97
Italy	-16.16	-19.92
Netherlands	9.93	7.34
Norway	10.11	8.60
Sweden	-1.01	-3.32
Switzerland	18.20	15.48
Canada	6.50	5.85
Japan	14.83	11.95
Finland	0.85	-0.46
Greece	-3.32	-5.20
Iceland	1.28	0.26
Ireland	-6.89	-7.16
Portugal	0.46	-1.93
Spain	13.60	11.01
Turkey	-62.06	-63.29
Australia	21.95	19.52
New Zealand	14.28	13.35
Yugoslavia	-33.22	
South Africa	0.15	
Argentina	-29.28	
Brazil	-35.77	
Chile	-184.91	
Mexico	-2.28	
Peru	-15.95	
Egypt	2.85	
Iran	0.55	
Iraq	16.74	
Israel	-26.24	
Kuwait	12.98	
Saudi Arabia	17.19	
Taiwan	-3.38	
Hong Kong	13.02	
India	-17.13	
Indonesia	-22.74	
Korea	-38.00	
Malaysia	14.01	
Pakistan	-87.43	
Philippines	-19.38	
Singapore	10.84	
Thailand	-9.55	
Libya	12.13	
Nigeria	-69.20	
Zambia	6.40	

Trade-Weighted Average Appreciation (+) or Depreciation (-) of the U. S. Dollar

(Percent change relative to base rates as of May 29, 1970)

As of end of period or date indicated:	Vis-A-Vis OECD currencies	Vis-A-Vis world 1/
Dec. 1971	- 8.2	- 5.7
Dec. 1972	- 9.4	- 6.1
Jan. 1973	- 9.8	- 6.1
Feb. 1973	-16.1	-11.4
Mar. 1973	-15.8	-11.2
Apr. 1973	-15.6	-11.1
May 1973	-17.4	-12.5
Jun. 1973	-19.6	-14.2
Jul. 1973 2/	-19.8	-14.5
Aug. 1973	-18.3	-13.2
Sep. 1973	-18.6	-13.7
Oct. 1973	-18.9	-13.7
Nov. 1973	-15.5	-11.1
Dec. 1973	-14.7	-10.5
Jan. 1974	-12.0	- 8.5
Feb. 1974	-15.0	- 9.0
Mar. 1974	-17.3	-10.7
April 4, 1974	-16.9	-10.4
April 11, 1974	-16.6	-10.2
April 18, 1974	-17.1	-10.5
April 25, 1974	-17.7	-11.0

Percent Change As of April 25, 1974

Since:		
May 29, 1970 (Pre-Canadian Float)	-17.74	-10.96
Smithsonian	- 8.09	N.A.
February 1973 Realignment	- 1.55	- 0.94
March 20, 1973 (Post EC Float)	- 1.50	- 1.37
April 18, 1974	- 0.65	- 0.44

1/ Against the currencies of 48 countries which account for approximately 90% of U.S. total trade.

2/ On July 6, 1973, the dollar reached its lowest level of effective depreciation during the measurement period. Measured against the May 29, 1970 base rates, the effective depreciation was 20.81% vis-a-vis the OECD.

TRADE-WEIGHTED AVERAGE APPRECIATION (+)
or Depreciation (-) of Currency Concerned
VIS-A-VIS OTHER OECD CURRENCIES
(Percent change relative to base rates as of May 29, 1970)

As of end of period or date indicated.	U.S. Dollar	Canadian Dollar	French Franc	German Mark	Italian Lira	Japanese Yen	U.K. Pound
Dec 1971	- 8.2	+5.2	-2.2	+ 4.0	- 1.1	+10.6	0
Dec 1972	- 9.4	+5.7	-1.4	+ 5.1	- 0.4	+14.3	- 9.9
Jan 1973	- 9.8	+5.1	-0.4	+ 5.4	- 1.5	+14.2	- 9.1
Feb 1973	-16.1	+3.7	+2.2	+ 8.2	- 7.4	+22.2	-12.4
Mar 1973	-15.8	+3.3	+3.1	+ 9.7	- 9.5	+24.2	-11.5
Apr 1973	-15.6	+2.8	+2.7	+10.3	-10.8	+24.5	-10.7
May 1973	-17.4	+2.9	+4.6	+11.8	-13.3	+23.5	-10.6
Jun 1973	-19.6	+2.1	+5.4	+19.0	-17.4	+22.0	-13.8
Jul 1973	-19.8	+1.8	+3.2	+21.7	-20.8	+22.7	-18.2
Aug 1973	-18.3	+1.9	+1.1	+19.4	-13.9	+22.8	-17.1
Sep 1973	-18.6	+1.8	+1.5	+20.0	-15.0	+21.8	-20.4
Oct 1973	-18.9	+2.4	+2.5	+18.0	-16.3	+21.1	-19.3
Nov 1973	-15.5	+3.5	+1.7	+16.8	-16.8	+17.4	-19.1
Dec 1973	-14.7	+4.2	-0.4	+15.6	-14.8	+18.0	-18.9
Jan 1974	-12.0	+5.9	-5.9	+17.0	-19.9	+12.1	-18.0
Feb 1974	-15.0	+7.3	-3.1	+18.0	-21.3	+15.1	-19.1
Mar 1974	-17.3	+5.8	-5.7	+20.5	-20.1	+19.4	-17.8
April 25, 1974	-17.7	+7.5	-8.4	+22.9	-23.0	+18.6	-17.7

Percent Change As Of April 25, 1974

Since:							
Smithsonian	- 8.09	+2.60	-7.04	+18.16	-22.63	+ 5.89	-18.58
Feb. 1973 Realignment	- 1.55	+3.73	-10.41	+14.46	-15.30	- 3.44	- 4.59

TO: Messrs. Volcker, Hennessy, Bennett,
Willis, Widman, Cross, Lederer,
Schotta and Ranson

February 8, 1973

FROM: Thomas D. Willett TW

I thought you might find of interest the attached comments by Gottfried Haberler on Art Laffer's recent article in the Wall Street Journal.

Attachment

OASIA:RESEARCH:TDWillett:MGJ 2/8/73

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OPTIONAL FORM NO. 10
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UNITED STATES GOVERNMENT

Memorandum

FOR INFORMATION

TO : Deputy Assistant Secretary Willett
(Through: Charles Schotta)

DATE: January 31, 1973

FROM : Sung Kwack and David Coe

SUBJECT: Relation of U.S. Global Trade Balance to the Global Balances of Major Foreign Countries: Revision

The Canadian and Japanese data used in the empirical work reported in the memo of January 11, 1973 was found to be inconsistent with the balance of payments data from those countries. This is especially serious in the case of Japan whose imports on a "customs clearance" basis include foreign military supplies shipped to Japan.

We have, therefore, re-estimated the equations and given them in Table 1. The notable change in our finding is that the importance of Canada's trade balance as an explainatory variable has changed with time. However, the substance of our findings is unchanged; we summarize the findings below:

1. The global balances of the U.S., Canada, Japan and West Germany are offsetting in the sense that one can improve its balance only at the expense of the others.

2. Canada's global balance does not appear to significantly affect the U.S. global balance. We treat this finding tentatively because of multicollinearity between the foreign global balances.

3. Changes in Japan's global balance have the largest negative impact on the U.S. balance.

The magnitude of each coefficient indicates the change in the U.S. global balance resulting from a change in a foreign global balance, when the remaining foreign global balances are constant. It is, however, extremely unlikely that the underlying ceteris paribus assumption is valid.

Solely to illustrate the importance of interactions of foreign global balances on the U.S. global balance, we have constructed a very naive three equation recursive model where Japan's global balance is the only exogenous variable. The estimated equations of the model are attached in Table 2. Using the model we find that one billion dollar deterioration

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in Japan's global balance will improve the U.S. global balance by 0.974 billion dollars. This figure differs from an improvement of 0.817 billion dollars obtained with the ceteris paribus assumption. We note, however, that the difference between the two values is marginally significant. This is due to the incomplete specifications of the model, indicating the need of further intensive work.

The relationship between the U.S. and foreign global balances estimates for 60:1-71:4 is typical and is shown in Figure 1. We know from Table 1 that the standard error of estimates is 1.648 billion dollars. If the sum of Canada, Japan and West Germany's global balance is a 17.0 billion dollar surplus in 1972 and if we use a 2.0 standard error criteria, then the U.S. global balance will be a 6.1 billion dollar deficit. For the case in which the sum of the foreign global balances is zero, the U.S. global balance is expected to be a surplus from 3.5 to 8 billion dollars.

Attachments including data set

cc: Messrs. Widman, Cline

TABLE 1

United States Trade Balance Equations

	$\bar{R}^2$	SEE	DW	SSR
A. Sample Period 1960:1 to 71:4				
$BAL_{US} = \underset{(16.96)}{6.189} - \underset{(10.14)}{0.529}^{*} (BAL_{CA} + BAL_{JP} + BAL_{WG})$	0.684	1.648	1.514	124.9
$BAL_{US} = \underset{(14.19)}{5.907} + \underset{(0.02)}{0.008}^{*} BAL_{CA} - \underset{(6.05)}{0.818}^{*} BAL_{JP} - \underset{(1.93)}{0.359}^{*} BAL_{WG}$	0.706	1.590	1.809	111.3
$BAL_{US} = \underset{(14.37)}{5.906} - \underset{(6.90)}{0.817}^{*} BAL_{JP} - \underset{(2.08)}{0.357}^{*} BAL_{WG}$	0.712	1.573	1.806	111.3
B. Sample Period 1962:1 to 71:4				
$BAL_{US} = \underset{(14.16)}{6.341} - \underset{(9.31)}{0.546}^{*} (BAL_{CA} + BAL_{JP} + BAL_{WG})$	0.687	1.700	1.588	109.8
$BAL_{US} = \underset{(12.68)}{6.053} + \underset{(0.05)}{0.020}^{*} BAL_{CA} - \underset{(5.88)}{0.847}^{*} BAL_{JP} - \underset{(1.93)}{0.372}^{*} BAL_{WG}$	0.712	1.632	1.911	95.8
$BAL_{US} = \underset{(12.86)}{6.053} - \underset{(6.63)}{0.843}^{*} BAL_{JP} - \underset{(2.07)}{0.368}^{*} BAL_{WG}$	0.720	1.610	1.902	95.9
C. Sample Period 1960:1 to 70:4				
$BAL_{US} = \underset{(15.70)}{5.864} - \underset{(6.68)}{0.433}^{*} (BAL_{CA} + BAL_{JP} + BAL_{WG})$	0.504	1.568	1.500	103.3
$BAL_{US} = \underset{(13.90)}{5.856} - \underset{(0.36)}{0.141}^{*} BAL_{CA} - \underset{(2.96)}{0.584}^{*} BAL_{JP} - \underset{(2.19)}{0.416}^{*} BAL_{WG}$	0.489	1.591	1.657	101.3
$BAL_{US} = \underset{(14.14)}{5.869} - \underset{(3.56)}{0.617}^{*} BAL_{JP} - \underset{(2.48)}{0.440}^{*} BAL_{WG}$	0.500	1.574	1.748	101.6
D. Sample Period 1960:1 to 69:4				
$BAL_{US} = \underset{(15.47)}{6.111} - \underset{(6.45)}{0.525}^{*} (BAL_{CA} + BAL_{JP} + BAL_{WG})$	0.510	1.551	1.639	91.4
$BAL_{US} = \underset{(14.16)}{5.988} - \underset{(1.69)}{0.995}^{*} BAL_{CA} - \underset{(3.04)}{0.596}^{*} BAL_{JP} - \underset{(1.79)}{0.342}^{*} BAL_{WG}$	0.500	1.567	1.548	88.4
$BAL_{US} = \underset{(13.75)}{5.946} - \underset{(3.62)}{0.694}^{*} BAL_{JP} - \underset{(2.52)}{0.459}^{*} BAL_{WG}$	0.476	1.605	1.739	95.3

Notes: 1. BAL_k = Global trade balance of country k, k = US (U.S.), CA (Canada), JP (Japan), and WG (West Germany), Bil of U.S. $, Annual Rates.

2. $\bar{R}^2$ Stands for the percentage of variance esplained corrected for degrees of freedom, SEE is the standard error of the estimate, DW is the Durbin-Watson statistic, and SSR is the sum of squared residuals.

3. Figures in () are T-ratios.

TABLE 2

Illustrative Global Balance Model

Sample Period 1960:1 to 71:4	$\bar{R}^2$	SEE	DW	SSR
$BAL_{CA} = \underset{(2.01)}{0.259} + \underset{(6.35)}{0.258}^{*} BAL_{JP}$	0.456	0.700	0.720	22.6
$BAL_{WG} = \underset{(6.21)}{1.519} + \underset{(2.55)}{0.258}^{*} BAL_{JP} + \underset{(2.64)}{0.707}^{*} BAL_{CA}$	0.464	1.273	0.733	73.0
$BAL_{US} = \underset{(14.37)}{5.906} - \underset{(6.90)}{0.817}^{*} BAL_{JP} - \underset{(2.08)}{0.357}^{*} BAL_{WG}$	0.712	1.573	1.806	111.3

$$BAL_{US} = -\left[0.817 + \left((-0.357)^{*}(0.258) \right) + \left((-0.357)^{*}(0.707)^{*}(0.258) \right)\right]^{*} BAL_{JP}$$

$$= -0.974^{*} BAL_{JP}$$

TABLE 3

Data Used in Estimation of U.S. Trade Balance Equations

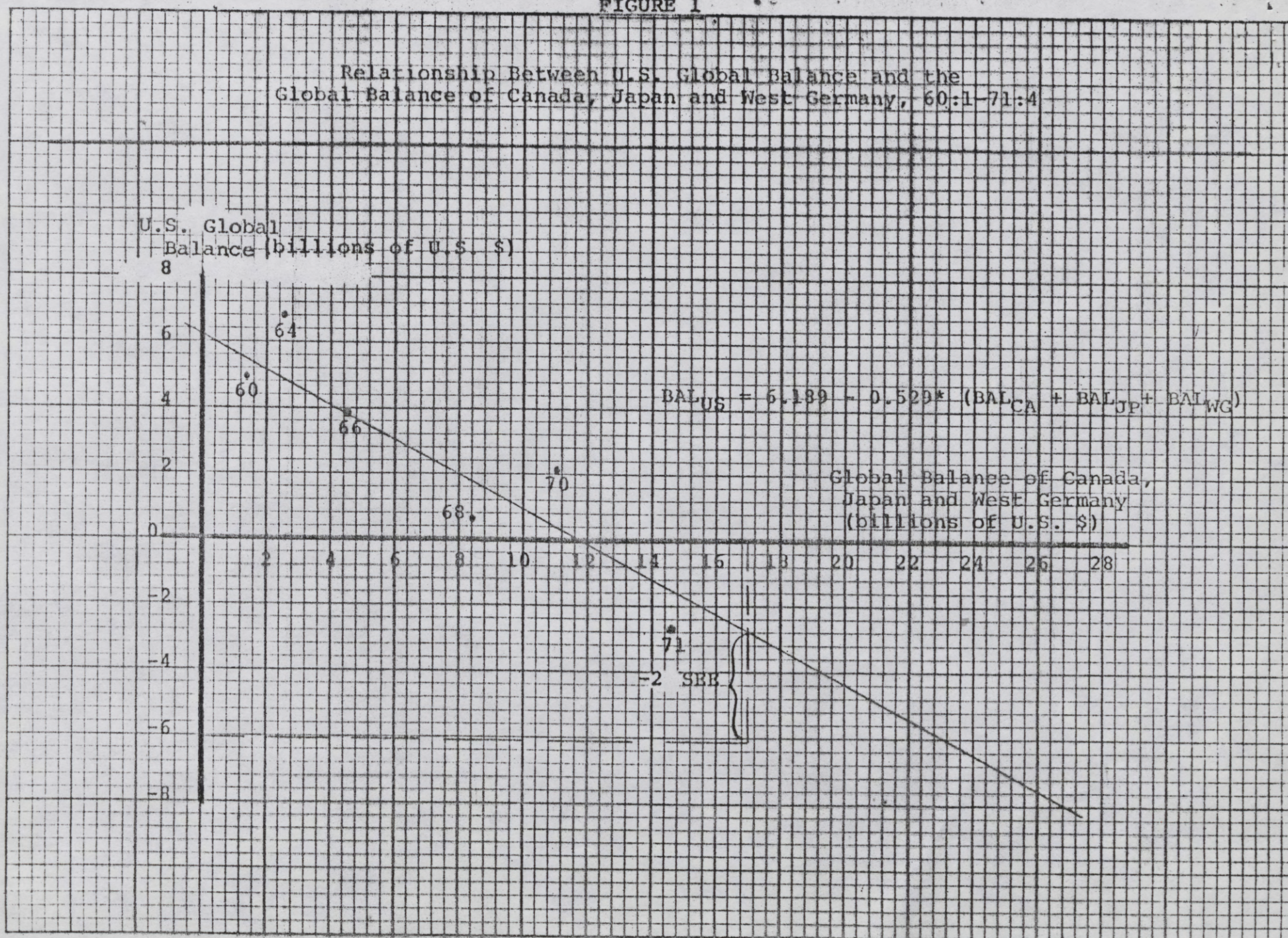
	U.S. Global Trade Balance	Global Trade Balances of Major Countries				Total Global Balances
		Sum	Canada	Japan	West Germany	
	(1)	(2)=(3)+(4)+(5)	(3)	(4)	(5)	(6) = (1)+(2)
Mean (60:1-71:4)	3.380	5.308	0.767	1.970	2.571	8.688
Standard Deviation	2.933	4.606	0.949	2.515	1.739	2.713
1960:1	3.316	0.885	-0.181	-0.252	1.318	4.201
2	4.780	0.135	-0.768	0.064	0.838	4.915
3	4.712	1.834	0.337	0.396	1.101	6.546
4	6.816	2.611	0.000	0.860	1.751	9.427
1961:1	6.632	1.315	0.024	-0.580	1.871	7.947
2	6.024	0.703	-0.125	-0.892	1.720	6.727
3	4.128	1.567	0.535	-0.692	1.724	5.695
4	5.568	1.433	0.232	-0.068	1.270	7.001
1962:1	4.444	0.078	0.008	-0.548	0.619	4.522
2	5.692	0.882	-0.149	0.092	0.939	6.574
3	3.940	2.088	0.271	0.848	0.969	6.036
4	4.160	2.702	0.528	1.224	0.950	6.862
1963:1	4.320	0.557	0.275	-0.468	0.750	4.877
2	6.136	1.076	0.275	-0.384	1.186	7.212
3	3.788	1.844	0.559	0.016	1.269	5.632
4	6.720	3.780	0.757	0.168	2.856	10.500
1964:1	7.368	1.302	0.130	-1.232	2.405	8.670
2	7.052	2.317	0.559	-0.228	1.986	9.369
3	5.288	2.985	1.316	0.980	0.688	8.273
4	7.616	3.624	0.596	1.988	1.040	11.240
1965:1	4.136	1.704	-0.149	0.748	1.104	5.840
2	6.384	1.458	-0.100	1.604	-0.046	7.842
3	3.540	2.756	0.600	2.608	-0.453	6.296
4	5.708	3.333	0.086	2.644	0.604	9.041
1966:1	4.848	2.360	0.037	1.480	0.843	7.208
2	4.624	2.988	-0.182	1.796	1.374	7.612
3	1.952	5.857	0.829	2.764	2.264	7.809
4	4.284	6.706	0.148	3.060	3.498	10.990
1967:1	4.152	5.392	0.426	0.608	4.358	9.544
2	5.592	5.249	0.104	0.684	4.461	10.841
3	3.192	5.964	0.372	1.800	3.792	9.156
4	2.500	7.050	1.201	1.548	4.301	9.550
1968:1	1.044	5.788	0.969	0.472	4.347	6.832
2	1.752	7.077	1.454	2.184	3.439	8.829
3	-0.688	9.267	1.722	3.380	4.164	8.579
4	0.388	11.508	0.962	4.080	6.466	11.896
1969:1	0.512	5.853	0.856	2.240	2.757	6.365
2	0.524	7.878	0.301	3.652	3.925	8.402
3	-0.824	9.102	0.830	4.268	4.003	8.278
4	2.428	11.037	1.078	4.636	5.322	13.465
1970:1	2.636	7.781	2.256	2.316	3.209	10.417
2	4.012	9.391	2.307	3.380	3.705	13.403
3	0.640	11.905	2.788	4.420	4.697	12.545
4	1.152	15.161	3.829	5.736	5.596	16.313
1971:1	1.900	10.899	2.646	4.220	4.033	12.799
2	-3.112	12.771	2.145	6.992	3.634	9.659
3	-4.308	17.814	2.363	9.956	5.495	13.503
4	-5.236	17.006	1.776	9.980	5.250	11.770

Notes: 1. All figures are in billions of U.S. dollars, at annual rates; a negative figure represents a deficit.

2. All data is f.o.b. except for West German imports which are c.i.f. (as reported in their balance of payments statistics).

SOURCES: United States, Survey of Current Business, BOP Table 2.
Canada, Bank of Canada Review and Bank of Canada Statistical Summary, Balance of International Payments.
Japan, Balance of Payments Monthly and Balance of Payments of Japan, Summary Table.
West Germany, Monthly Report of the Deutsche Bundesbank, Supplement #3.

FIGURE 1



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OPTIONAL FORM NO. 10
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UNITED STATES GOVERNMENT

Memorandum

TO : Deputy Assistant Secretary Willett DATE: January 29, 1973

FROM : Hang-Sheng Cheng H.S.C

SUBJECT: Exodus of U.S. Companies: A Likely Result of the Burke-Hartke Bill?

The question was asked if U.S. companies could not avoid the increased tax burden on their foreign-source incomes imposed by the Burke-Harke bill, by becoming incorporated abroad instead of in the U.S.

After consultations with tax experts in the Treasury, the answer obtained is as follows:

(a) The "exodus" of U.S. companies in the sense described above is unlikely to occur, because U.S. incorporation is valuable to U.S. companies, and because there exist less costly ways of avoiding Burke-Hartke without their having to relinquish U.S. incorporation.

(b) For companies with U.S. earnings, a far more attractive method would be through a "spin-off reorganization," to be described below. However, even in this case, the company would incur a tax on the accumulated earnings retained abroad, which in certain cases might be large enough to be a significant deterrent to such an operation.

(c) Various other methods might be employed to avoid the effect of the Burke-Hartke bill, But, they appear to be either of limited applicability or involving undesirable features.

(d) In short, companies should be able to find ways to circumvent the Burke-Hartke without giving up their U.S. incorporation. The extent to which they would be able to get around Burke-Hartke and the method used should vary according to the specific circumstances.

I would like to record that the following analysis relies heavily on the expert knowledge on the subject of Mr. Thomas Bissell of the Treasury General Councel's office. However, he wishes to take neither credit nor blame for the final version that appears below.

US/3/906

A number of possible methods for U.S. companies to circumvent the Burke-Hartke bill are described in the following. They are for illustrative purposes, not meant to be exhaustive.

(1) Dissolution and Reincorporation Abroad of the U.S. Company. In this case, the U.S. company would transfer all its assets -- including U.S. operating assets and stock of foreign subsidiaries -- to a foreign corporation located in a tax-haven country, and issues shares in the new foreign corporation to its shareholders in exchange for their shares in the U.S. company. The company's present shareholders would thus become shareholders in the new foreign corporation. The company would conduct its U.S. operations in the form of a U.S. branch, while the foreign subsidiaries would continue to exist as separate corporations owned by the new foreign corporation.

If the U.S. company which contemplates such a reincorporation is widely held by a number of shareholders, its foreign subsidiaries would not be classified as a "controlled foreign corporation" after the reincorporation, so that U.S. tax on the earnings of the foreign subsidiaries would continue to be deferred until remitted to the United States as dividends. This is because a "controlled foreign corporation" is defined in the Burke-Hartke bill as a foreign corporation in which more than 50 percent of the voting power is owned by U.S. shareholders each owning more than 10 percent of the foreign corporation.*

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* Thus, a foreign corporation that is owned by 11 U.S. shareholders each owning 9 percent of the voting power of the foreign corporation would not be a "controlled foreign corporation." However, if five U.S. shareholders each own 11 percent, it would be considered as a "controlled foreign corporation. In determining a U.S. shareholder's percentage ownership in a foreign corporation, indirect ownership rules are applied where there are intervening foreign corporations. Thus, where stock in a foreign corporation is indirectly held by U.S. shareholders through a foreign company, the stock in the second-tier foreign subsidiary is deemed as owned proportionately by the U.S. shareholders.

The U.S. income tax treatment of the new foreign corporation and its U.S. shareholders after the reincorporation described above would be substantially the same as if is at present. The U.S. operations, which would thereafter be conducted as a U.S. branch of a foreign corporation, would continue to be taxed at the regular corporate income tax rates. Since the United States does not impose a tax on profits remitted by a U.S. branch of a foreign corporation to its home office abroad, after-tax profits could be remitted to the tax haven free of withholding tax. Presumably the tax haven would impose no profits tax on the new foreign corporation and no withholding tax on dividends, with the result that such profits could be distributed to the U.S. shareholders without a further tax on the corporation. The U.S. shareholders would then be taxed by the United States on the dividends at the rates applicable to each of them, as at present. Since the provisions of the Burke-Hartke bill would not apply, any U.S. corporate shareholder in the new foreign corporation which indirectly owned at least 5 percent of the stock of any foreign operating subsidiary, would be entitled to a deemed-paid foreign tax credit under the Internal Revenue Code with respect to its pro rata share of the foreign taxes paid by such foreign subsidiaries.

In order for the reorganization to be accomplished, however, the Internal Revenue Service would have to give its advance approval. Under present I.R.S. practice, the U.S. corporation would not be permitted to transfer its U.S. operating assets and the stock of its foreign subsidiaries to a new foreign corporation unless it first included in its income (1) the unrealized gain from certain of its domestic operating assets, such as inventory, accounts receivable, and U.S. patents, and (2) the unrealized gain on the stock of its foreign subsidiaries. To the extent that a foreign subsidiary had undistributed earnings, the capital gain on the stock would be taxed to the U.S. company as a dividend on which the U.S. company would be entitled to a foreign tax credit for foreign taxes paid in previous years, provided the company acted before the Burke-Hartke bill became law. Depending on the particular facts, therefore, a U.S. company might feel that the taxes which would have to be paid currently were too large relative to the expected future tax savings to be realized from the operation.

Moreover, there might also be serious business objections to reincorporating a U.S. company abroad. The United States might change its tax laws to impose a withholding tax on profits remitted abroad by a U.S. branch. The foreign tax

haven might in some future year impose an income tax and dividend-withholding tax on the new foreign corporation, and even attempt to expropriate some or all of the property of the corporation or impose serious restrictions on operating in the particular foreign country. There would also be substantial problems involving the interest equalization tax which would affect the value of the company's outstanding stock and might hinder future flotations of stock and bonds in the United States.

(2) Retaining U.S. incorporation of the U.S. parent, but relinquishing control of foreign subsidiaries. A U.S. company which wished to maintain its U.S. incorporation but nevertheless circumvent the provisions of the Burke-Hartke bill could "de-control" its foreign subsidiaries in one of several ways so that the subsidiaries would not be considered as "controlled foreign corporations" in the U.S. tax code.

(a) "Spin-Off Reorganization" -- The U.S. company could distribute all the shares in its foreign subsidiaries to its shareholders, provided that certain I.R.S. rules were satisfied. With the composition of the shareholders largely unchanged, the same board of directors could be elected to operate the foreign subsidiaries.

In order for the stocks of foreign subsidiaries to be transferred to the U.S. company's shareholders without a capital gains tax, however, the undistributed earnings of the foreign subsidiaries would probably first have to be included in the U.S. company's gross income as a dividend, before the I.R.S. would approve the distribution. But, the tax liability in this case should be considerably less than in the preceding case. For, first, only the undistributed earnings of the foreign subsidiaries--not including unrealized capital gain--would be taxed; and, as in (1) above, a tax credit could be taken for foreign taxes paid by the foreign subsidiaries in prior years, provided the company acted before the Burke-Hartke bill became law. Second, no tax need to be paid on the company's U.S. assets as in the preceding case. This factor should be especially important if the company held a large number of U.S. patents.

It should be noted that the I.R.S. has not yet been requested to rule on this type of case. The above analysis thus reflects only the I.R.S.' expectation of the rules that would be applied if such a case arose.

Though conceivable, to what extent the method might be used is open to question. A U.S. company might have serious business reasons against using it. For example, the shareholders in the foreign subsidiaries would probably not be

identical to the shareholders in the U.S. company for long, and the foreign subsidiaries would have to be operated as separate companies for accounting purposes. The same interest equalization tax problems mentioned in (1) above would also arise with respect to the stock and bond of the foreign subsidiaries.

(b) Dividend Distribution of Stock of Foreign Subsidiaries -- The stock of foreign subsidiaries could be distributed by the U.S. company to its shareholders as a dividend rather than as a "spin-off" reorganization. In this case, the accumulated earnings of the foreign subsidiaries would not have to be included in the gross income of the U.S. company, and no I.R.S. approval would be required. The U.S. shareholders, however, would be taxed on the dividend distribution, if the company had any current or accumulated earnings at the time of the distribution. This alternative would, therefore, be attractive only if the U.S. company had no current or accumulated earnings at the time of the dividend distribution. Moreover, the same interest equalization tax and other business problems mentioned in 2(a), would also apply in this case.

(2c) Diluting the ownership or the control of foreign subsidiaries. As noted above, a foreign affiliate is a "controlled corporation" only when more than 50% of its voting power are controlled by U.S. nationals. A. U.S. company could, therefore, reduce its controlling share to less than 51% by issuing additional stocks to foreigners. (Selling off outstanding shares would be an inferior method, as any capital gains would be taxed as dividends). The obvious disadvantage of this method is that the company would lose at least half of its share in the foreign subsidiary's earnings. To the extent economic rent is an important element in these profits, as is commonly the case in foreign direct investment, the company would be most reluctant to do it. Moreover, the company might lose managerial control over the foreign subsidiary, as it would no longer possess the majority voting power in the foreign subsidiary's board of directors.

The method, however, might be attractive to companies with foreign subsidiaries in countries where local participation in the ownership and control would soon be forced upon the company in any event, as a result of the surging economic nationalism in these countries.

A variant of this method would be to sell to foreigners a new class of voting preferred shares of a foreign subsidiary with equal voting power as the common stock, but less shares in the earnings. For instance, the terms of the new preferred stock might be specified such that their foreign holders would control 50% of the foreign subsidiary's voting power,

But share only 5% of its earnings. Thus, the company might be able to remove the foreign subsidiary's status as a "controlled foreign corporation" under the terms of Burke-Hartke, and still retain practically all of its share of the subsidiary's earnings. In so doing, however, the company would expose itself to the risk of losing both the managerial control and its share of earnings to the foreign stockholders who now possessed the voting power to make changes as they saw fit. (A separate agreement, formal or informal, with foreign stockholders to leave control in the parent company's hands would be of no avail, as a recent U.S. Tax Court decision has ruled in a similar case in the "Subpart F subsidary" area to treat a U.S. company with such an agreement as if it owned 100% of the voting power of the foreign subsidiary).

* * *

In conclusion, various methods exist whereby a U.S. company could circumvent the provisions of the Burke-Hartke bill without relinquishing its U.S. incorporation. The precise method which a U.S. company might adopt would depend on the various tax and business considerations suggested above.

cc: Messrs. Widman, Korp, Bissell, Cutler, Kopits, Patrick, Shapiro.

OASIA:Research mah:1/29/73 HSC

January 19, 1973

Summary and Analysis of John Williamson's Paper on the Historical Performance of Objective Indicators

Thomas D. Willett

Williamson compares the historical performance of 12 objective indicators for 14 industrial countries over the period 1961-1971. The "test" consists in seeing how well each indicator signals the existence of each of 62 disequilibrium situations. These disequilibria were identified on primarily subjective grounds. The indicators tested were as follows:

	Indicator	Trigger Point
1.	Spot exchange rates. A premium or discount on parity greater than or equal to	0.36 per cent.
2.	Forward rates. A premium or discount on parity greater than or equal to	0.52 per cent.
3.	Monthly reserve changes. Four or more consecutive monthly reserve increases or decreases greater than	1 per cent.
4.	Annual reserve changes. An increase or decrease of reserves during a year greater than or equal to (i)	12 per cent for gross reserves
	(ii)	16.7 per cent for net reserves.
5.	Reserve levels. A value of actual end-year gross reserves as a proportion of the base level of less than	88 per cent
	or more than	196 per cent.
6.	Reserves/imports. A ratio of reserves/imports (i) above	52.5 per cent
	or below	19.5 per cent for gross reserves
	(ii) above	52 per cent
	or below	12 per cent for net reserves.

Indicators	Trigger Point
7. Export prices. Export prices relative to those of competitors more than different from "equilibrium."	2.9 per cent
8. Wholesale prices. Wholesale prices relative to an average for all industrial countries more than different from "equilibrium."	2.6 per cent
9. Consumer prices. Consumer prices relative to an average for all industrial countries more than different from "equilibrium."	3.4 per cent
10. Unit labor costs. Costs relative to those of competitors more than different from "equilibrium."	4.8 per cent
11. Basic balances.= The basic balance as a percentage of imports greater than or equal to	6.1 per cent.
12. Adjusted basic balance. The adjusted basic balance as a percentage of imports greater than or equal to	6.1 per cent.

The signals given by these indicators, i.e., the situations identified as disequilibria, were compared with a subjectively determined set of "true" disequilibrium, and the various indicators ranked according to the percentage of correct signals they gave minus the percentage of incorrect signals.

I. The Overall Performance of the Indicators

On the whole, I felt that the indicators scored surprisingly well in this test. Williamson concludes that "there is no indicator with a performance that is sufficiently impressive to suggest that it would be wise to adopt a mechanistic role making par changes dependent upon the indicator." (p. 11) He also notes, however, that even though the indicators are far from satisfactory, "the exchange rate performance (i.e., frequency of changes) suggested by a number of the indicators was considerably better than that which actually materialized under the system as it was operated during the 1960's." (p. 12)

Williamson himself seems attracted to the idea of using a fairly broad set of objective criteria "either as presumptive evidence of the need for a par value change or as a trigger to analysis and discussion of the need for such a change." (p. 12)

II. The Comparative Performance of the Indicators

Williamson found that the best performance was given by forward rates, gross reserve levels relative to quotas, the ratio of net reserves to imports, and unadjusted basic balances relative to imports. This group gave "correct" signals on the order of 45 to 60 per cent of the time with very few "wrong" signals.

The worst performances were given by domestic cost/price criteria--unit labor costs, and the wholesale and consumer price indices. The performance of these domestic variables was little better than random.

In between came spot rates, export prices, cyclically adjusted basic balances, and the other reserve indicators (monthly and annual reserve changes, and the ratio of gross reserves to imports).

In general, Williamson concludes that the indicators using net reserves seem to perform marginally better than those using gross reserves as indicators of the need for adjustment. He also notes that use of the OECD cyclical adjustments for trade balances worsens the performance of the basic balance as an indicator. Our Quantitative Analysis Group did not find this result surprising, given the serious methodological problem characterizing the current state of the OECD work on cyclical adjustment. Our group is continuing work on trying to improve our ability to make cyclical adjustments.

III. Critical Analysis of Williamson's Work

I found Williamson's paper to be a quite useful beginning to the historical testing of objective indicators. For several reasons, however, we cannot have confidence that his reported findings are definitive. Questions may be raised both about his normative standard for judging "correct" signals and about the specific forms in which he tested the various objective indicators. We cannot tell *a priori* whether changes in either aspect would or would not

yield significant differences in the absolute and relative levels of performance of the various indicators. Experimentation with alternative formulations in both areas is essential. The two areas will be discussed in turn.

A. The normative standard

As Williamson frankly admits, his standard of performance was subjectively determined, relying heavily upon the judgment of IMF country experts.* In many instances, however, cases of disequilibrium, and particularly the dating of the year in which a particular fundamental disequilibrium begins to occur, are quite difficult to diagnose. In such cases experts may quite reasonably differ. Another expert's judgment as to the best dating list of disequilibrium might differ a good bit from Williamson's and this in turn might significantly affect the degree to which the various objective indicators were judged to give correct signals.

Furthermore, some cases of disequilibrium may be much more important than others in terms of their effect on the operation of the international monetary system. It might be, for instance, that an indicator which caught 80 per cent of the major disequilibriums and only 20 per cent of the minor ones would be more useful than one which caught 60 per cent of both major and minor disequilibriums, even though the latter would have a higher overall average for catching disequilibria.

It would seem to me that one way to handle the problem of determining a standard for judging the performance of the indicators would be to have a frank analysis of historical experience by a group of experts

* Williamson's normative standard contained a total of 62 country years in which exchange rate changes were considered desirable and 92 country years in which parities should have remained unchanged. Of the 34 desired revaluations and 28 desired devaluations, 10 of the former and 5 of the latter occurred. The frequent failure of desired adjustments to take place means that the number of country years of desired adjustment exceeds the number of episodes of disequilibrium, for a particular case of disequilibrium could continue over several years.

from the Fund and other major international institutions, and from member countries. Out of these could come a list of country years divided into three categories--those for which there was rather general agreement that there was a disequilibrium, those for which there was rather general agreement that there was not a disequilibrium, and those on which expert opinion was mixed. This third category could be subdivided as desired into differing degrees of consensus that there was or was not a disequilibrium. Similarly, the group could be asked to attempt to distinguish between major and minor disequilibria.

This procedure does not, of course, eliminate the problem of differing views of when disequilibrium has arison, but it would seem to be the most straightforward way of handling the problem of differing views and obtaining as much consensus as possible on the normative standards of evaluation.

B. Selection of Trigger Points for the Objective Indicators

As Williamson points out, whether a particular indicator is triggered at any particular time depends not only on the nature of the indicator but also on the numerical value of its trigger points. Thus, it is important to select a set of trigger points for the various indicators which allows as fair a comparison as possible.

Williamson argues that "Since one is evaluating the indicators by comparing them to a particular normative standard, the obvious procedure is to select the triggers as those that would have yielded the same total number of recommended changes as the number in the standard. In this way each indicator will be triggered the same number of times and it is possible to compare the performances of the different indicators."

It does not follow, however, that the best method of comparison is Williamson's method of fitting trigger values such that each indicator is triggered the same number of times as the standard. I believe a more appropriate procedure would be to select the trigger value for each indicator which allows it to do the best possible job over the sample period.

This would be done by determining trigger values for each indicator which maximized its number of net correct signals.** The total number of adjustments signaled by such maximum forecasting triggers need not equal the number of cases of "needed" adjustment. For instance, a set of triggers which signaled only 50 adjustments but called all 50 of these correctly would receive a better score than one which called for exactly the right number of adjustments in total, but for which the signals were only correct in say 40 of the 62 cases.

It is also possible that trigger values for maximum forecasting performance would frequently not fall at the same distance above and below the norm. A commitment to functional symmetry in the operation of the system need not imply that upper and lower trigger points be placed an equal distance from the norm. Except in the cases of reserve levels and the reserves to import ratio, Williamson did have the upper and lower triggers placed equidistant from the norm. Hence it would be useful to re-estimate values for the triggers for various indicators without this symmetry constraint.

Although it is possible that the performance of maximum forecasting triggers would not differ greatly from Williamson's set, we can only tell by trying them out to see.

It should also be noted that such maximum forecasting triggers, while probably the fairest method of comparing the relative performance of different indicators, would tend to overstate the likely performance of the indicators in general for observations outside of the sample period.

** It should be noted that false starts and failure to indicate needed changes may not be deemed to carry the same costs, in which case Williamson's criterion of merely subtracting perverse signals from correct ones would not be appropriate. Adjustments to reflect different costs of the two types of mistakes would be easy to make. It would also be possible conceptually to adjust for the degree to which various indicators succeed or fail in isolating unambiguous, severe disequilibria.

Given this problem it would also be useful to see how sensitive the performance of the indicators was to several degrees of tightening and loosening of the triggers. The less sensitive was their relative performance to progressive tightening or loosening of the triggers, the greater confidence we could have about their relative performance in the future. Likewise, the less sensitive were the absolute levels of performance to progressive tightening and loosening of the triggers, the closer performance outside of the sample period would be likely to come to the maximum performance which was achieved by the indicators during the sample period.

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : Mr. William R. Cline

DATE: September 15, 1972

FROM : C. Lowinger

SUBJECT: Summary and Evaluation of Robert B. Schwenger's "A Conceptual Framework for Measurement of the Impact of Foreign Trade on Workers"

cc - Mr. Widman

Central Files
1/5/3/906 Bill

Synopsis and evaluation of: Robert B. Schwenger's "A Conceptual Framework for Measurement of the Impact of Foreign Trade on Workers" (Graduate School, USDA, April 1971).

Schwenger's paper is critical of studies that purport to show the overall employment effect of trade. Typically such a study would come up with a certain figure measuring the "job producing" effect of U.S. exports and another figure showing the "job replacing" effect of U.S. competitive imports, and finally come up with a "balance of employment" effect of U.S. trade. In fact such studies would attempt to show whether this balance over time has "improved" or "worstened".

There is no need to detail much of his criticism of the "balance of employment" approach both on the technical level and on the conceptual level. For example, in such studies there is often a comparison between the "real" employment effects of our exports and the hypothetical effect of our competitive imports on employment. The kind of question asked is if $1 billion worth of U.S. competitive imports were kept out how many jobs would industry "gain"? Schwenger argues (rightly) that one has to ask how are these imports kept out? If by trade restrictions (tariff, quotas, etc.) then one has to compare this "gain"

to jobs lost due to reduced exports resulting from foreign retaliation.

Schwenger does take a swing at traditional trade theory couched in terms of the static gains of trade. In essence he says the static allocational benefits from trade are too small and thus unlikely to impress public officials (and the public) and therefore they get easily overshadowed by the more "catchy" employment effects of trade.

More specifically neoclassical trade theorists failed to incorporate into their model the existence of: (1) the mixed economy -- or what Galbraith calls the New Industrial State -- where monopolistic elements and concentration of economic power are prevalent. (2) Elements of dynamic growth and innovation. (3) Recognition of an increasingly economically integrated world, i.e. the interconnection that exist in present day international economy.

Some credit is given to trade theorists for recent attempts of incorporating factors such as technology, innovation and the skill distribution of labor and their trade effects, in their models.

Again while one can be sympathetic with the inadequacy of neoclassical models and with the frustration of

public officials given the "small" gains from trade, and while they can be accused of multiple sins; the responsibility for the "balance of employment" concept is not one of them.

Schwenger's hope seems to be that if trade theorists and econometricians get busy in constructing more complete and dynamic models, the "true" gains from trade will come out to be large and duly impress the public. Therefore I was looking with anticipation to the second part of the paper where Schwenger describes the task in the following terms: "A useful conceptual framework for the measurement of trade impact must have the generality (the comprehensiveness) of the classical theory; it must embrace the complexity of variables and inter-relationships understood in systems analysis; it must include the dynamic technological developments for whose efficient appreciation trade change is necessary; it must receive an obvious relevance to the interests of workers broadly understood; and it must have a publicly persuasive validity". An ambitious undertaking in anyone's book!

Yet when Schwenger comes down to specifics, he is once again measuring only the static costs and benefits resulting from trade changes.

For example on the side of benefits he would include increased consumption, lower prices, increased employment, etc. How are the dynamic effects measured? What about the connection between trade and technological change? What is the nature of the international links he assumes to be of major importance? Not much about these questions in the paper.

The discussion of the U.S.-Canada Automobile Agreement as an application of this "method" suffers from the same weaknesses. He is on safe ground as long as he talks about the static efficiency gains from the Agreement. But how do you disengage the presumed effects of the trade expansion on growth of output (or employment) in the automotive industry from those due to growth of aggregate demand during the same period? The problem is that the "dynamic" benefits, if any, in a period of general rapid expansion of the economy, cannot be clearly assigned to the trade expansion that transpired. No one can deny that U.S.-Canada trade in automotives has expanded during 1964-68, but has it led to technological changes, in the industry? If it did how would it be measured? No methodology for answering these questions is presented.

He ends with some improvements in the measurement of costs and benefits of changes in trade flows; which is a far cry from the more ambitious purpose of the study.

UNITED STATES GOVERNMENT

Central Files

Memorandum

TO : Deputy Assistant Secretary Willett (Through Charles Schotta)

DATE: January 11, 1972

FROM : Sung Kwack and David Coe

SUBJECT: Relation of U.S. Global Trade Balance to the Global Balances of Major Foreign Countries

We assume that one of the policy goals for a country is to at least prevent deterioration in its global balance of trade rather than its local balance of trade with a particular country.

In a world of two countries both are in direct competition and one can improve its trade position only at the expense of the other. In a multi-country world, however, the global balance for any one country can be changed only with an equal change in the total global balance of the remaining countries. Often we ignore the fact that two countries compete not only over their local trade balance with each other but also over their respective local balances in third countries.

The purpose of the exercise reported in this memo is two-fold:

1. To attempt to forecast the global U.S. trade balance with known values of the global balance of our major trading partners. This is viewed as a means of checking trade balance forecasts from a system of U.S. export-import equations.

2. To examine which trade partner has the most influence on the U.S. global balance.

On an ad-hoc basis we hypothesize that the U.S. global balance is a negative function of the global balances of the three major trading countries (Canada, Japan and West Germany), specified separately or as a sum. The empirical results are attached. We note that all of the coefficients are of the expected sign.

05/3/9/06

Four interesting findings emerge:

1. The four countries' balances are offsetting in the sense that one can improve its global balance only at the expense of the others.

2. The global trade balance of Canada does not appear to significantly influence the U.S. global balance. However, this finding should be treated cautiously, considering some degree of multicollinearity between Canada's, Japan's and West Germany's global trade balance.

3. The coefficient on Japan's trade balance is highest, followed by West Germany's. Thus, for equal deteriorations in the global trade balances of Canada, Japan or West Germany, the U.S. will benefit most from that of Japan.

4. The findings (1) through (3) appear to be independant of the sample period.

Attachment

cc: Messrs. Widman, Cline, Cheng, Lederer, Klock, Hays

United States Trade Balance Equations

	$\bar{R}^2$	SEE	DW	SSR
A. Sample Period 1960:1 to 71:4				
$BAL_{US} = \underset{(17.20)}{5.483} - \underset{(10.02)}{0.640}^{*} (BAL_{CA} + BAL_{JP} + BAL_{WG})$	0.679	1.662	1.605	127.1
$BAL_{US} = \underset{(10.76)}{5.009} - \underset{(0.71)}{0.236}^{*} BAL_{CA} - \underset{(5.91)}{0.895}^{*} BAL_{JP} - \underset{(3.19)}{0.574}^{*} BAL_{WG}$	0.690	1.633	1.918	117.3
$BAL_{US} = \underset{(10.80)}{4.998} - \underset{(6.47)}{0.927}^{*} BAL_{JP} - \underset{(4.13)}{0.638}^{*} BAL_{WG}$	0.694	1.624	2.035	118.6
B. Sample Period 1962:1 to 71:4				
$BAL_{US} = \underset{(14.31)}{5.495} - \underset{(9.17)}{0.646}^{*} (BAL_{CA} + BAL_{JP} + BAL_{WG})$	0.680	1.718	1.664	112.17
$BAL_{US} = \underset{(9.42)}{4.942} - \underset{(0.45)}{0.162}^{*} BAL_{CA} - \underset{(5.79)}{0.920}^{*} BAL_{JP} - \underset{(3.13)}{0.584}^{*} BAL_{WG}$	0.697	1.674	2.057	100.9
$BAL_{US} = \underset{(9.53)}{4.914} - \underset{(6.28)}{0.941}^{*} BAL_{JP} - \underset{(3.83)}{0.624}^{*} BAL_{WG}$	0.703	1.656	2.141	101.4
C. Sample Period 1960:1 to 70:4				
$BAL_{US} = \underset{(16.48)}{5.292} - \underset{(6.42)}{0.527}^{*} (BAL_{CA} + BAL_{JP} + BAL_{WG})$	0.483	1.601	1.493	107.6
$BAL_{US} = \underset{(10.87)}{5.223} - \underset{(0.74)}{0.264}^{*} BAL_{CA} - \underset{(2.75)}{0.645}^{*} BAL_{JP} - \underset{(3.24)}{0.586}^{*} BAL_{WG}$	0.466	1.627	1.704	105.9
$BAL_{US} = \underset{(10.90)}{5.202} - \underset{(3.13)}{0.697}^{*} BAL_{JP} - \underset{(4.21)}{0.654}^{*} BAL_{WG}$	0.472	1.618	1,859	107.4
D. Sample Period 1960:1 to 69:4				
$BAL_{US} = \underset{(16.31)}{5.416} - \underset{(6.06)}{0.625}^{*} (BAL_{CA} + BAL_{JP} + BAL_{WG})$	0.478	1.601	1.582	97.4
$BAL_{US} = \underset{(10.81)}{5.313} - \underset{(1.42)}{0.836}^{*} BAL_{CA} - \underset{(2.70)}{0.664}^{*} BAL_{JP} - \underset{(2.97)}{0.549}^{*} BAL_{WG}$	0.453	1.640	1.532	96.8
$BAL_{US} = \underset{(10.58)}{5.194} - \underset{(3.12)}{0.753}^{*} BAL_{JP} - \underset{(3.94)}{0.664}^{*} BAL_{WG}$	0.438	1.662	1.755	102.2

Notes: 1. BAL_k = Global trade balance of country k,k = US (U.S.), CA (Canada), JP (Japan), and WG (West Germany), Bil of U.S. $, Annual Rates.

2. $\bar{R}^2$ Stands for the percentage of variance explained corrected for degrees of freedom, SEE is the standard error of the estimate, DW is the Durbin-Watson statistic, and SSR is the sum of squared residuals.

3. Figures in () are T-ratios.

TREASURY DEPARTMENT
OFFICE OF THE AS STANT SECRETARY
FOR INTERNATIONAL AFFAIRS

Date 6/15 19 21

To: D.W.

From: H.M.

Move keep with Bal. of Payments papers.

U.S. Trade - On Census Basis
(In $ million; seasonally adjusted)
Totals may not add due to rounding.

	1968			1969		
	Exports	Imports	Surplus	Exports	Imports	Surplus
Full Year, Total*	34,063	33,226	837	37,332	36,043	1,289
January	2,815	2,687	128	2,161	2,002	159
February	2,775	2,592	184	2,266	2,672	-406
March	2,439	2,588	-150	3,188	2,982	206
First Quarter	8,028	7,867	161	7,615	7,655	- 40
April	2,855	2,604	251	3,318	3,183	136
May	2,740	2,755	-15	3,268	3,257	11
June	2,870	2,792	78	3,179	3,152	27
Second Quarter	8,465	8,151	314	9,765	9,591	174
July	2,858	2,725	133	3,182	3,074	108
August	2,950	2,872	78	3,366	3,163	204
September	3,211	2,951	261	3,341	3,078	263
Third Quarter	9,019	8,548	471	9,889	9,315	574
October	2,631	2,736	-105	3,342	3,192	150
November	2,972	2,883	89	3,398	3,180	218
December	2,977	2,908	70	3,280	3,078	202
Fourth Quarter	8,581	8,527	54	10,020	9,450	569

	1970			1971		
	Exports	Imports	Surplus	Exports	Imports	Surplus
Full Year, Total*	42,662	39,963	2,699			
January	3,406	3,223	183	3,735	3,686	49
February	3,547	3,278	269	3,690	3,553	136
March	3,376	3,218	158	3,815	3,569	246
First Quarter	10,328	9,719	609	11,240	10,809	431
April	3,409	3,263	146	3,543	3,758	-215
May	3,661	3,338	323			
June	3,730	3,266	465			
Second Quarter	10,800	9,867	934			
July	3,699	3,255	445			
August	3,592	3,346	246			
September	3,553	3,428	125			
Third Quarter	10,845	10,029	816			
October	3,689	3,501	188			
November	3,499	3,428	71			
December	3,570	3,404	166			
Fourth Quarter	10,758	10,333	425			

* Seasonally adjusted quarterly figures do not add to annual totals.

Source: Department of Commerce, FT 900. Export data include re-exports, and exclude Department of Defense Map-Grant-Aid shipments. Import data are "general imports" for immediate consumption plus entry into bonded warehouses.

U.S. TREAS. DEPT.
May 27, 1971

INDICES OF U.S. AND FOREIGN COSTS AND PRICES

	Percent Changes					
	Annual		Quarterly			
	1969 Over 1968	1970 Over 1969	I 70 Over IV 69	II 70 Over I 70	III 70 Over II 70	IV 70 Over III 70
A. WHOLESALE PRICES, MANUFACTURES:						
1. Canada	4.7	4.7	0.7	2.1	3.1	0.7
2. France	7.3	-3.2	-2.4	0.5	-0.6	0.3
3. Germany	5.1	10.1	4.7	1.1	1.1	1.1
4. Italy	3.9	6.4	2.2	1.4	-0.1	1.5
5. Japan	2.8	2.8	0.3	0.1	1.0	2.5
6. Netherlands	0.6	5.1	2.6	0.8	0	1.7
7. United Kingdom	1.3	7.4	2.2	2.5	1.7	2.2
8. Foreign Average 1/	4.0	5.7	2.1	1.1	0.9	1.5
9. U.S. Index	3.5	3.8	1.3	0.7	0.8	0.5
B. UNIT LABOR COSTS/MANUFACTURES 2/						
1. France	0.9	n.a.	-1.9	3.8	0.9	n.a.
2. Germany	4.0	n.a.	3.7	1.8	3.5	n.a.
3. Italy	4.2	n.a.	2.9	7.4	4.3	n.a.
4. Japan	2.9	n.a.	0	2.8	4.6	n.a.
5. United Kingdom	5.4	n.a.	4.2	4.0	2.3	n.a.
6. United States	4.0	n.a.	1.1	0.5	1.5	n.a.

1/ Eight-country weighted average, adjusted for exchange-rate changes. Countries are: Belgium, France, Germany, Italy, Japan, Canada, Netherlands, and United Kingdom. Weights are relative amounts of manufactures exports (to all markets) in previous year. For data sources, see below.

2/ Not adjusted for exchange rate changes.

n.a. = Not Available.

Sources:
WHOLESALE PRICES, MANUFACTURES: Data for U.S. from Wholesale Prices and Price Indexes (BLS); all other countries from Main Economic Indicators (OECD).
UNIT LABOR COSTS. Data for U.S. from Business Conditions Digest (Commerce Dept.); all other countries from (U.K.) National Institute Economic Review (NIESR).

U.S. Department of Treasury
May 25, 1971

Under Secretary Volcker

(Through Assistant Secretary Petty)

June 8, 1971

Wilson E. Schmidt/4

Balance-of-Payments Studies

As you are aware, Secretary Connally has requested us to examine the prospects for U.S. trade by commodity groups. This is a difficult and complex task which will require the greater part of the manpower available to the Research Division for at least the next two or three months.

In order to pursue this project we will have to delay further work on the balance-of-payments studies described in my memorandum of April 5 (PR-1). We have completed and submitted to you initial papers on Balance-of-Payments Objectives (PR-2), Trends in U.S. Balance of Payments (PR-4) and Financing of U.S. Payments Deficits (PR-3). We have not been able to complete a paper on the Potential for Restoring Payments Equilibrium Without Exchange Rate Changes.

Unless there are specific elements of the balance-of-payments outlook which are of sufficient urgency to justify priority over the study of the trade outlook, we will delay until fall the adjustment paper and the refining of the other documents, including the alternative approaches to the projection of U.S. balance of payments contained in the Trends paper.

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REDUCTION IN TRADE BARRIERS

POTENTIAL FOR EQUILIBRIUM FROM SURPLUS COUNTRIES

In a situation of disequilibrium in international payments, actions taken by surplus countries to reduce their payments surplus will generally tend to reduce imbalance and the pressure on reserves of deficit countries. The use of measures influencing the trade account is one possible alternative; others are tailoring monetary and fiscal policy to balance of payments needs, restricting capital inflows; promoting service expenditures abroad such as tourism; encouraging capital outflow and revaluing the currency.

MEASURES AVAILABLE

Unilateral tariff reductions are one form of reduction in trade barriers which a surplus country could undertake. This would allow an increase in the value of goods imported, provided the elasticity of demand for imports is greater than unity for the products where tariffs are reduced. One major difficulty in adopting such measures has been that surplus countries don't wish to give up rights to reciprocal reductions in tariffs by others in a multilateral context. It is also argued that such a unilateral move would ease the impetus toward multilateral negotiations.

As a result the unilateral tariff reductions which have taken place in recent years have been of the rather limited and specialized form of advanced ~~the~~ Kennedy Round cuts. Cuts already agreed to and staged over a five year period were advanced by Switzerland, Austria, and Canada. This measure has a temporary nature creating an initial differential which

is reduced to zero as other nations complete their scheduled cuts. (Japan has a measure before the Diet to advance the last cut. At this point in time however, its effect would be negligable). Substantial across the board cuts in tariffs could be very effective in reducing a surplus. No surplus country has undertaken such a dramatic step.

Placing a tax on exports would be another means of reducing a surplus if the elasticity of demand was greater than unity. This would have the undesirable effect of limiting total world trade and may be especially unfeasable politically. Taxes on exports are used for the opposite effect in certain LDC's with exports with low price elasticities of demand.

Reduction in non-tariff barriers would also be very useful. Germany and Japan at one time maintained substantial quota systems. Germany has almost completely removed this barrier to imports and Japan has made substantial progress. The removal of other non-tariff barriers can also have substantial trade effects.

Japan maintains a substantial array of non-tariff barriers including a comprehensive licensing system, a required method of settlement for all import transactions, restrictions against discounting import commercial paper, and restrictions on the establishment of sales and service branches.

In Germany the operation of the EC Common Agricultural Policy sustains German agricultural production at a level substantially above efficient operation. This prevents supply of German agricultural needs by more efficient producers.

Another trade measure which could be undertaken somewhat similar in effect to tariff measures would be the removal

of border taxes and rebates. Germany after increasing its border tax rates inconjunction with the imposition of a TVA in early 1968 suspended a portion of the rates in December 1968 in the face of a substantial surplus. the rates were restored to the maximum however in conjunction with the German revaluation in 1969.

In general the pressures placed on surplus countries to adjust by any means is much less than those placed on deficit countries. With the exception of the U.S. deficit countries are absolutely constrained by their foreign exchange reserves and ability to borrow. Surplus countries if not suddenly inundated by Foreign capital can continue to sterilize and accumulate foreign exchange indefinitely. The pressure from export industries not to undertake revaluation can be intense. If revaluation occured a large adjustment burden is placed on them. There is in addition a certain tendancy for countries to view a payments surplus and the accumulation of foreign exchange as desirable and an indication of sound financial policies. All these factors make it difficult to bring pressure to bear on removing trade barriers.

UNITED STATES GOVERNMENT

Memorandum

TO : Messrs. Petty, Hennessy, Cates, Willis, Schaffner, S. Cross, Pelikan, Reynolds (7), and Watson (5)

DATE: May 20, 1971

FROM : Wilson E. Schmidt WS

SUBJECT: Balance-of-Payments Charts and Tables

Attached for your use is a set of balance-of-payments charts dealing with various aspects of our balance of payments and international competitive position. Each chart is preceded by a brief note and followed by a tabular presentation of the data. Messrs. Reynolds and Watson may wish to send copies to our Treasury representatives overseas.

These materials were prepared in connection with Secretary Connally's appearance before the Subcommittee on International Trade of the Senate Finance Committee on May 17, 1971. Although the Secretary did not hand out copies of the charts, he made extensive use of them in the course of his testimony.

Attachment

LIST OF CHARTS

1. U. S. Basic Balance, Liquidity Balance, and Official Reserves Transactions Balance.

2. U. S. Reserve Assets and Liquid Liabilities to Foreigners.

3. U. S. Current Account and Long Term Capital Balance.

4. U. S. Government Grants and Credits.

5. Private Long-Term Capital.

6. Investment Income, Other Services, and Private Transfers & Government Pensions.

7. Market Shares in Total Exports of Manufactures.

8. Composition of U. S. Trade

   a. Consumer Non-durables
   b. Consumer Durables
   c. Auto Products (Excluding Canada)
   d. Capital Goods

9. Deterioration in U. S. Trade Balance since 1964.

10. Trends in Export Prices in Selected Countries.

11. Trends in Wholesale Price of Manufactures in Selected Countries.

12. Total Compensation Per Hour Worked in Manufacturing Industry, Selected Countries.

13. Trends in Output Per Man-hour in Manufacturing.

14. Trends in Wage Costs Per Unit of Output.

15. Trend Rates of GDP and Service Sector Growth.

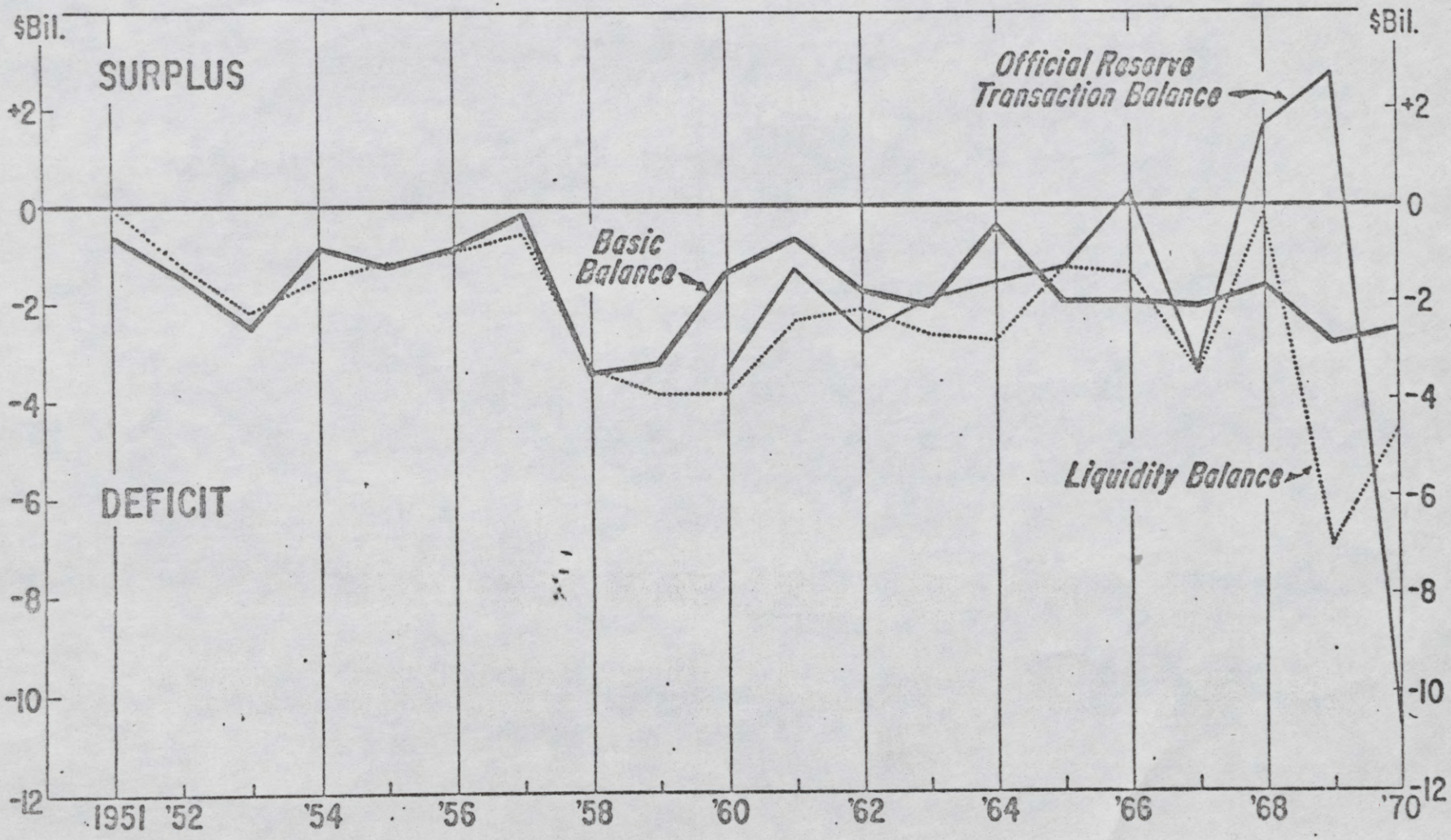
16. Projected Growth of Output Per Person Employed.

U. S. Basic Balance, Liquidity Balance, and Official Reserve Transaction Balance

This chart shows that the United States has had a deficit in its basic balance every year for the last 20 years. What this means is that the nation has not received enough from the sales of goods and services and from foreign investments here to offset the long-term investments made by U.S. industry and government outside the U. S.

The chart also shows that we have had 20 years of uninterrupted deficits measured on the liquidity basis. In eight of the 11 years on which a balance on the official reserve transaction basis has been calculated we were in deficit on that measurement as well.

U.S. BASIC BALANCE LIQUIDITY BALANCE AND OFFICIAL RESERVE TRANSACTION BALANCE



SOURCE: Survey of Current Business.

Measures of the U.S. Balance of Payments
Basic Balance, Liquidity Balance and
Official Reserve Transactions Balance

($ billions)

	Basic Balance	Liquidity Balance	Official Reserve Transactions Balance
1951	-0.6	- *	n.a.
1952	-1.5	-1.2	n.a.
1953	-2.5	-2.2	n.a.
1954	-0.9	-1.5	n.a.
1955	-1.3	-1.2	n.a.
1956	-0.9	-1.0	n.a.
1957	-0.2	0.6	n.a.
1958	-3.5	-3.4	n.a.
1959	-4.5	-3.9	n.a.
1960	-1.4	-3.9	-3.4
1961	-0.7	-2.4	-1.3
1962	-1.8	-2.2	-2.7
1963	-2.1	-2.7	-2.0
1964	-0.4	-2.8	-1.6
1965	-2.0	-1.3	-1.3
1966	-2.0	-1.4	0.3
1967	-3.1	-3.5	-3.4
1968	-1.7	0.2	1.6
1969	-2.8	-7.0	2.7
1970	-2.6	-4.7 1/	-10.7 1/

n.a. Not available.
* Less than $50 million.
1/ Exclude SDR allocation of $867 million.

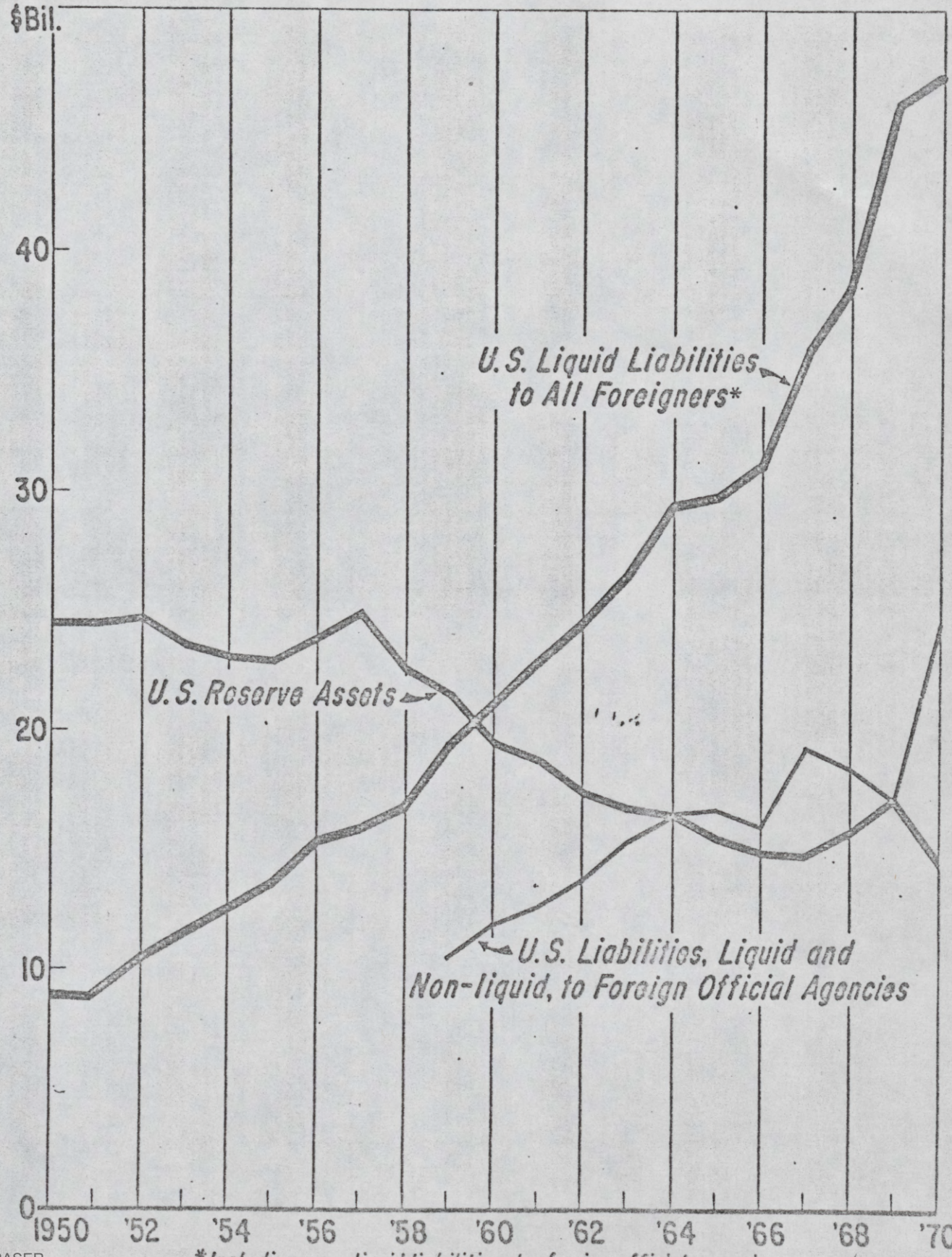
U.S. Reserve Assets and Liquid Liabilities to Foreigners

This chart shows how our reserve assets have declined and our short-term liabilities to foreigners have risen until the liabilities are now more than three times our reserve assets.

Our liabilities to foreign monetary authorities, most of which are included in the $47 billion figure for total liquid liabilities to foreigners, were $24.5 billion at the end of 1970.

It is important to note that this chart does not attempt to portray the full international investment position of the United States. We have other assets--mostly long-term--and long-term liabilities. At the end of 1969, Americans held assets abroad . totalled $158 billion (including the official reserves) while total foreign official and private investments in the United States were only $91 billion. This means we have had a favorable net investment position overall (short-term and long-term) of roughly $67 billion.

U.S. RESERVE ASSETS AND LIQUID LIABILITIES TO FOREIGNERS



*Including non-liquid liabilities to foreign official agencies

SOURCE: Treasury Bulletin

U. S. RESERVE ASSETS AND LIQUID LIABILITIES TO FOREIGNERS 1/
(in $ billions)

	U. S. Reserve Assets	U. S. Liquid Liabilities to All Foreigners 1/	U. S. Liabilities Liquid & non-liquid to Foreign Official Agencies
1950	24.3	8.9	n.a.
1951	24.3	8.8	n.a.
1952	24.7	10.4	n.a.
1953	23.5	11.4	n.a.
1954	23.0	12.5	n.a.
1955	22.8	13.5	n.a.
1956	23.7	15.3	n.a.
1957	24.8	15.8	n.a.
1958	22.5	16.8	n.a.
1959	21.5	19.4	(10.6)
1960	19.4	21.0	(11.9)
1961	18.8	22.9	(12.6)
1962	17.2	24.3	(13.8)
1963	16.8	26.5	(15.4)
1964	16.7	29.5	(16.7)
1965	15.5	29.7	(16.8)
1966	14.9	31.1	(16.0)
1967	14.8	35.8	(19.3)
1968	15.7	38.6	(18.5)
1969	17.0	46.0	(17.1)
1970	14.5	47.1	(24.5)

1/ Including non-liquid liabilities to foreign official agencies
n.a. = Not available

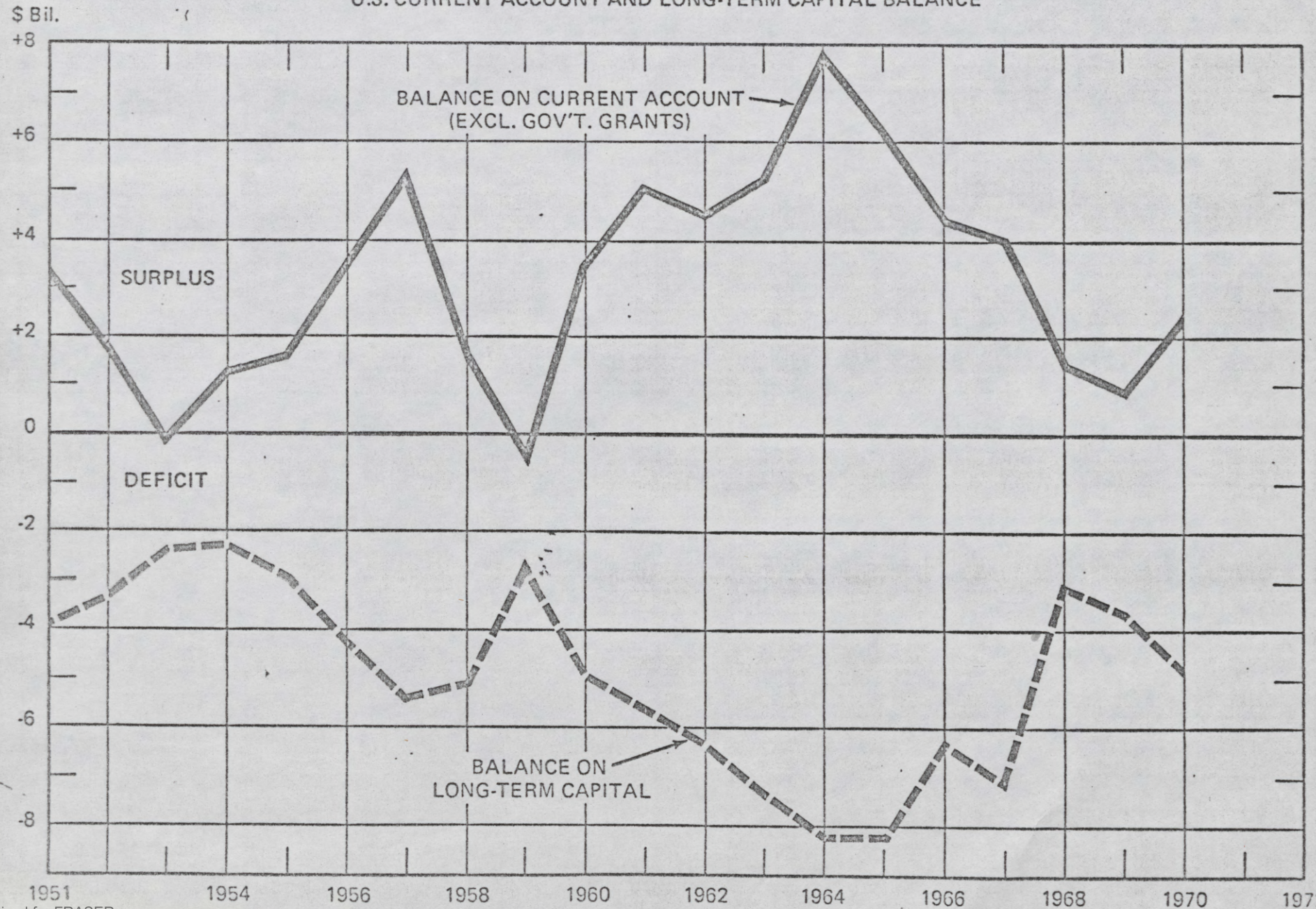
4/7/71

U. S. Current Account and Long-Term Capital Balances

This chart is one of the series designed to show the structure of the U. S. balance of payments. It indicates that with minor exceptions the U. S. has maintained a favorable balance of goods and services. At the same time we have experienced sizeable net outflows of long-term capital. These figures include the investments made by American firms as well as government loans and grants.

COMPOSITION OF U.S. BALANCE OF PAYMENTS

U.S. CURRENT ACCOUNT AND LONG-TERM CAPITAL BALANCE



SOURCE: SURVEY OF CURRENT BUSINESS

U.S. Current Account and Long Term Capital Balance ($ Billions)

	Balance on Current Accounts Excl. Gov't Grants	Balance on Long Term Capital
1951	3.3	-3.9
1952	1.8	-3.3
1953	-0.1	-2.4
1954	1.3	-2.3
1955	1.6	-2.9
1956	3.5	-4.3
1957	5.2	-5.4
1958	1.6	-5.1
1959	-0.5	-4.0
1960	3.5	-4.9
1961	5.0	-5.7
1962	4.5	-6.3
1963	5.2	-7.3
1964	7.8	-8.2
1965	6.2	-8.2
1966	4.4	-6.4
1967	4.0	-7.1
1968	1.4	-3.1
1969	0.8	-3.6
1970	2.3	-4.8

Source: Survey of Current Business

5/18/71

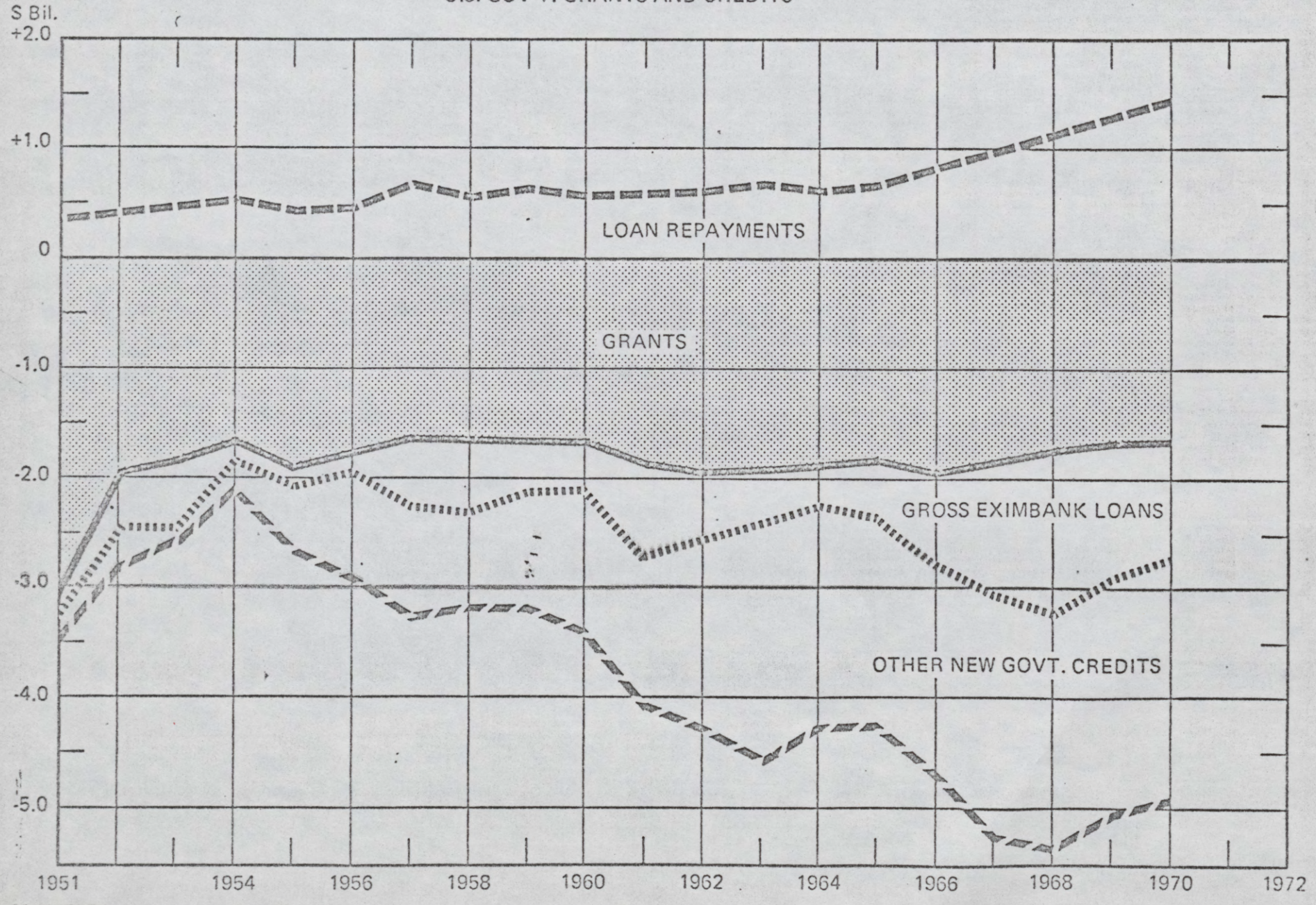
U. S. Government Grants and Credits

This chart traces the course of grants and credits extended by the U. S. Government and the repayments which have been received on government loans.

The level of government grants has diminished slightly in the last four years, but there has not been a major change since 1952. EXIM Bank loans have shown a rapid growth in the last five years while other government credits have remained relatively constant during this period. Loan repayments on the other hand have been rising steadily and are now at a rate of $1.5 billion annually.

COMPOSITION OF U.S. BALANCE OF PAYMENTS

U.S. GOV'T. GRANTS AND CREDITS



SOURCE: SURVEY OF CURRENT BUSINESS

U. S. GOVERNMENT GRANTS AND CREDITS

	Grants	New Credits			Loan Repayments
		Total	XMB	Other	
1951	-3035	- 461	- 222	- 239	305
1952	-1960	- 849	- 483	- 366	429
1953	-1837	- 705	- 645	- 60	487
1954	-1647	- 414	- 185	- 229	507
1955	-1901	- 726	- 164	- 562	416
1956	-1733	-1108	- 219	- 889	479
1957	-1616	-1617	- 639	- 978	659
1958	-1616	-1515	- 680	- 835	544
1959	-1633	-1407	- 493	- 914	620
1960	-1664	-1741	- 406	-1335	583
1961	-1853	-2200	- 822	-1378	579
1962	-1919	-2374	- 621	-1753	599
1963	-1917	-2648	- 509	-2139	661
1964	-1888	-2394	- 337	-2057	594
1965	-1808	-2470	- 533	-1937	651
1966	-1910	-2766	- 909	-1857	803
1967	-1802	-3425	-1259	-2166	997
1968	-1 --	-3652	-1517	-2135	1114
1969	-1644	-3388	-1258	-2130	1291
1970	-1647	-3307	-1095	-2212	1475

Source: Commerce Dept., Office of Business Economics

Private Long-Term Capital

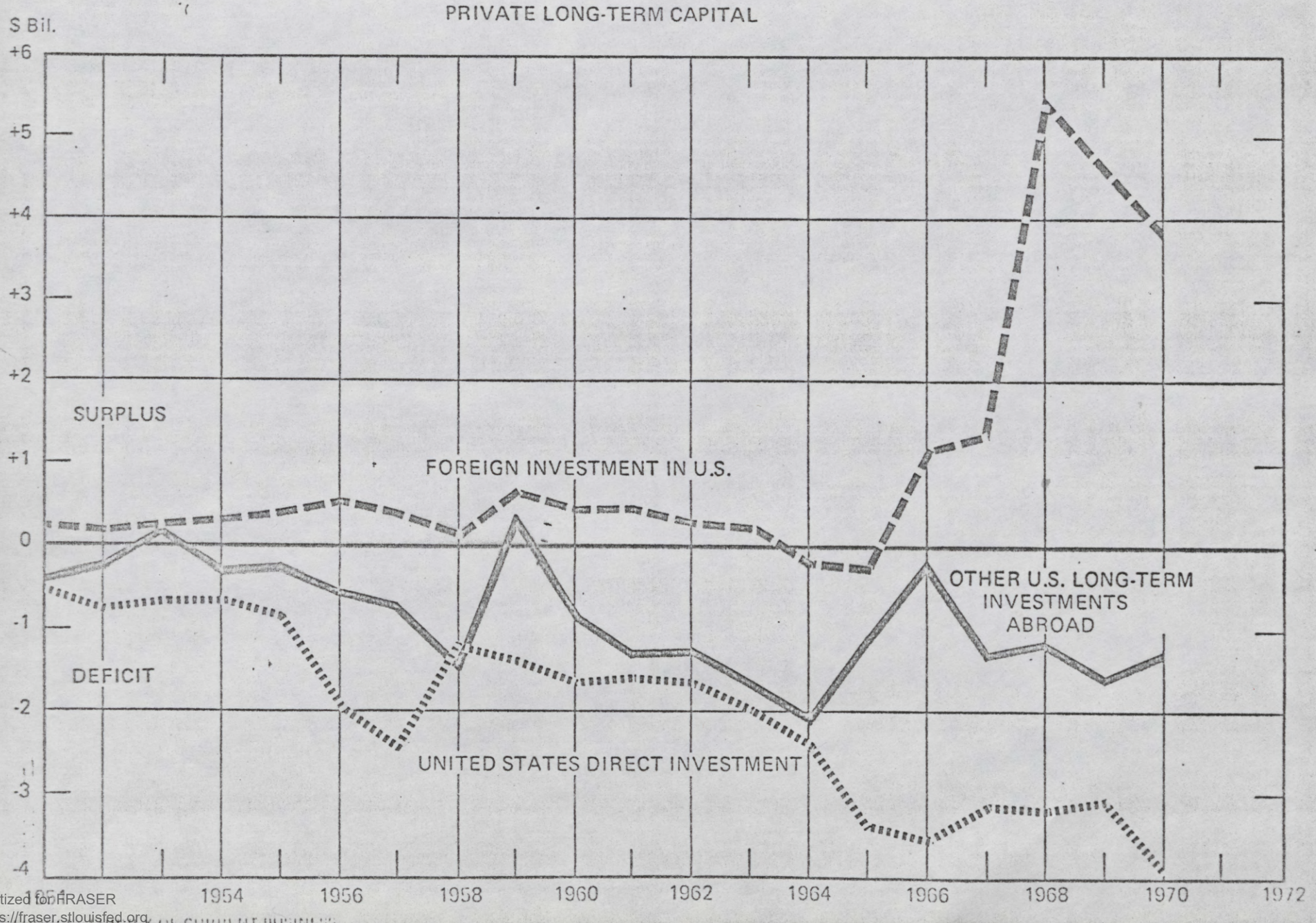
This chart is designed to provide more detailed information about long-term capital movements. The flow of foreign investment in the U. S. -- direct investments and purchases of American securities -- was relatively small in the 1950's and the first half of the 1960's. Since that time there have been quite substantial foreign investments in the U.S. although the amounts have varied widely. A major part of these investments constituted securities being sold abroad by American firms to finance their overseas investments. These sales followed the action of the U.S. government in imposing restraints on outflows of capital from the U.S. to finance the overseas investments.

The chart also shows that U.S. companies have been making increasingly larger direct investments outside the U.S. The imposition of the foreign direct investment program in 1965 arrested the trend but outflows increased again in 1970.

Other types of investments abroad by Americans show an irregular movement without decisive trend.

COMPOSITITION OF U.S. BALANCE OF PAYMENTS

PRIVATE LONG-TERM CAPITAL



CAPITAL ACCOUNT

($ Millions)

Year	U.S. Private Capital		Foreign Capital in U.S.
	Direct Investment	Other	
1951	-508	-437	205
1952	-852	-214	165
1953	-735	185	228
1954	-667	-320	273
1955	-823	-241	390
1956	-1951	-603	595
1957	-2442	-755	390
1958	-1181	-1440	81
1959	-1372	322	710
1960	-1674	-855	424
1961	-1598	-1025	447
1962	-1654	-1227	269
1963	-1976	-1698	264
1964	-2328	-2103	-127
1965	-3468	-1079	-271
1966	-3661	-256	1175
1967	-3137	-1287	1359
1968	-3209	-1116	5423
1969	-3070	-1588	4586
1970	-3967	-1266	3854

5/18/71

Investment Income, Other Services, Private Transfers and Government Pensions

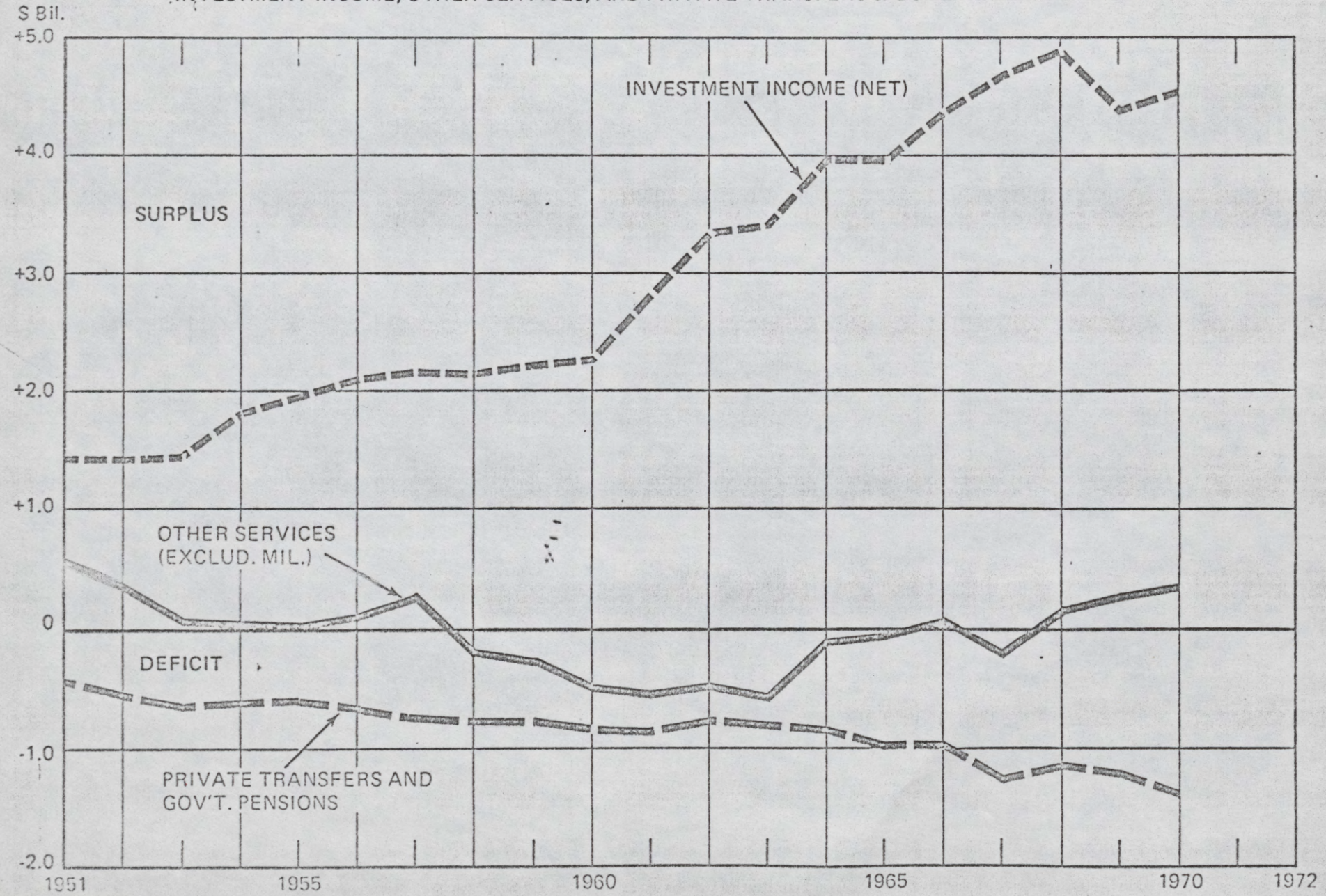
This chart offers further detail concerning transactions in the current account. Its principal feature is the steady increase in net investment income which has risen from a level of $1.5 billion annually in 1951 to $4.5 billion in 1970. The rate of increase was strong throughout the 1960's until 1969 when high interest rates in the U. S. increased the interest payments to foreigners resulting from U.S. liquid liabilities.

The U.S. position on other service transactions deteriorated gradually throughout the 1950's and then recovered in the 1960's to show a small positive position last year.

Private transfers -- including contributions by individual Americans to Israel -- and government pensions being paid to persons living abroad have gradually increased until they now amount to nearly $1.5 billion annually.

COMPOSITION OF U.S. BALANCE OF PAYMENTS

INVESTMENT INCOME, OTHER SERVICES, AND PRIVATE TRANSFERS & GOVERNMENT PENSIONS



SOURCE: SURVEY OF CURRENT BUSINESS

INVESTMENT INCOME, OTHER SERVICES & UNILATERAL TRANSFERS 1/
($Millions)

	Net Investment Income	Other Services (excluding military)	Private Transfe & Gov't Pension
1951	1,468	552	- 457
1952	1,407	392	- 545
1953	1,449	69	- 617
1954	1,807	36	- 615
1955	1,955	2	- 585
1956	2,094	96	- 665
1957	2,178	293	- 702
1958	2,176	-147	- 722
1959	2,215	-245	- 791
1960	2,283	-481	- 842
1961	2,800	-517	- 878
1962	3,327	-467	- 736
1963	3,369	-576	- 812
1964	3,987	- 87	- 879
1965	3,985	- 49	- 994
1966	4,312	52	- 992
1967	4,565	-176	-1,276
1968	4,880	121	-1,159
1969	4,375	270	-1,190
1970	4,508	339	-1,387

1/ Excluding government economic grants.

Source: Survey of Current Business

5/18/71

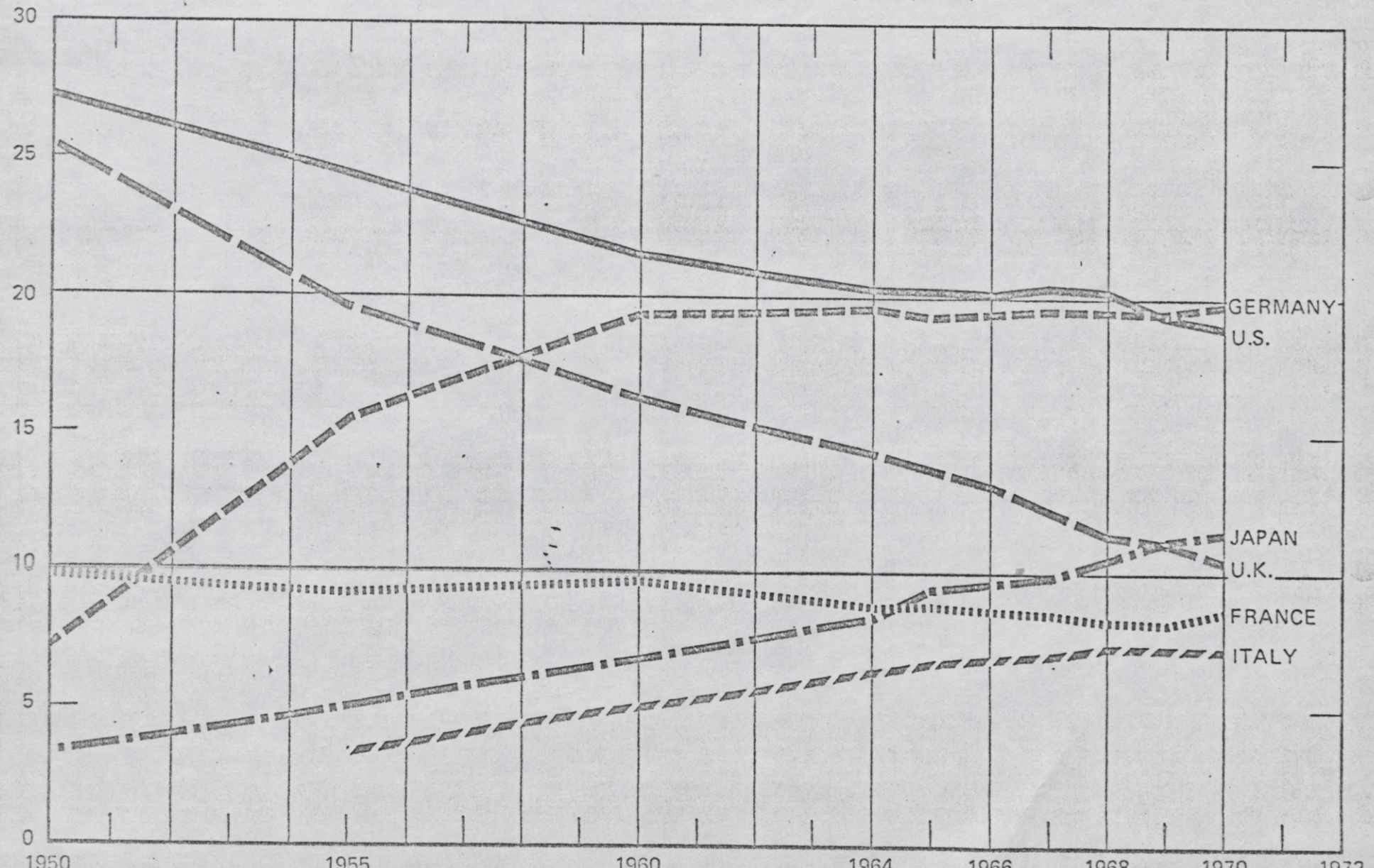
Market Shares in Total Exports of Manufactures

The purpose of this chart is to show that the U.S. share of total exports of manufactures by major industrial countries has diminished significantly over the past 20 years as other industrial countries recovered from the war and achieved rapid growth. From 1964 through 1968 our position stabilized with between 20 and 21 per cent of the market. But in 1969 and 1970 we again lost ground so that our share in this trade is now only about 18 per cent.

It may be noted that the U.K. has shown a steady and serious loss of market shares throughout the 20 year period while Japan has increased its share from about 3.5 per cent to 11.5 percent. Germany increased its share dramatically during the 1950's, but for the past decade has merely held its ground.

SELECTED COUNTRIES' MARKET SHARES IN TOTAL EXPORTS OF MANUFACTURES

BY ELEVEN MAJOR INDUSTRIAL COUNTRIES 1/: 1950; 1955; 1960; 1964-70



1/ TOTAL ALSO INCLUDES EXPORTS FROM BELGIUM, CANADA, NETHERLANDS, SWEDEN AND SWITZERLAND.

SOURCE: NATIONAL INSTITUTE ECONOMIC REVIEW (U.K.)

SELECTED COUNTRIES' MARKET SHARES IN TOTAL EXPORTS OF MANUFACTURES
By Eleven Major Industrial Countries 1/: 1950; 1955; 1960; 1964-70 (%)

	1950	1955	1960	1964	1965	1966 -	1967	1968	1969	1970
U.S.	27.3	24.5	21.6	20.3	20.3	20.2	20.4	20.3	19.3	19.0
U.K	25.5	19.8	16.3	14.4	13.8	13.2	12.2	11.3	11.2	10.5
W. Ger.	7.3	15.5	19.3	19.6	19.2	19.4	19.6	19.5	19.5	19.
Fr.	9.9	9.3	9.7	8.8	8.8	8.6	8.5	8.2	8.2	8.7
Italy	n.a.	3.4	5.1	6.4	6.7	6.9	7.0	7.3	7.3	7.2
Japan	3.4	5.1	6.9	8.3	9.4	9.7	9.8	10.6	11.2	11.5

Source: National Institute Economic Review (U.K.)

5/18/71

Composition of U. S. Trade

This series of charts is designed to look at the composition of U. S. merchandise trade to show the kinds of products in which we do well and those in which we have not been doing well.

In nondurable consumer goods our imports have been growing rapidly while our exports have shown a very small growth.

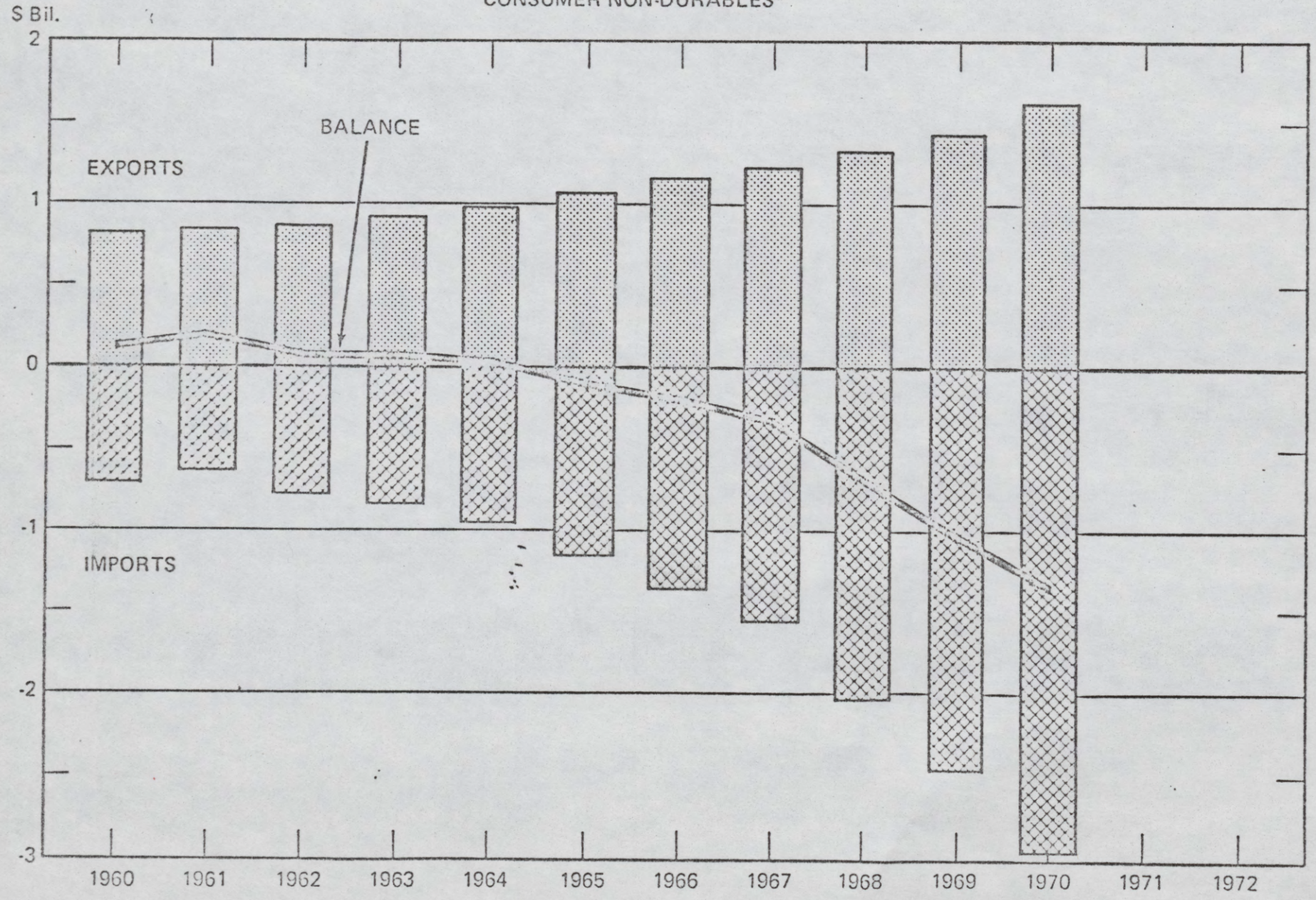
The same is true of consumer durable goods as shown by the next chart. This chart also portrays the situation in one particular sector of consumer durables, that of radios, television, phonographs, tape recorders, etc. During the 1960's we moved from a very small net import position -- about $100 million annually -- to a deficit of about $1.25 billion annually.

In automobiles and automotive products (excluding our trade with Canada which is covered by a special agreement) our exports have shown very little growth throughout the 1960's while our imports have risen from about $400 million in 1961 to $2.4 billion in 1970.

It is the field of capital goods to which we must turn to see a picture of strength. In this category exports have risen more rapidly than imports. Our net export of capital goods has increased from about $5 billion in 1960 to more than $10 billion in 1970.

COMPOSITION OF U.S. TRADE

CONSUMER NON-DURABLES*

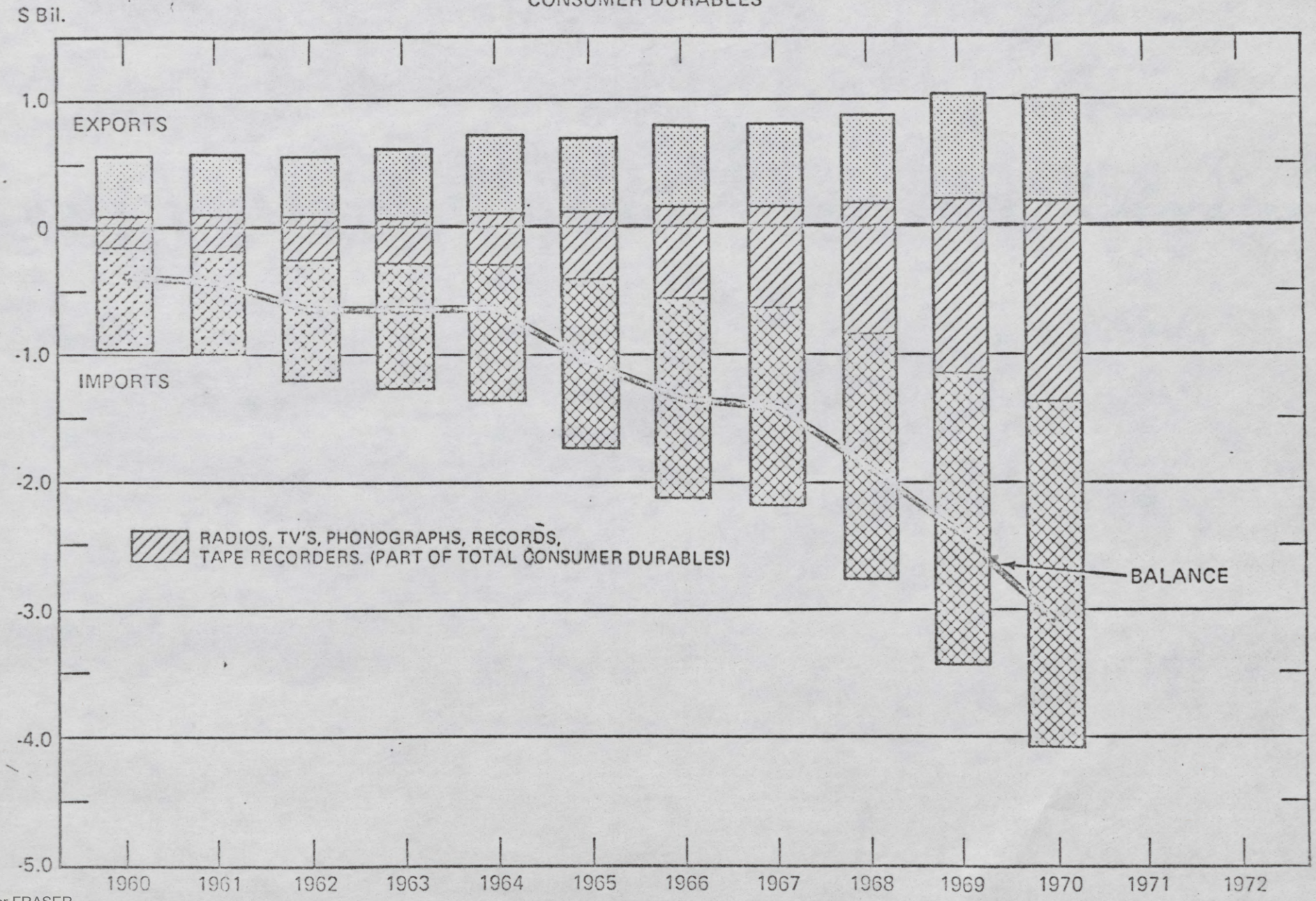


SOURCE: DEPT. OF COMMERCE, OBE

*EXCLUDES TEXTILES & APPAREL, FOOTWEAR, BOOKS, CIGARETTES, MEDICINE & PHARMACEUTICALS.

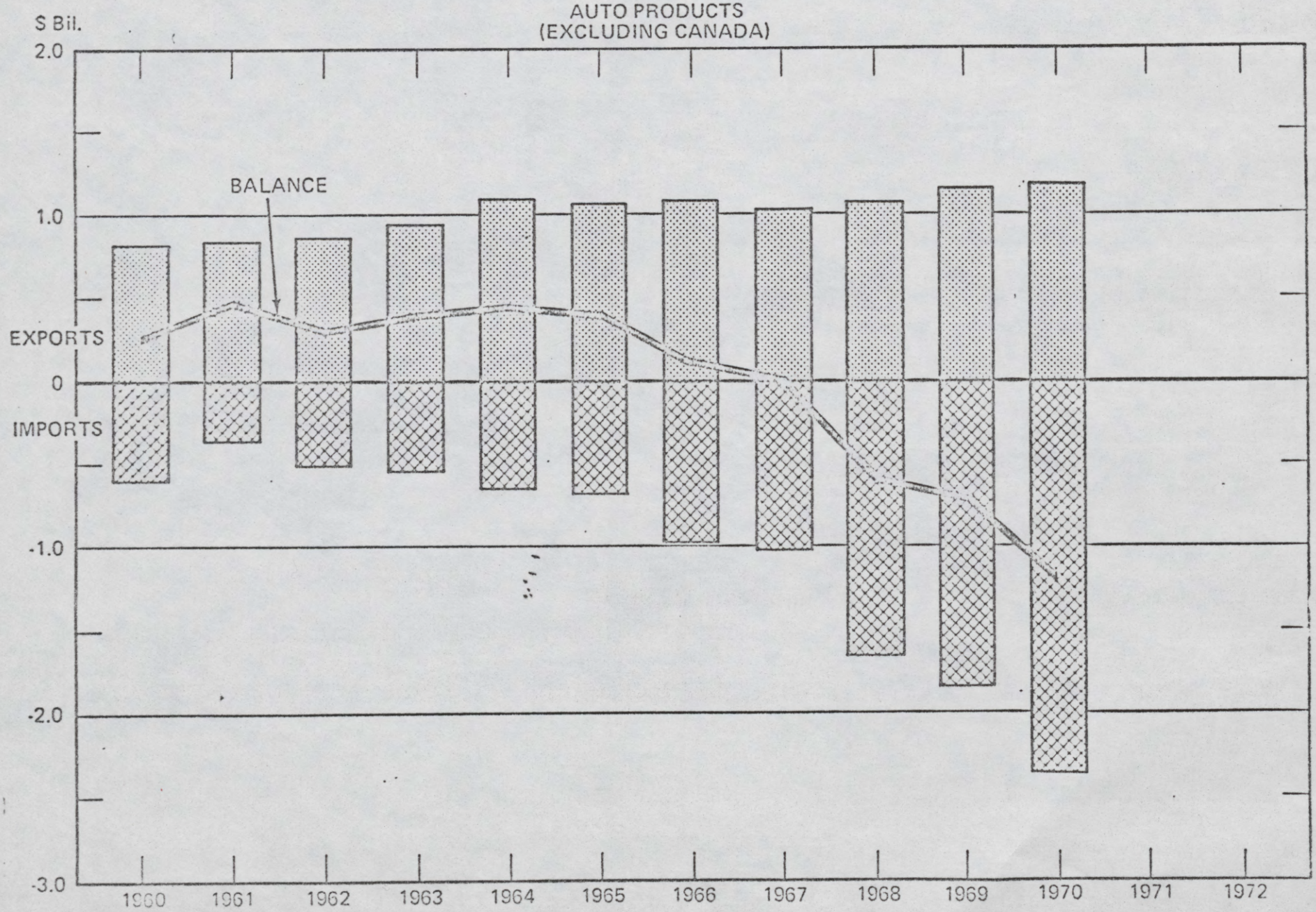
COMPOSITION OF U.S. TRADE

CONSUMER DURABLES



SOURCE: DEPT. OF COMMERCE, OBE

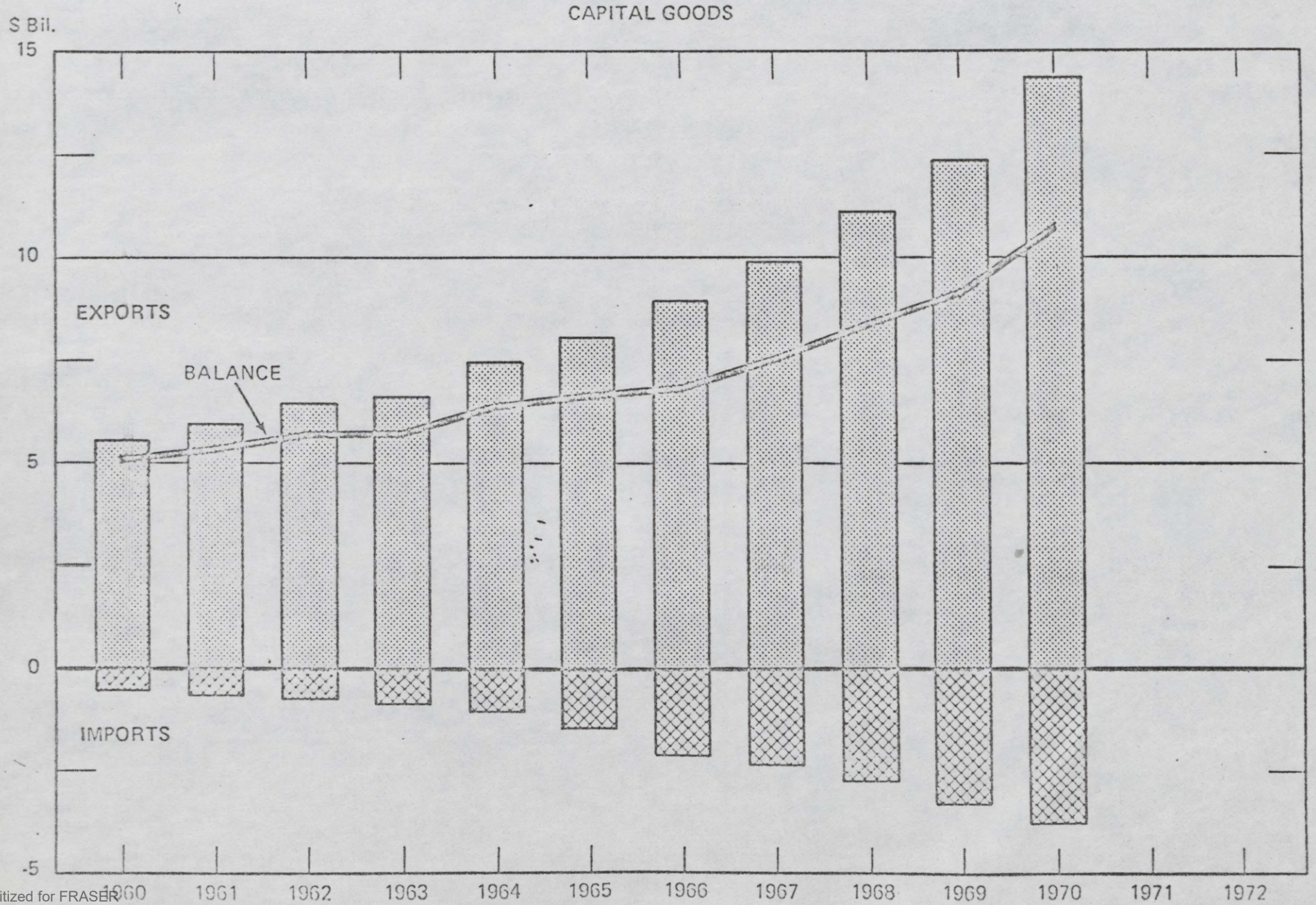
COMPOSITION OF U.S. TRADE



SOURCE: DEPT. OF COMMERCE, OBE

COMPOSITION OF U.S. TRADE

CAPITAL GOODS



THE COMPOSITION OF U.S. TRADE 1960-1970 (End-Use)

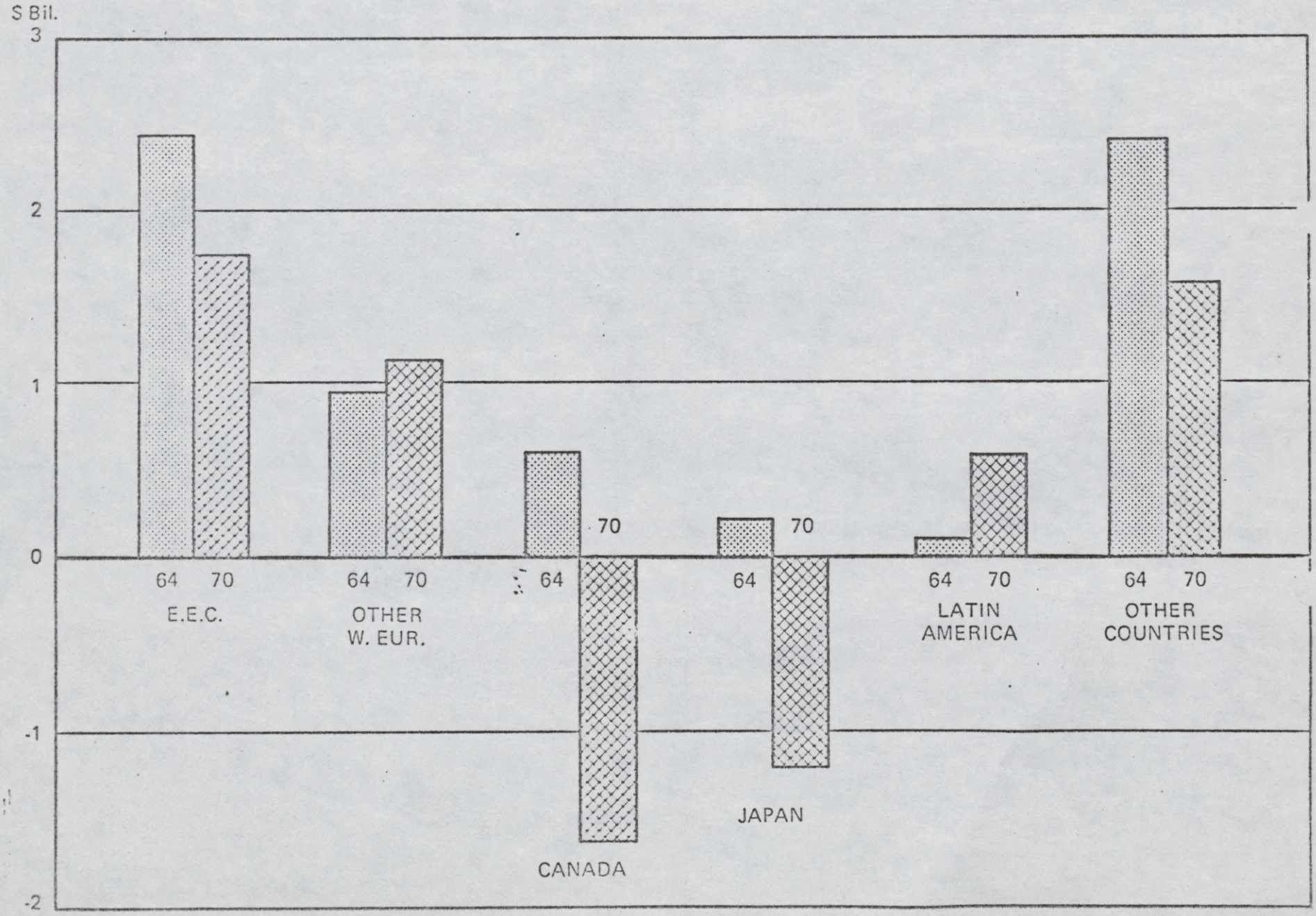
($ Million)

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	19
Consumer Non-Durables											
Exports	826	847	866	914	998	1,054	1,162	1,222	1,344	1,451	1,6
Imports	714	644	811	844	991	1,191	1,349	1,556	2,009	2,480	2,9
Balance	112	203	55	70	7	- 137	- 187	- 334	- 665	-1,029	-1,3
Consumer Durables											
Exports	562	579	570	603	706	698	809	825	890	1,017	1,0
Imports	971	1,000	1,216	1,266	1,379	1,732	2,108	2,190	2,754	3,422	4,0
Balance	-409	- 421	- 646	- 663	- 673	-1,034	-1,299	-1,365	-1,864	-2,405	-3,0
Of which Radios, TVs, Phonographs, Tape Recorders, Records											
Exports	83	93	86	73	93	99	120	120	148	180	1
Imports	146	183	253	280	290	399	573	641	880	1,123	1,3
Auto Products (exclud. Canada)											
Exports	866	817	832	939	1,092	1,062	1,084	1,029	1,075	1,152	1,1
Imports	622	375	512	557	665	693	994	1,035	1,677	1,853	2,3
Balance	244	442	320	382	427	369	90	- 6	- 602	- 701	-1,1

DETERIORATION IN U.S. TRADE BALANCE SINCE 1964

The U.S. trade surplus dropped from a peak of $6.8 billion in 1964 to $2.1 billion in 1970. We experienced deterioration in our trade position with nearly all areas of the world except for Latin America and parts of Western Europe. As the chart illustrates, the deterioration in our trade with Canada was more than $2 billion and the deterioration in our trade with Japan was $1.5 billion. With the EC, our trade position deteriorated about $700 million.

DETERIORATION OF U.S. TRADE BALANCE SINCE 1964



SOURCE: U.S. CENSUS BUREAU AND SURVEY OF CURRENT BUSINESS

DETERIORATION in U.S. TRADE
BALANCE SINCE 1964
($ millions)

	1964	1970
EEC	2436	1740
Other W. Europe	942	1189
Canada	593	-1645
Japan	200	-1240
Latin America	74	576
Other Countries	2404	1565

Source: Survey of Current Business and U.S. Census Bureau.

5/18/71

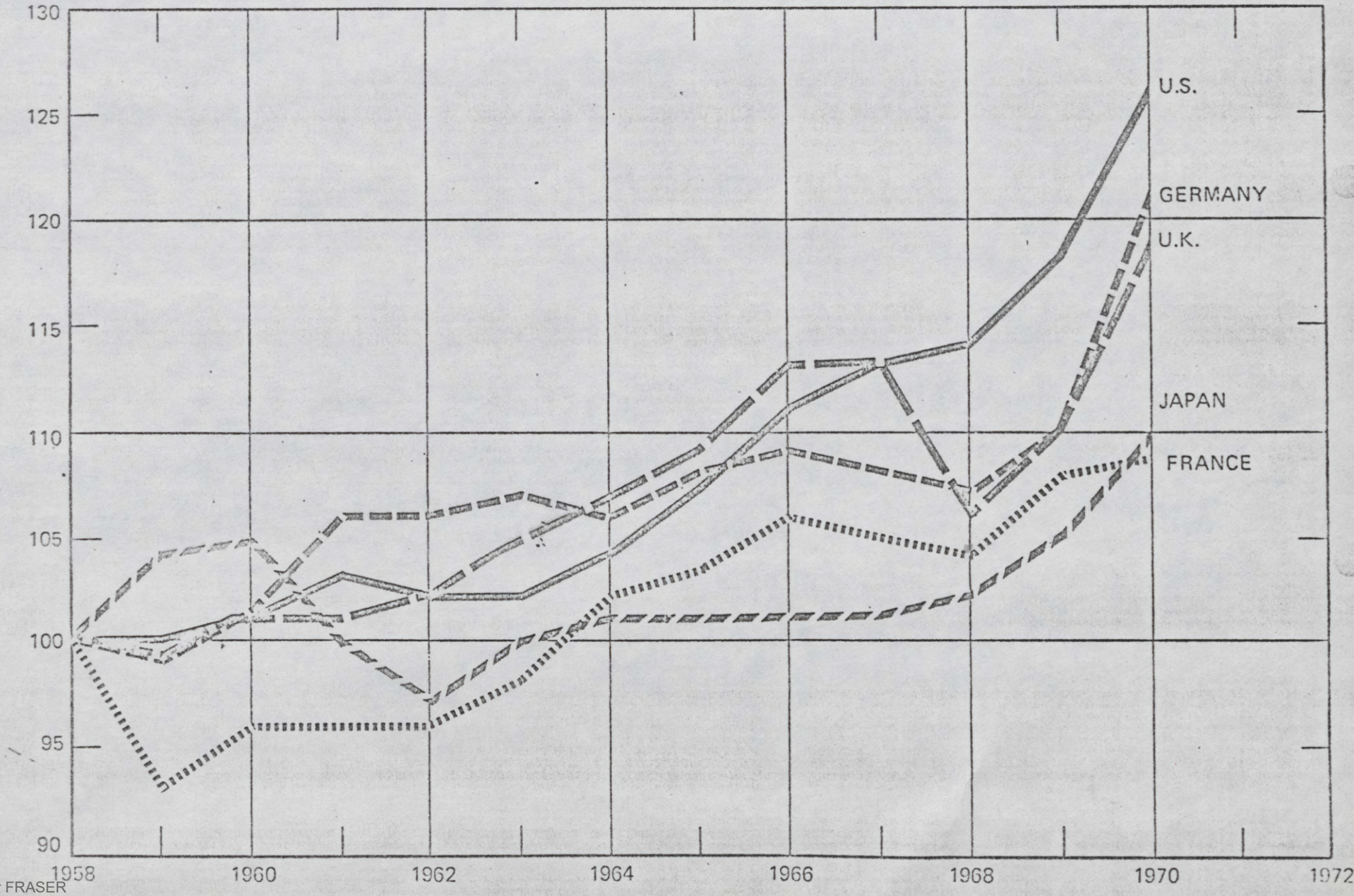
TRENDS IN EXPORT PRICES IN SELECTED COUNTRIES

This chart indicates that U.S. export prices have been rising much more rapidly than those of our major competitors. The index suggests that U.S. export prices last year were 25% above the level of 1958, while France and Japan showed increases (expressed in dollars) of 10% or less.

The data used in this chart are not wholly satisfactory and should be used with caution. It is very difficult to measure changes over time in prices of capital equipment and other high technology products which are not highly standardized.

TRENDS IN EXPORT PRICES IN SELECTED COUNTRIES

(EXPRESSED IN U.S. DOLLARS)



SOURCE: INTERNATIONAL FINANCIAL STATISTICS

TRENDS IN EXPORT PRICES IN SELECTED COUNTRIES
(Expressed in U.S. Dollars)
(1958 = 100)

	U.S.	U.K.	Japan	France	Germany
1958	100	100	100	100	100
1959	100	99	104	93	99
1960	101	101	105	96	101
1961	103	101	100	96	106
1962	102	102	97	96	106
1963	102	105	100	98	107
1964	104	107	101	102	106
1965	107	109	101	103	108
1966	111	113	101	106	109
1967	113	113	101	105	108
1968	114	106	102	104	107
1969	118	110	105	108	110
1970	126	119	110	109	121

Source: International Financial Statistics

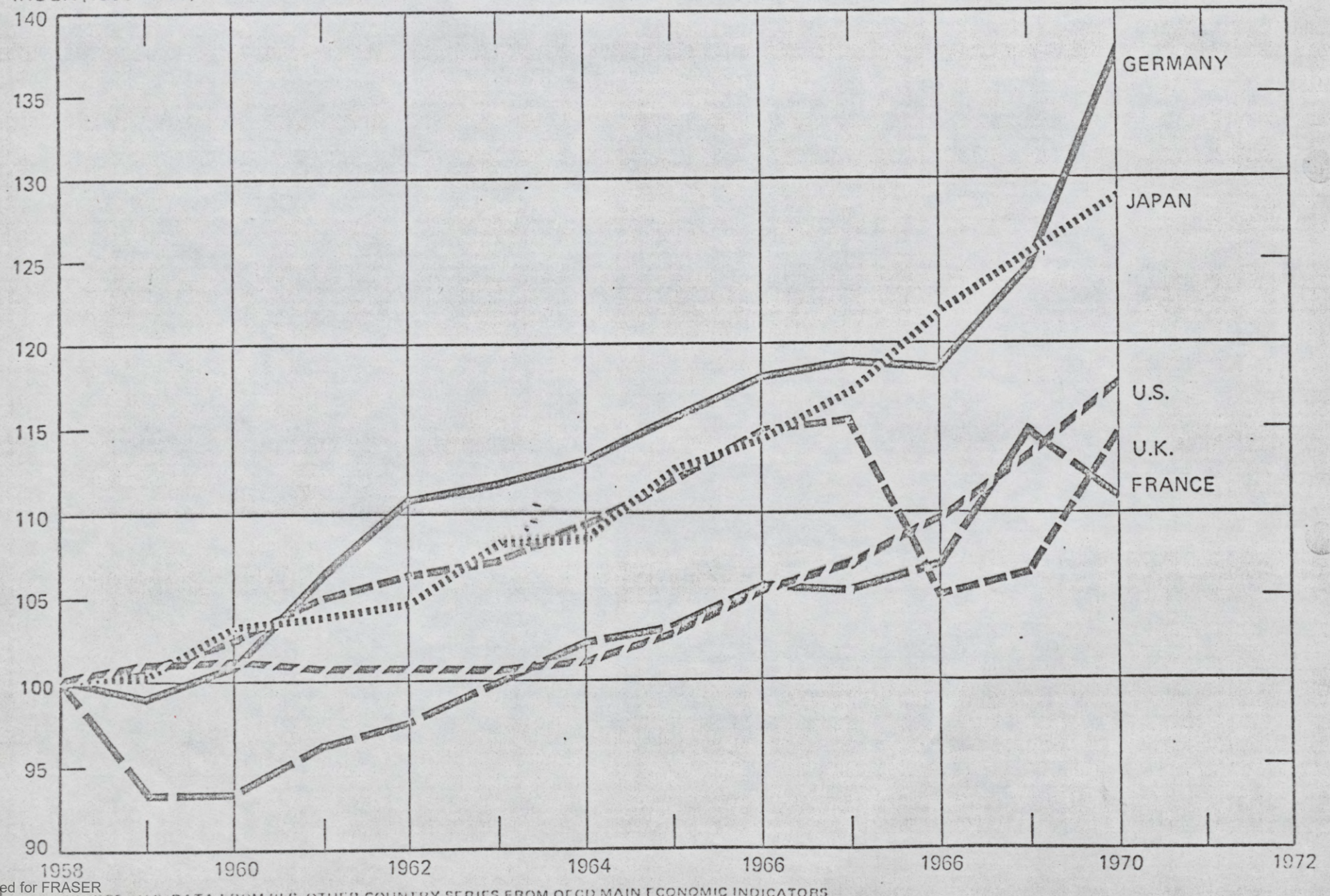
5/18/71

Trends in Wholesale Prices of Manufacturers

As this chart indicates, U.S. wholesale prices have risen about 17 percent since 1958. Measured in terms of dollars, the U.K. and France show slightly smaller increases in their wholesale price level but both countries have devalued their currencies during this period. Japan and Germany show more rapid increases in wholesale prices. A major part of the German increase is the result of currency revaluations in 1961 and again in 1968.

TRENDS IN WHOLESALE PRICES OF MANUFACTURES IN SELECTED COUNTRIES

(ADJUSTED FOR EXCHANGE RATE CHANGES)



SOURCE: U.S. DATA FROM BLS, OTHER COUNTRY SERIES FROM OECD MAIN ECONOMIC INDICATORS

TRENDS IN WHOLESALE PRICES OF MANUFACTURES
IN SELECTED COUNTRIES
(Adjusted For Exchange Rate Changes)
1958=100

	U.S.	U.K.	Japan	Germany	France
1958	100.0	100.0	100.0	100.0	100.0
1959	100.8	100.7	100.4	99.0	93.1
1960	101.1	102.3	103.0	100.8	93.3
1961	100.6	105.0	104.0	106.3	96.1
1962	100.7	106.3	104.2	110.6	97.4
1963	100.6	107.0	108.3	111.8	100.0
1964	101.0	109.0	108.3	112.9	102.2
1965	102.7	111.9	112.3	115.5	102.9
1966	105.6	114.8	114.7	118.0	105.5
1967	106.7	115.3	116.9	118.7	105.2
1968	109.4	105.0	121.8	118.5	106.8
1969	113.2	106.3	125.2	124.5	114.6
1970	117.5	114.2	128.7	137.0	110.9

Sources: U.S. Data From BLS; other country series from OECD Main Economic Indicators

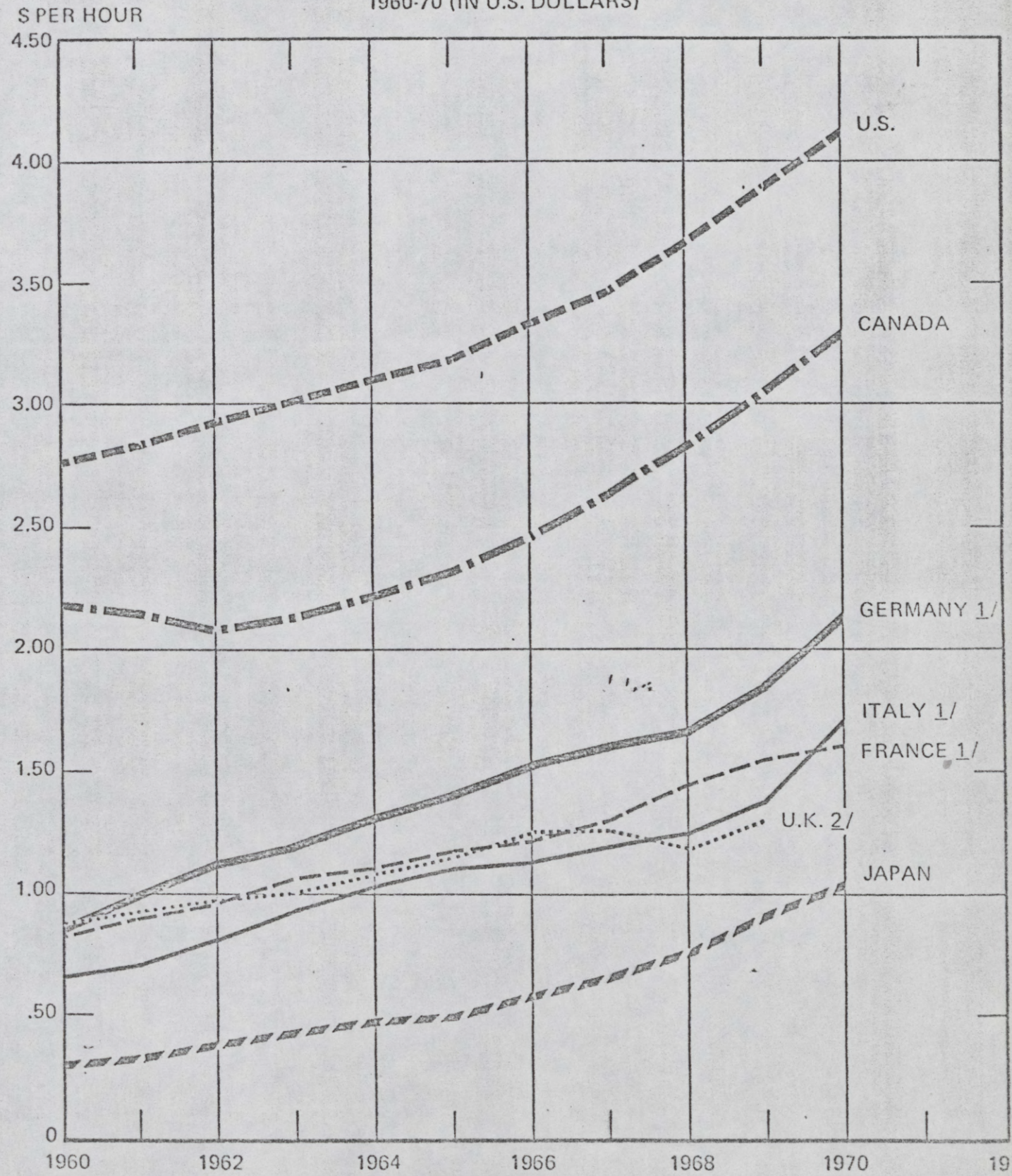
5/18/71

COMPENSATION PER HOUR IN MANUFACTURING

This chart shows that despite the fact that U. S. wage rates have not risen as rapidly in percentage terms as those of our major competitors, they remain at a much higher level and the gap in the amount of compensation measured in dollars has tended to widen. These figures tell only part of the story. Another important aspect - relating to changes in U. S. productivity -- is shown by the charts "Trends in Output per Man-hour in Manufacturing" and "Trends in Wage Costs per Unit of Output".

TOTAL COMPENSATION PER HOUR WORKED IN MANUFACTURING INDUSTRY, SELECTED COUNTRIES

1960-70 (IN U.S. DOLLARS)



1/ 1ST HALF 1970 ONLY

2/ 1970 NOT AVAIL.

SOURCE: DERIVED FROM COUNTRY DATA AND ADJUSTMENT FACTORS SUPPLIED BY BLS.

Total Compensation Per Hour Worked in Manufacturing Industry
Selected Countries: 1960-70 (in U.S. dollars)

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
U.S.	2.76	2.83	2.92	3.00	3.09	3.18	3.32	3.45	3.67	3.89	4.10
Canada	2.18	2.14	2.08	2.12	2.21	2.31	2.45	2.62	2.82	3.04	3 3
U.K.	.87	.92	.97	1.00	1.08	1.15	1.24	1.27	1.19	1.30	N.A.
W. Germany	.85	.99	1.11	1.19	1.29	1.41	1.52	1.58	1.64	1.84	2.17*
France	.82	.89	.96	1.05	1.10	1.16	1.22	1.30	1.44	1.55	1.60*
Italy	.65	.70	.81	.93	1.03	1.09	1.12	1.19	1.24	1.37	1.68*
Japan	.29	.32	.37	.41	.46	.50	.57	.64	.75	.90	1.03*

* 1st half only for 1970.

Source: Derived from country data and adjustment factors supplied by BLS.

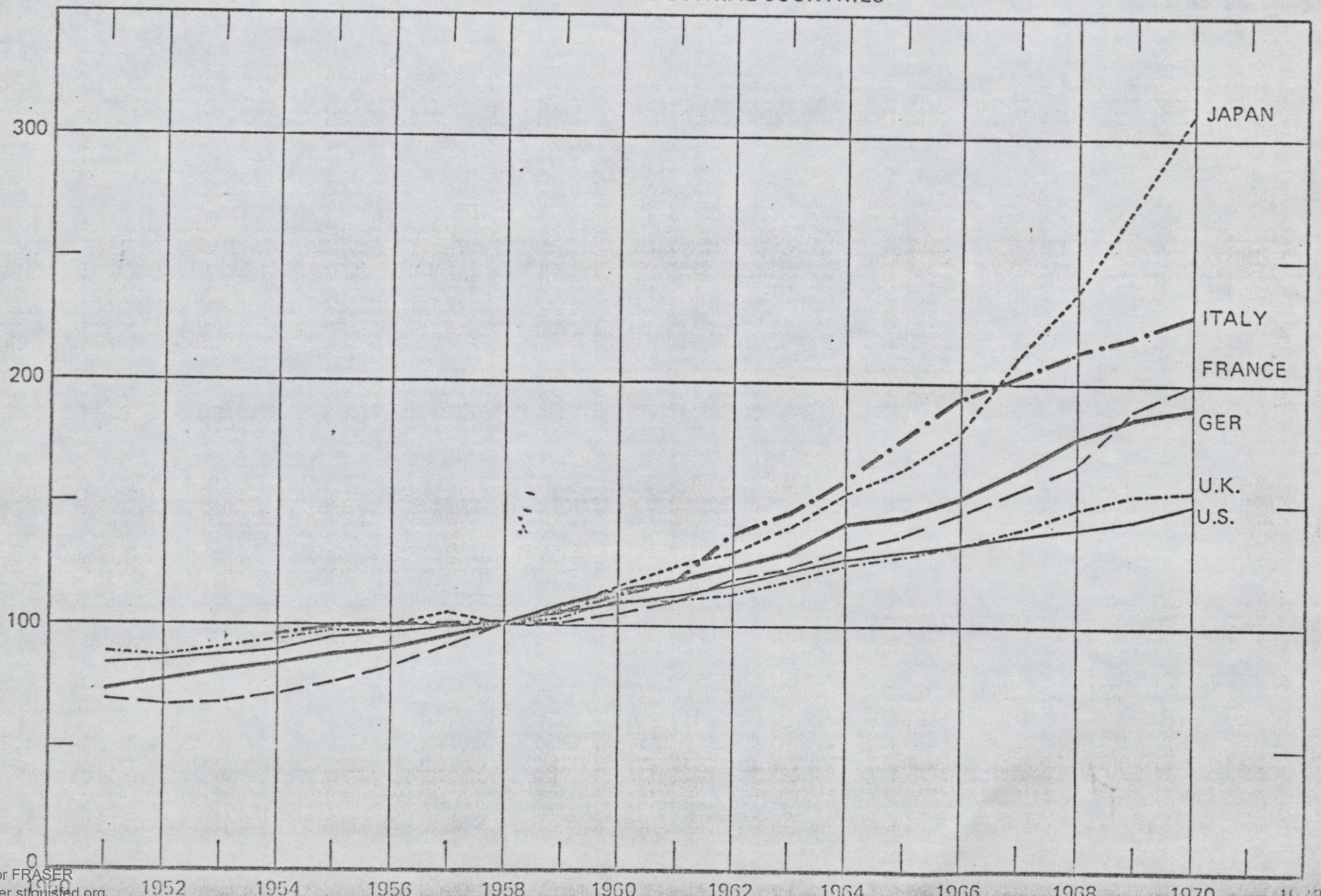
5/18/71

TRENDS IN OUTPUT IN MANUFACTURING

This chart compares U.S. performance with that of other major industrial countries in output per man hour. What it brings out is that the U.S. and the U.K. are not only at the bottom of the list in performance but are also steadily worsening their positions in relation to the Japanese, the Italians, the Germans and the French.

TRENDS IN OUTPUT PER MAN-HOUR IN MANUFACTURING

U.S. AND MAJOR INDUSTRIAL COUNTRIES



TRENDS IN OUTPUT PER MAN-HOUR IN MANUFACTURING
U.S. and Major Industrial Countries
1958=100

	U.S.	U.K.	West Germany	France	Italy*	Japan
1951	84	89	74	68		
1952	85	87	77	67		
1953	88	91	81	69		
1954	89	93	85	74	94	
1955	95	97	89	79	98	
1956	96	96	91	83	100	99
1957	99	99	97	92	100	105
1958	100	100	100	100	100	100
1959	106	105	108	102	105	107
1960	109	110	114	106	113	115
1961	113	110	117	110	117	125
1962	118	113	123	121	138	128
1963	123	119	130	125	145	139
1964	128	126	143	134	159	154
1965	132	130	147	139	177	164
1966	135	135	151	148	193	179
1967	138	140	164	155	201	210
1968	142	149	178	166	212	236
1969	146	153	187	199	219	272
1970E	150	155	190	198	227	309

*All industries.
Source: National Institute Economic Review (U.K.)

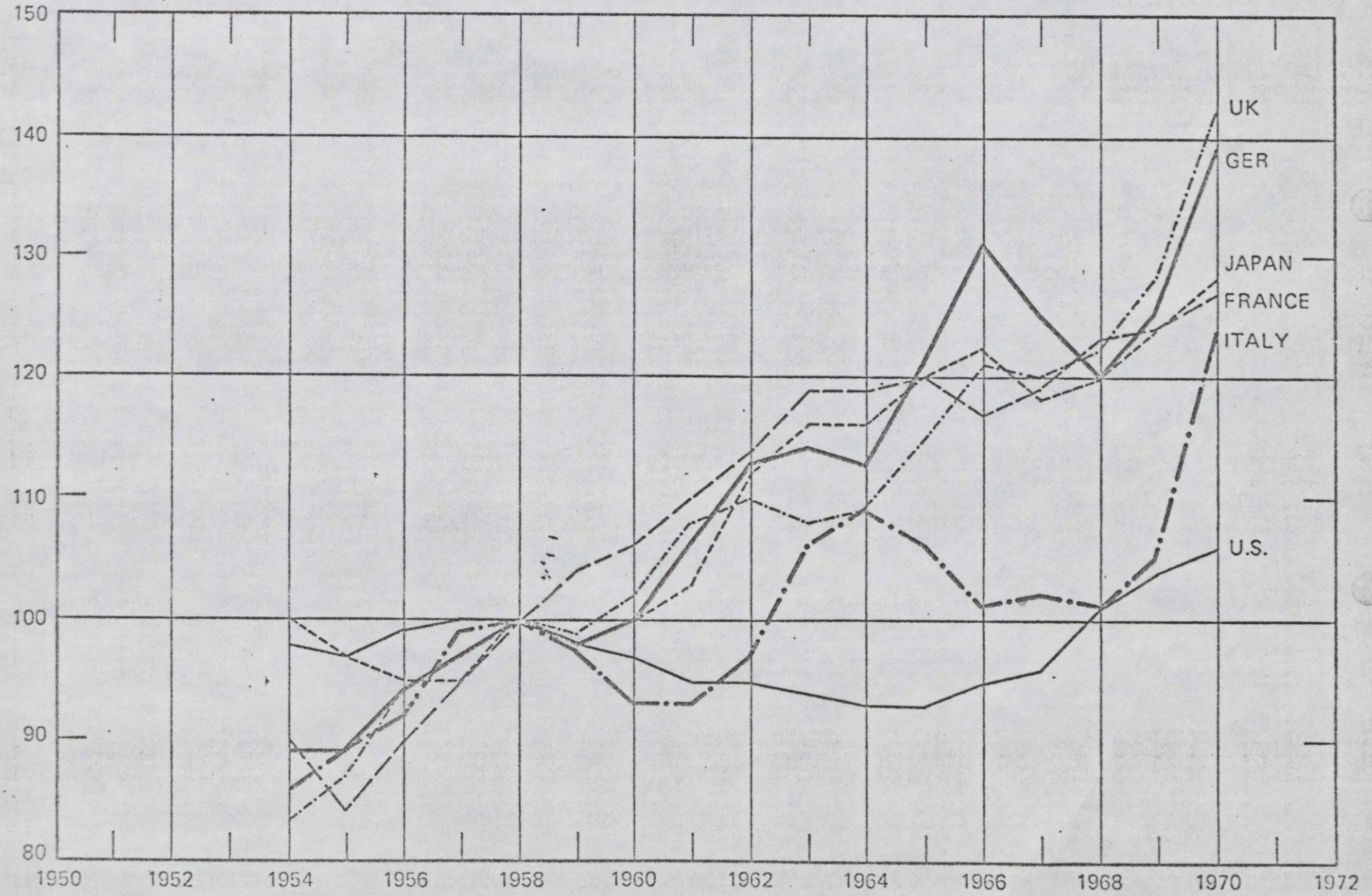
5/18/71

TRENDS IN WAGE COSTS PER UNIT OF OUTPUT

In looking at wage costs per unit of output the United States has done much better. In the early 1960's we succeeded in reducing wage costs to some extent, and although they have risen rapidly in the last three years, in 1970 they were only 6% above the 1958 level. Our major competitors meanwhile had allowed their wage costs to rise much more rapidly. The Italians, French and Japanese show an increase of between 25 and 30% since 1958, while the Germans and the British show increases of around 40% in their own currencies.

TRENDS IN WAGE COSTS PER UNIT OF OUTPUT

U.S. AND MAJOR INDUSTRIAL COUNTRIES (IN NATIONAL CURRENCIES)



SOURCE: NATIONAL INSTITUTE ECONOMIC REVIEW (U.K.)

TRENDS IN WAGE COSTS PER UNIT OF OUTPUT
U.S. and Major Industrial Countries (In National Currencies)
1958=100

	U.S.	U.K.	West Germany	France	Italy	Japan
1951						
1952						
1953						
1954	98	83	89	90	86	100
1955	97	87	89	84	89	97
1956	99	94	94	90	92	95
1957	100	97	97	95	99	95
1958	100	100	100	100	100	100
1959	98	99	98	104	98	100
1960	97	102	100	106	93	100
1961	95	108	106	110	93	103
1962	95	110	113	114	97	112
1963	94	108	114	119	106	116
1964	93	109	113	119	109	116
1965	93	115	121	120	106	120
1966	95	121	131	117	101	122
1967	96	120	125	119	102	118
1968	101	122	120	123	101	120
1969	104	128	125	124	105	124
1970E	106	142	139	127	124	128

Source: National Institute Economic Review

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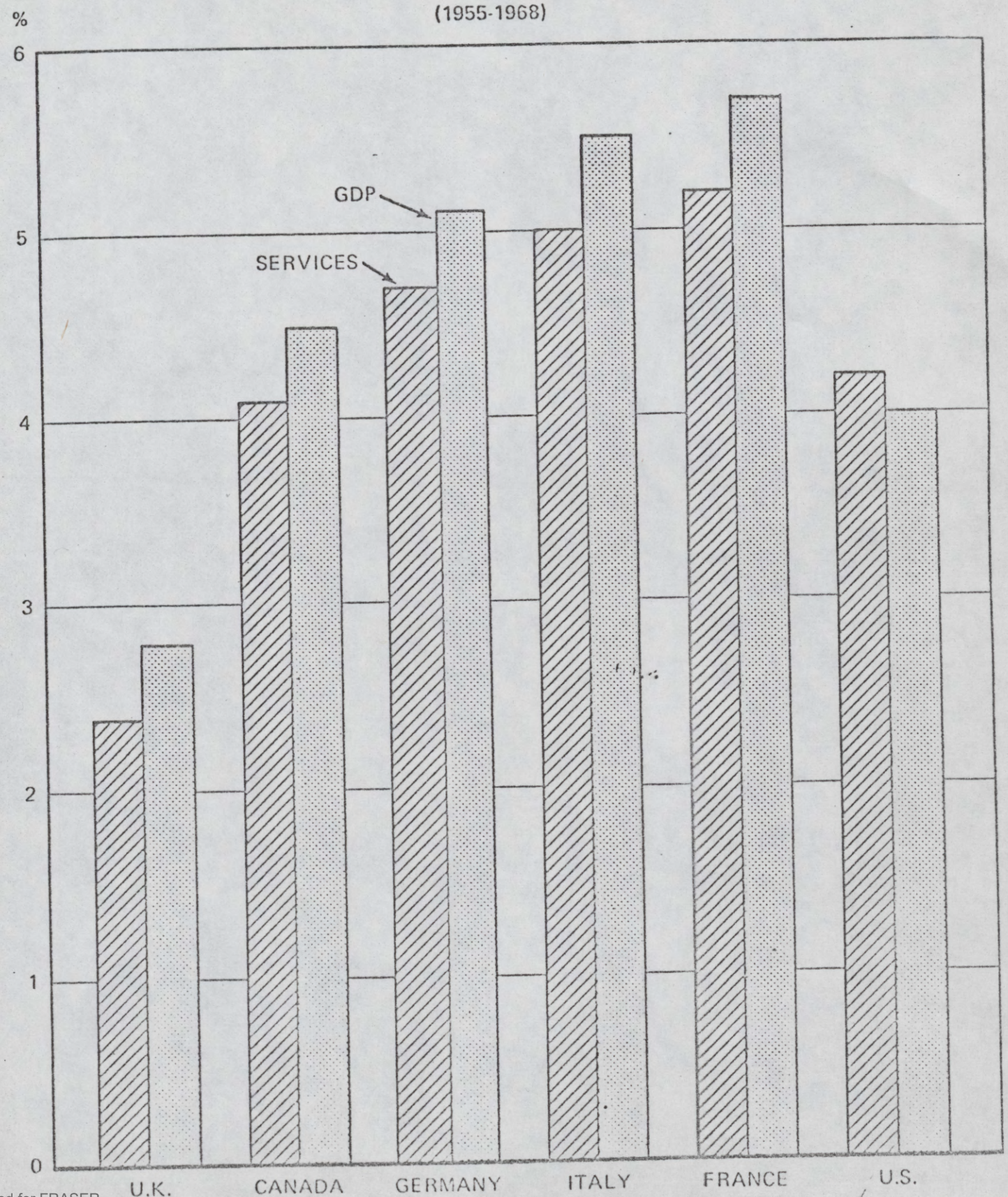
TREND RATES OF GROWTH

This chart shows that the services sector of the American economy, whose output in the main cannot be exported, is growing more rapidly than the economy as a whole, whereas in other major industrial countries the services sector is growing somewhat more slowly.

TREND RATES OF GDP AND SERVICE SECTOR GROWTH

(1955-1968)



SOURCE: OECD, THE GROWTH OF OUTPUT 1960-1970

TREND RATES OF GDP AND SERVICE SECTOR GROWTH
(1955-1968)

	Service Sector	GDP
Canada	4.1	4.5
U.S.	4.2	4.0
Japan	N.A.	10.2
France	5.2	5.7
Germany	4.7	5.1
Italy	5.0	5.5
U.K.	2.4	2.8

Source: OECD, The Growth Of Output 1960-1980

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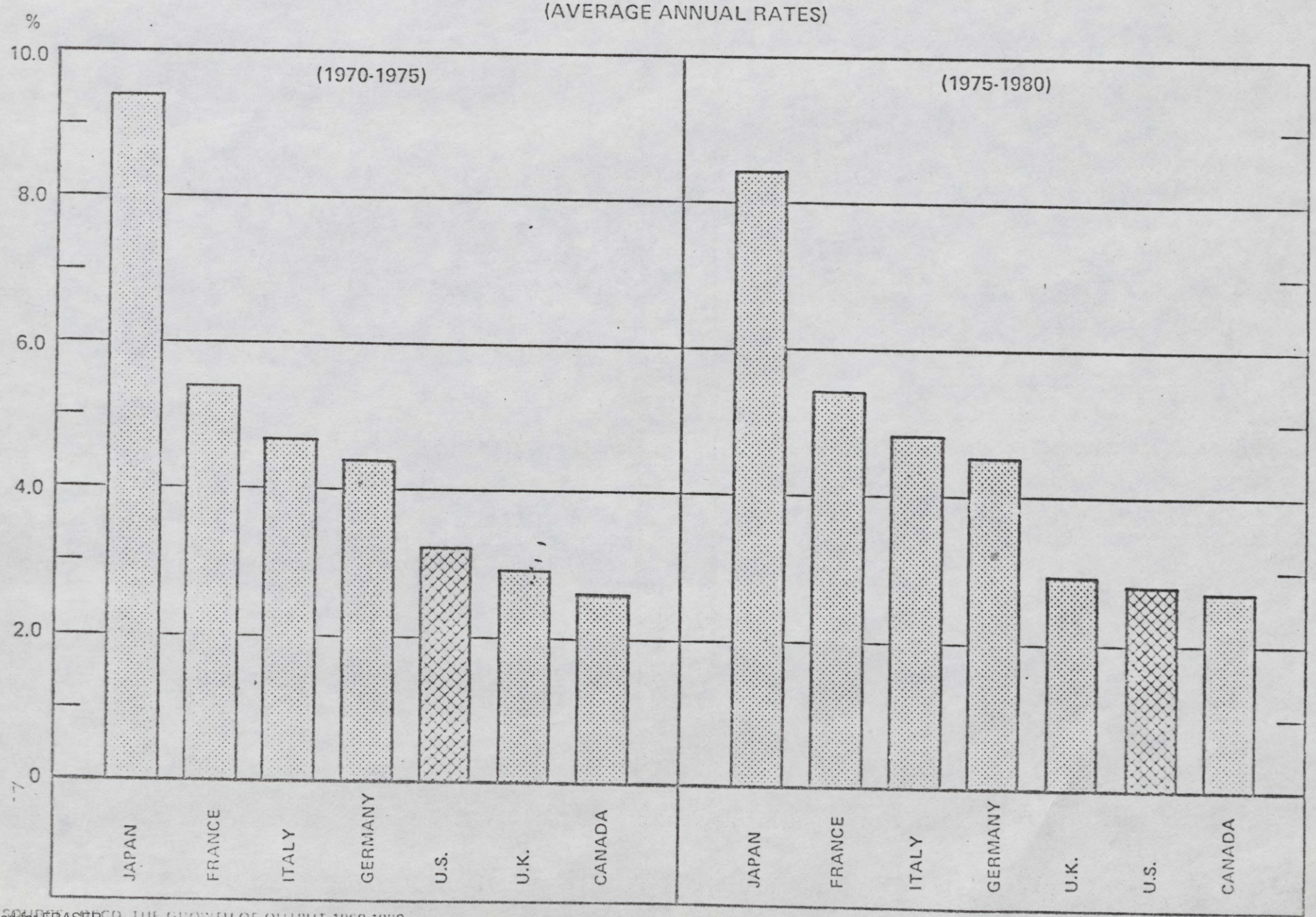
GROWTH PER OUTPUT, PER PERSON EMPLOYED

This chart shows OECD projections of the growth of output per person employed which the major industrial countries can expect over the decade of the 70's. What is important to note is that the U.S. growth rate is not only expected to remain among the lowest of the major countries but also is expected to decline between 1970-75 and 1975-80.

PROJECTED GROWTH OF OUTPUT PER PERSON EMPLOYED

(AVERAGE ANNUAL RATES)



SOURCE: OECD, THE GROWTH OF OUTPUT 1960 1980

PROJECTED GROWTH OF OUTPUT PER PERSON EMPLOYED
(Average Annual Rates)

	1970-1975	1975-1980
Canada	2.6	2.7
United States	3.2	2.8
Japan	(9.4)	(8.4)
France	(5.4)	(5.4)
Germany	(4.4)	(4.5)
Italy	4.7	4.8
United Kingdom	(2.9)	(2.9)
Total	4.4	3.6

( ) OECD Secretariat Estimations

Source: OECD, The Growth of Output: 1960-1980

5/18/71

Balance of Payments Project Team April 20, 1971

F. Lisle Widman

Identification and distribution of documents

In order to facilitate the handling and distribution of documents being prepared for the current series of balance of-payments projects, we propose to establish four series of papers, each of which will be numbered serially according to date of preparation.

Papers which have been approved by the Advisory and Review Group and are ready for distribution to policy officials will be given a number in a "Project Report" (PR) series or, if highly sensitive, in a "Project Report Limited" (PR LIM) series. The designation should appear in the upper right hand corner of the first page and also on the cover note, as:

Treas -- OASIA
B/P Projects
PR _____
(Date)

A cover note describing the paper will normally be addressed to Undersecretary Volcker through Assistant Secretary Petty and will go from Mr. Schmidt, Mr. Cates or from me.

When revisions of such papers are approved the revised document will show the original number followed by "/Rev". Appendices which may be distributed at a later date will use the original number followed by "APP _".

All drafts, papers prepared as back-up documents, and other contributions which have not been approved for distribution to policy officials will be given a number in a "Working Document" (WD) series or, if highly sensitive in a (WD LIM) series. Each document of this type should be distributed with a cover note addressed to me from the drafting officer which explains the purpose, and identifies the particular project to which the paper is related.

Mrs. Webber will assign the necessary numbers, maintain a running index, and arrange the necessary reproduction and distribution.

Tentatively, we plan the following distribution:

(1) Project Reports -- Limited distribution:

Under Secretary Volcker
Assistant Secretary Petty
Deputy Under Secretary MacLaury
Deputy Assistant Secretary Webster
Deputy Assistant Secretary Schmidt
Deputy Assistant Secretary Hennessy
Deputy Assistant Secretary Cates
Mr. Willis
Mr. Dale
Mr. Bradfield
Mr. Nelson
Mr. Sam Cross
Mr. Harley
Mr. Schaffner
Mr. Widman

(2) Project Reports -- Regular distribution:

Those receiving limited distribution documents plus all members of project teams.

(3) Working Documents -- Limited distribution:

Deputy Assistant Secretary Schmidt
Deputy Assistant Secretary Cates
Mr. Willis
Mr. Dale
Mr. Harley
Mr. Bradfield
Mr. Schaffner
Mr. Sam Cross
Mr. Widman
Drafter

(4) Working Documents -- Regular:

Those receiving limited distribution working drafts plus all members of project teams.

Other members of the project teams include Messrs. Brown, Curtis, Fauver, Gaaserud, Grubel, Keran, Klock, Lederer, Leddy, McCamey, McFadden, Meissner, J. Newman, and Miss Steiner.

OAS:
Widman:bmg 4/20/71

Under Secretary Volcker
(Through Dr. Schmidt)

April 20, 1971

F. Lisle Widman

Distribution of Documents Being Prepared for the Balance of Payments Project

It will no doubt be necessary to prepare quite a number of papers over the next few months in connection with the balance of payments projects initiated in response to our recent discussion. We propose to number the papers prepared for this series serially and to distribute them as follows:

(1) Project Reports -- Limited distribution:

Under Secretary Volcker
Assistant Secretary Petty
Deputy Under Secretary MacLaury
Deputy Assistant Secretary Webster
Deputy Assistant Secretary Schmidt
Deputy Assistant Secretary Hennessy
Deputy Assistant Secretary Cates
Mr. Willis
Mr. Dale
Mr. Bradfield
Mr. Nelson
Mr. Sam Cross
Mr. Harley
Mr. Schaffner
Mr. Widman

(2) Project Reports -- Regular distribution:

Those receiving limited distribution documents plus all members of project teams.

(3) Working Documents -- Limited distribution:

Deputy Assistant Secretary Schmidt
Deputy Assistant Secretary Cates
Mr. Willis
Mr. Dale
Mr. Harley
Mr. Bradfield
Mr. Schaffner

TO: Research Staff February 8, 1973

FROM: Thomas D. Willett TW

On Monday, February 12, there will be a discussion of Mr. Curtis's paper: "Recent Massive Deterioration and Current Behavior of U. S. Foreign-Trade Balance" in Room 5470 at 2:30 p.m. Anyone who would like to attend can get a copy of the paper from Mr. Curtis.

OASIA:RESEARCH:MGJohnson 2/9/73

DWCurtis:cap

Recent Massive Deterioration and Current Behavior of U.S. Foreign-Trade Balance

This memorandum reviews the evolution of the U.S. trade-account position over the past four years, with the objective of clarifying as much as possible three questions:

(a) Just how long and how far did the deterioration which began in the last part of 1970 continue?

(b) What has been the main area composition of this recent deterioration in the aggregate trade position?

(c) What, if any, pattern appears to have been emerging during 1972?

The statistics used in this review are all in the form of six-month moving averages of seasonally adjusted monthly data, disregarding the two periods (early-1969 and from June 1971 through January 1972) when the month-by-month trade flows were distorted by major U.S. dock strikes. This is believed to provide a more reliable and informative basis for assessing developments over this period than any alternative simple formulation of the available statistics.

Chart 1, attached shows the behavior on this measurement since mid-1969 of the U.S. aggregate trade balance with all foreign areas.

On the basis of the moving-average data shown by the heavy black line in this chart, together with the indicated straight-line interpolations bridging over the dock-strike periods, the chart shows a clear-cut sequence of three quite different patterns:

(a) A moderate improvement between early 1969 and mid-1970 (which was widely recognized to be a temporary cyclical effect of our domestic recession).

(b) A rapid and sustained deterioration thereafter which apparently continued unabated through the whole period of dock-strike distortions into the first few months of 1972 and amounted in total, to an almost $900 million per month (annual rate over $10 1/2 billion) adverse swing in our global trade position.

(c) Since April of last year, a clear halt to the previous deterioration but only minimal, if any, net recovery.

Chart 2. shows the broad area composition of this shifting over-all trade -- tracing, over the same period on the same six-months-average basis, our net trade balances with: (1) Canada only; (2) total other Developed Areas; and (3) total Less Developed Countries; ~~(this chart also~~

(4) ~~Includes trade with~~ Communist areas - which until mid-1972 was too small to show, since then has contributed an additional $35 million per month of average net surplus toward improvement of our world-wide position).

Major facts evident from this chart include the following:

(a) Slightly more than two-thirds of the total amount of the mid-1970 to early-1972 deterioration in our global trade balance, as well as the timing of the beginning and end of this aggregate deterioration, reflected our trade with developed countries other than Canada.

(b) The aggregate balance with all less developed countries shows a similar pattern of initial improvement (lagging six to twelve months behind that with developed countries) followed by clear-cut deterioration extending from the beginning of 1971 through at least the middle of last year;

(c) The pattern on net trade with Canada is both totally different from that with the other areas and largely inconclusive pending further analysis.

(d) Trade with Communist areas

More detailed calculations, not shown in those charts, indicate that the total deterioration (amounting to $650 million per month, or a $7.8 billion annual rate) between mid-1970 and early-1972 in U.S. net trade with the Other Developed group of countries was distributed as follows:

-- almost half ($250 million) with Japan;

-- a further $200 million with the EC Six combined;

-- leaving a $200 million remainder spread (more or less equally) among three sources: (1) the U.K.; (2) a residual for "other" West Europe and (3) the Australia/New Zealand/South Africa group.

One obvious, but presumably only partial, cause of these shifts was the divergence between domestic cyclical patterns in Japan and West Europe compared with the United States. Chart 3, presenting U.S. gross imports and gross exports with this group of countries on the same six-month moving-average basis used in the first two charts, shows very clearly the cyclical origins of the turning points in the behavior of our net position on this important component of the total trade account, notably:

-- our recession-induced decline in imports during late 1969 giving way in the first quarter of 1970 to renewed rapid import growth;

-- an abrupt halt in the previously rapid growth of

U.S. exports to these major countries beginning in the third quarter of 1970; and

-- a renewal of growth in such exports not finally reappearing until the second quarter of last year.

What particularly stands out from this chart, is the striking discrepancy between the apparent brevity of the recession induced decline in our imports and the long (1 3/4 years) period of either decline or complete stagnation in U.S. total exports to these countries. Pending careful econometric analysis, it does not appear plausible that differential cyclical situations alone can explain this discrepancy between U.S. export and import performance in bilateral trade with these countries.

In the case of Less Developed areas, both the country distribution and the causes of the $300 million month peak-to-trough deterioration in our aggregate trade balance with the group are less amenable to cursory examination and apparently more diverse. However, the following points can be noted:

-- The clearest single factor here (accounting for one-third of our total deterioration with LDC's) is the worsening balance with a Miscellaneous East-Asia group, dominated by Taiwan, Hong Kong, and South Korea -- where the growth rate of our

total imports (presumably mainly of manufactures) has been extremely rapid for several past years and showed perceptible acceleration during 1972.

-- A second area of fairly clear-cut deterioration, beginning in mid-1970, is with LDC-Africa (where increased imports, presumably oil, from Nigeria and Libya have apparently been the major element).

-- Most of the remaining deterioration on our LDC trade can probably be found in Latin America -- but is not, however, readily attributable to any particular country, product, or cause.

Although the product-category statistics show a roughly $200 million per month increase since early 1971 in total mineral-fuel imports, the bulk of this appears to have come from the above-cited African LDC's plus Canada. (With Near-East Asia, over this same 1971-72 period, our all-product gross imports have grown only $30 million per month which was offset by more than half increased exports).

The pattern (or lack of pattern) shown by Chart 2 for U.S. net trade with Canada warrants several comments.

(a) This balance is, of course, heavily influenced by the U.S.-Canadian automotive trade which, besides being very large, also has strong seasonal patterns of its own and, thus, probably should be analyzed separately.

(b) Review of our gross export and import pattern with Canada (similar to that shown in Chart 3 for the Other Developed group) suggests that the approximate simultaneity, plus a more nearly equal impact on imports and exports, of the U.S. and Canadian cyclical swings was probably the major shown by our net trade balances with Canada from that with Japan and Europe.

(c) While the Chart shows a trade-balance improvement with Canada during 1972 that is, ostensibly both sharper and slightly greater than with the Other Developed group, roughly half of that gain with Canada reflected an extraordinary August shortfall (due to several abnormal factors) in both auto and other imports from Canada.

Later accounting for the trade distortions

TO: Messrs. Volcker, Hannessy, Pennett, Willis, Widman, Cross, Lederer, Schotta and Ranson

February 8, 1973

FROM: Thomas D. Willett TW

I thought you might find of interest the attached comments by Gottfried Haberler on Art Laffer's recent article in the Wall Street Journal.

Attachment

OASIA:RESEARCH:TDWillett:MGJ 2/8/73

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

FOR INFORMATION

TO : Deputy Assistant Secretary Willett
Through: Charles Schotta)

DATE: January 31, 1973

FROM : Sung Kwack and David Coe

SUBJECT: Relation of U.S. Global Trade Balance to the Global Balances of Major Foreign Countries: Revision

The Canadian and Japanese data used in the empirical work reported in the memo of January 11, 1973 was found to be inconsistent with the balance of payments data from those countries. This is especially serious in the case of Japan whose imports on a "customs clearance" basis include foreign military supplies shipped to Japan.

We have, therefore, re-estimated the equations and given them in Table 1. The notable change in our finding is that the importance of Canada's trade balance as an explainatory variable has changed with time. However, the substance of our findings is unchanged; we summarize the findings below:

1. The global balances of the U.S., Canada, Japan and West Germany are offsetting in the sense that one can improve its balance only at the expense of the others.

2. Canada's global balance does not appear to significantly affect the U.S. global balance. We treat this finding tentatively because of multicollinearity between the foreign global balances.

3. Changes in Japan's global balance have the largest negative impact on the U.S. balance.

The magnitude of each coefficient indicates the change in the U.S. global balance resulting from a change in a foreign global balance, when the remaining foreign global balances are constant. It is, however, extremely unlikely that the underlying ceteris paribus assumption is valid.

Solely to illustrate the importance of interactions of foreign global balances on the U.S. global balance, we have constructed a very naive three equation recursive model where Japan's global balance is the only exogenous variable. The estimated equations of the model are attached in Table 2. Using the model we find that one billion dollar deterioration

in Japan's global balance will improve the U.S. global balance by 0.974 billion dollars. This figure differs from an improvement of 0.817 billion dollars obtained with the ceteris paribus assumption. We note, however, that the difference between the two values is marginally significant. This is due to the incomplete specifications of the model, indicating the need of further intensive work.

The relationship between the U.S. and foreign global balances estimates for 60:1-71:4 is typical and is shown in Figure 1. We know from Table 1 that the standard error of estimates is 1.648 billion dollars. If the sum of Canada, Japan and West Germany's global balance is a 17.0 billion dollar surplus in 1972 and if we use a 2.0 standard error criteria, then the U.S. global balance will be a 6.1 billion dollar deficit. For the case in which the sum of the foreign global balances is zero, the U.S. global balance is expected to be a surplus from 3.5 to 8 billion dollars.

Attachments including data set

cc: Messrs. Widman, Cline

TABLE 1

United States Trade Balance Equations

	$\bar{R}^2$	SEE	DW	SSR
A. Sample Period 1960:1 to 71:4				
$BAL_{US} = \underset{(16.96)}{6.189} - \underset{(10.14)}{0.529}^{*} (BAL_{CA} + BAL_{JP} + BAL_{WG})$	0.684	1.648	1.514	124.9
$BAL_{US} = \underset{(14.19)}{5.907} + \underset{(0.02)}{0.008}^{*} BAL_{CA} - \underset{(6.05)}{0.818}^{*} BAL_{JP} - \underset{(1.93)}{0.359}^{*} BAL_{WG}$	0.706	1.590	1.809	111.3
$BAL_{US} = \underset{(14.37)}{5.906} - \underset{(6.90)}{0.817}^{*} BAL_{JP} - \underset{(2.08)}{0.357}^{*} BAL_{WG}$	0.712	1.573	1.806	111.3
B. Sample Period 1962:1 to 71:4				
$BAL_{US} = \underset{(14.16)}{6.341} - \underset{(9.31)}{0.546}^{*} (BAL_{CA} + BAL_{JP} + BAL_{WG})$	0.687	1.700	1.588	109.8
$BAL_{US} = \underset{(12.68)}{6.053} + \underset{(0.05)}{0.020}^{*} BAL_{CA} - \underset{(5.88)}{0.847}^{*} BAL_{JP} - \underset{(1.93)}{0.372}^{*} BAL_{WG}$	0.712	1.632	1.911	95.8
$BAL_{US} = \underset{(12.86)}{6.053} - \underset{(6.63)}{0.843}^{*} BAL_{JP} - \underset{(2.07)}{0.368}^{*} BAL_{WG}$	0.720	1.610	1.902	95.9
C. Sample Period 1960:1 to 70:4				
$BAL_{US} = \underset{(15.70)}{5.864} - \underset{(6.68)}{0.433}^{*} (BAL_{CA} + BAL_{JP} + BAL_{WG})$	0.504	1.568	1.500	103.3
$BAL_{US} = \underset{(13.90)}{5.856} - \underset{(0.36)}{0.141}^{*} BAL_{CA} - \underset{(2.96)}{0.584}^{*} BAL_{JP} - \underset{(2.19)}{0.416}^{*} BAL_{WG}$	0.489	1.591	1.657	101.3
$BAL_{US} = \underset{(14.14)}{5.869} - \underset{(3.56)}{0.617}^{*} BAL_{JP} - \underset{(2.48)}{0.440}^{*} BAL_{WG}$	0.500	1.574	1.748	101.6
D. Sample Period 1960:1 to 69:4				
$BAL_{US} = \underset{(15.47)}{6.111} - \underset{(6.45)}{0.525}^{*} (BAL_{CA} + BAL_{JP} + BAL_{WG})$	0.510	1.551	1.639	91.4
$BAL_{US} = \underset{(14.16)}{5.988} - \underset{(1.69)}{0.995}^{*} BAL_{CA} - \underset{(3.04)}{0.596}^{*} BAL_{JP} - \underset{(1.79)}{0.342}^{*} BAL_{WG}$	0.500	1.567	1.548	88.4
$BAL_{US} = \underset{(13.75)}{5.946} - \underset{(3.62)}{0.694}^{*} BAL_{JP} - \underset{(2.52)}{0.459}^{*} BAL_{WG}$	0.476	1.605	1.739	95.3

Notes: 1. BAL_K = Global trade balance of country k, k = US (U.S.), CA (Canada), JP (Japan), and WG (West Germany), Bil of U.S. $, Annual Rates.

2. $\bar{R}^2$ Stands for the percentage of variance esplained corrected for degrees of freedom, SEE is the standard error of the estimate, DW is the Durbin-Watson statistic, and SSR is the sum of squared residuals.

3. Figures in () are T-ratios.

Illustrative Global Balance Model

Sample Period 1960:1 to 71:4	R^2	SEE	DW	SSR
$BAL_{CA} = \underset{(2.01)}{0.259} + \underset{(6.35)}{0.258}^{*}\ BAL_{JP}$	0.456	0.700	0.720	22.6
$BAL_{WG} = \underset{(6.21)}{1.519} + \underset{(2.55)}{0.258}^{*}\ BAL_{JP} + \underset{(2.64)}{0.707}^{*}\ BAL_{CA}$	0.464	1.273	0.733	73.0
$BAL_{US} = \underset{(14.37)}{5.906} - \underset{(6.90)}{0.817}^{*}\ BAL_{JP} - \underset{(2.08)}{0.357}^{*}\ BAL_{WG}$	0.712	1.573	1.806	111.3

$$BAL_{US} = -\left[0.817 + \left((-0.357)^{*}(0.258) \right) + \left((-0.357)^{*}(0.707)^{*}(0.258) \right)\right]^{*} BAL_{JP}$$

$$= -0.974^{*}\ BAL_{JP}$$

TABLE 3

Data Used in Estimation of U.S. Trade Balance Equations

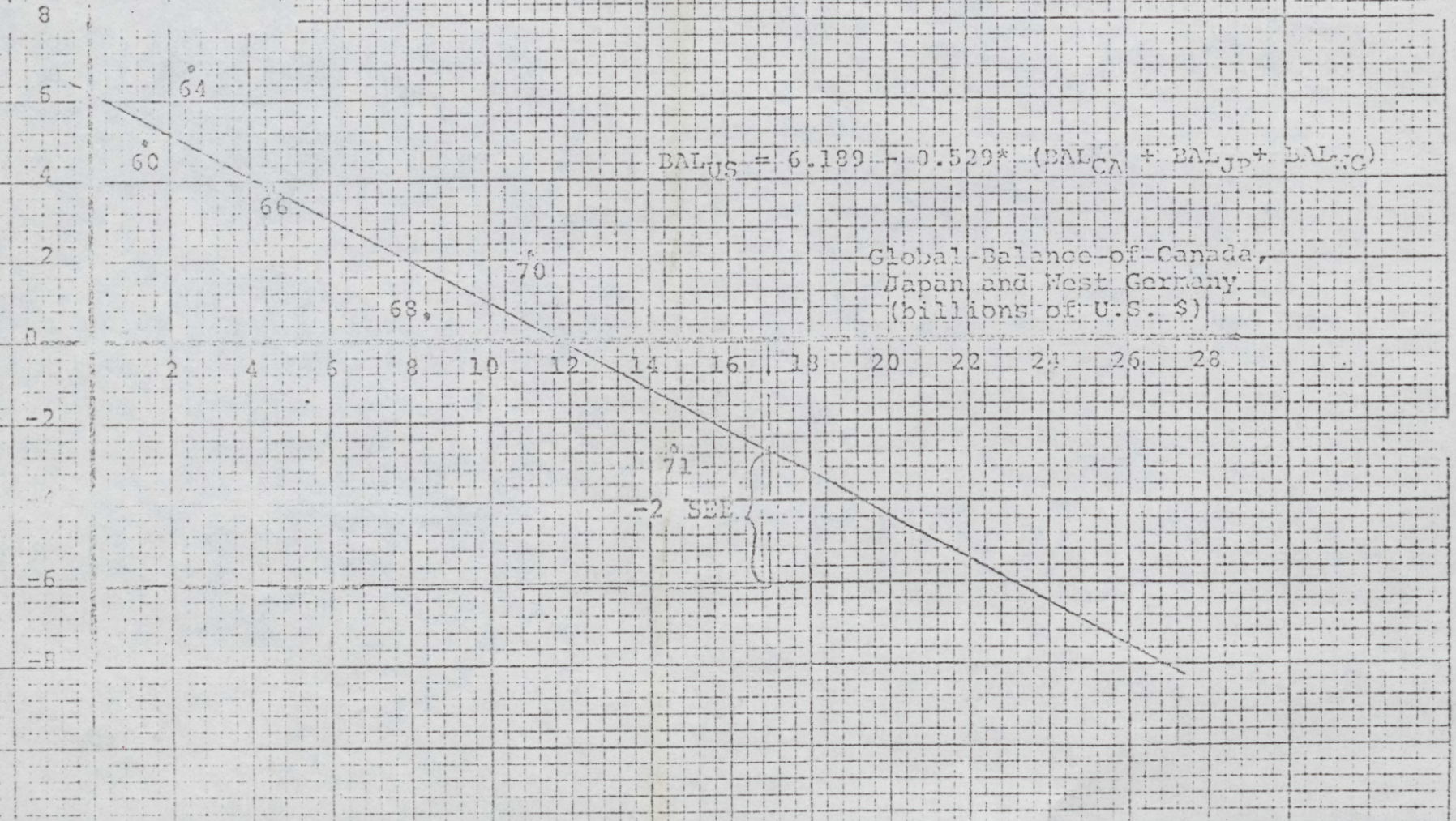
	U.S. Global Trade Balance	Global Trade Balances of Major Countries				Total Global Balances
		Sum	Canada	Japan	West Germany	
	(1)	(2)=(3)+(4)+(5)	(3)	(4)	(5)	(6) = (1)+(2)
Mean (60:1-71:4)	3.380	5.308	0.767	1.970	2.571	8.688
Standard Deviation	2.933	4.606	0.949	2.515	1.739	2.713
1960:1	3.316	0.885	-0.181	-0.252	1.318	4.201
2	4.780	0.135	-0.768	0.064	0.838	4.915
3	4.712	1.834	0.337	0.396	1.101	6.546
4	6.816	2.611	0.000	0.860	1.751	9.427
1961:1	6.632	1.315	0.024	-0.580	1.871	7.947
2	6.024	0.703	-0.125	-0.892	1.720	6.727
3	4.128	1.567	0.535	-0.692	1.724	5.695
4	5.568	1.433	0.232	-0.068	1.270	7.001
1962:1	4.444	0.078	0.008	-0.548	0.619	4.522
2	5.692	0.882	-0.149	0.092	0.939	6.574
3	3.940	2.088	0.271	0.848	0.969	6.036
4	4.160	2.702	0.528	1.224	0.950	6.862
1963:1	4.320	0.557	0.275	-0.468	0.750	4.877
2	6.136	1.076	0.275	-0.384	1.186	7.212
3	3.788	1.844	0.559	0.016	1.269	5.632
4	6.720	3.780	0.757	0.168	2.856	10.500
1964:1	7.368	1.302	0.130	-1.232	2.405	8.670
2	7.052	2.317	0.559	-0.228	1.986	9.369
3	5.288	2.985	1.316	0.980	0.688	8.273
4	7.616	3.624	0.596	1.988	1.040	11.240
1965:1	4.136	1.704	-0.149	0.748	1.104	5.840
2	6.384	1.458	-0.100	1.604	-0.046	7.842
3	3.540	2.756	0.600	2.608	-0.453	6.296
4	5.708	3.333	0.086	2.644	0.604	9.041
1966:1	4.848	2.360	0.037	1.480	0.843	7.208
2	4.624	2.988	-0.182	1.796	1.374	7.612
3	1.952	5.857	0.829	2.764	2.264	7.809
4	4.284	6.706	0.148	3.060	3.498	10.990
1967:1	4.152	5.392	0.426	0.608	4.358	9.544
2	5.592	5.249	0.104	0.684	4.461	10.841
3	3.192	5.964	0.372	1.800	3.792	9.156
4	2.500	7.050	1.201	1.548	4.301	9.550
1968:1	1.044	5.788	0.969	0.472	4.347	6.832
2	1.752	7.077	1.454	2.184	3.439	8.829
3	-0.688	9.267	1.722	3.380	4.164	8.579
4	0.388	11.508	0.962	4.080	6.466	11.896
1969:1	0.512	5.853	0.856	2.240	2.757	6.365
2	0.524	7.878	0.301	3.652	3.925	8.402
3	-0.824	9.102	0.830	4.268	4.003	8.278
4	2.428	11.037	1.078	4.636	5.322	13.465
1970:1	2.636	7.781	2.256	2.316	3.209	10.417
2	4.012	9.391	2.307	3.380	3.705	13.403
3	0.040	11.905	2.788	4.420	4.697	12.545
4	1.152	15.161	3.829	5.736	5.596	16.313
1971:1	1.900	10.899	2.646	4.220	4.033	12.799
2	-3.112	12.771	2.145	6.992	3.634	9.659
3	-4.308	17.814	2.363	9.956	5.495	13.503
4	-5.236	17.006	1.776	9.980	5.250	11.770

Notes: 1. All figures are in billions of U.S. dollars, at annual rates; a negative figure represents a deficit.

2. All data is f.o.b. except for West German imports which are c.i.f. (as reported in their balance of payments statistics).

SOURCES: United States, Survey of Current Business, BOP Table 2.
Canada, Bank of Canada Review and Bank of Canada Statistical Summary, Balance of International Payments.
Japan, Balance of Payments Monthly and Balance of Payments of Japan, Summary Table.
West Germany, Monthly Report of the Deutsche Bundesbank, Supplement #3.

Relationship Between U.S. Global Balance and the Global Balance of Canada, Japan and West Germany, 60:1-71:4



Rsch. Studies – WD Series

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WD-25		U.S. Imports of Woodpulp from Canada	May 27, 1971

(Unno. Removed & filed 12/15/75

The Effectiveness of U.S. Capital Programs -- a Preliminary Survey of Statistical Data and Current Studies - by Philip Lehaffner & Hsing-Sheng Cheng Oct. 3, 1972)

Treas -- OASIA
B/P Projects
WD-1
April 20, 1971

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : Balance of Payments Project Team DATE: April 20, 1971

FROM : F. Lisle Widman

SUBJECT: Identification and distribution of documents

In order to facilitate the handling and distribution of documents being prepared for the current series of balance of payments projects, we propose to establish four series of papers, each of which will be numbered serially according to date of preparation.

Papers which have been approved by the Advisory and Review Group and are ready for distribution to policy officials will be given a number in a "Project Report" (PR) series or, if highly sensitive, in a "Project Report Limited" (PR LIM) series. The designation should appear in the upper right hand corner of the first page and also on the cover note, as:

Treas -- OASIA
B/P Projects
PR _____
(Date)

A cover note describing the paper will normally be addressed to Undersecretary Volcker through Assistant Secretary Petty and will go from Mr. Schmidt, Mr. Cates or from me.

When revisions of such papers are approved the revised document will show the original number followed by "/Rev". Appendices which may be distributed at a later date will use the original number followed by "APP _".

All drafts, papers prepared as back-up documents, and other contributions which have not been approved for distribution to policy officials will be given a number in a "Working Document" (WD) series or, if highly sensitive in a (WD LIM) series. Each document of this type should be distributed with a cover note addressed to me from the drafting officer which explains the purpose, and identifies the particular project to which the paper is related.

Mrs. Webber will assign the necessary numbers, maintain a running index, and arrange the necessary reproduction and distribution.

Tentatively, we plan the following distribution:

(1) Project Reports -- Limited distribution:

Under Secretary Volcker
Assistant Secretary Petty
Deputy Under Secretary MacLaury
Deputy Assistant Secretary Webster
Deputy Assistant Secretary Schmidt
Deputy Assistant Secretary Hennessy
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Mr. Willis
Mr. Dale
Mr. Bradfield
Mr. Nelson
Mr. Sam Cross
Mr. Harley
Mr. Schaffner
Mr. Widman

(2) Project Reports -- Regular distribution:

Those receiving limited distribution documents plus all members of project teams. *

(3) Working Documents -- Limited distribution:

Deputy Assistant Secretary Schmidt
Deputy Assistant Secretary Cates
Mr. Willis
Mr. Dale
Mr. Harley
Mr. Bradfield
Mr. Schaffner
Mr. Sam Cross
Mr. Widman
Drafter

(4) Working Documents -- Regular:

Those receiving limited distribution working drafts plus all members of project teams. *

Other members of the project teams include Messrs. Brown, Curtis, Fauver, Gaaserud, Grubel, Keran, Klock, Lederer, Leddy, McCamey, McFadden, Meissner, J. Newman, and Miss Steiner.

* Subject to security clearance on confidential documents.

U.S. Government Grants and Capital Flows (excludes MAP Grants)

The U.S.G. grant and capital account is composed of the following line items in the U.S. balance-of-payments accounts.

Line 29: U.S.G. grants (excluding military grants)

Line 42: Net transactions in U.S.G. loans and long-term assets. These are mainly long-term (over one year) loans and credits used to finance U.S. exports. Roughly 1/3 by AID, 40% by EXIM Bank, and 25% PL-480 loans. The rest finance military sales.

Line 43: Foreign currencies (soft) net. Net increases are usually from sale of agricultural surpluses for local currency and loan payments in local currencies. Includes also local U.S. operations involving use of local currencies such as Embassy accounts.

Line 44: Scheduled repayment of principal of U.S.G. capital assistance loans.

Projected Government Grants and Capital Account
(Millions of Dollars)

Line		1970	1971	1972	1973	1974	1975
29	GRANTS (-)	1,562	1,086	1,137	1,260	1,260	1,260
42	LONG-TERM LOANS (-)						
	Assumption 1*	3,137	3,623	3,631	3,669	4,208	4,763
	Assumption 2*	3,137	3,623	3,631	3,919	4,458	5,013
43	FOREIGN CURRENCY (-)	23	97	188	229	230	230
44	SCHEDULED REPAYMENTS (/)	1,420	1,550	1,680	1,810	1,940	2,070
	Assumption 1 TOTAL (-)	3,302	3,256	3,276	3,348	3,758	4,183
	Assumption 2 TOTAL (-)	3,302	3,256	3,276	3,598	4,008	4,433

* Assumption 1 - after 1972 current authorization of military credit sales to Israel will not be continued. Assumption 2 - military credit sales to Israel will be continued at an annual rate of $250 million after 1972.

PROJECTIONS OF U.S.G. GRANT AND CAPITAL FLOWS

GRANTS - U.S.G. non-military grants are primarily technical assistance, PL-480 AID (about 1/3 of Food for Peace expenditures), and contributions to international organizations. With the new emphasis on channeling our aid through multilateral organizations, on reducing direct bilateral aid, and on loans given in a "business-like" manner it seems reasonable to project declining technical assistance programs, increasing grants to international organizations, and roughly constant levels of PL-480. Using 1972 budget estimates and Commerce figures for calander year 1970 gives the following: a/

	1970	1971	1972
Contributions to multi. orgs.	----	-415	-495
Bilateral assistance	----	-1,011	-1,056
Approx. 1/3 Food for Peace expen. (less development loans)	----	-330	-300
	----	670	714
TOTAL grant aid ($ millions)	-1,562 b/	-1,086	-1,137

Assuming that projected 1971 and 1972 aid levels will not be further reduced, and arbitrarily using the average of 1970 to 1972, gives a projected figure for grants in 1973, 1974, and 1975 of $1,260 million.

LONG-TERM LOANS AND ASSETS - These are mainly long-term loans and credits used to finance commercial and military credit sales. Principal lending agencies are the Export-Import Bank, the Food for Peace Program (Administered abroad by State), DOD, and AID's successor, the International Development Corporation.

Using 1972 budget estimates gives the following estimates for:

	1090	1971	1972
Development loans	745	670	714
Export-Import loans	1,569	1,738	1,852
Military credit sales	93	515	415
Food for Peace (PL-480)	730	700	650
TOTAL	3,137	3,623	3,631

a/ U.S. budget estimates for fiscal years 1970 and 1972 are used for estimates for calander years 1971 and 1972 on the theory that in time it will all come out in the wash.

b/ Based on Commerce figures for the first three quarters of 1970.

Military credit sales in 1971 and 1972 include respectively $375 and $125 million in sales to Israel. Assuming that these amounts do not recur in 1973, 1974, and 1975, but that the Nixon Doctrine is implemented by increased credit sales of military equipment gives:

	1973	1974	1975
Development loans	700	700	700
Exim loans (assuming cont. $200 mil. annual increase in loans)	1,926	2,405	2,900
Military credit sales (annual $60 mil. increase)	350	410	470
PL-480 (average of 1970-72 figures)	693	693	693
TOTAL	3,669	4,208	4,763

However, since it is more likely that our MCS to Israel will continue at at least 50% of the current rate, or around $250 million annually, the total figures would be: 1973 - $4,043, 1974 - $4,303, 1975 - $4,563.

FOREIGN CURRENCIES* - Our net holdings of soft foreign currencies result from receipts for the sale of agricultural surplus commodities and from interest and principal payments on local currency loans and from disbursements for grants and credits and U.S.G. local expenditures by U.S. installations such as bases and embassies. Receipts from sales of agricultural commodities have been declining steadily at between $100 and $200 million per year. As a result of Congressional directive, soft foreign currency sales of agricultural surpluses under PL-480 will be phased out by 1973 or 1974 in favor of 20 to 40-year dollar credits. Dollar revenues from the change are unlikely to affect the balance of payments before 1975. Other soft currency sales of surpluses are expected to be insignificant. Thus, this item would be projected as follows:

1970	1971	1972	1973	1974	1975
				0	0

Interest payments on soft currency loans are running at about $200 million, and with at least $3 billion outstanding in dollar value maintenance loans, it seems likely that interest payments will continue to increase at an average rate of about $4 million annually before leveling off as a result of the elimination of PL-480 soft-currency sales.

1970	1971	1972	1973	1974	1975
$200	$204	$208	$212	$216	$220

On the same basis, assuming that repayments of principal continue to increase at an average rate of $10 million gives:

1970	1971	1972	1973	1974	1975
$159	$169	$179	$189	$199	$209

"Other sources" of foreign soft currency fluctuate from year to year and assuming that the period through 1975 will see the same fluctuation gives an average annual figure of around $15 million.

Grants in the recipient's currency seem to have settled at around $150 million, although the figure for 1970 may be about $162 million based on three quarter figures. Credits in the recipient's currency have varied widely in the past five years but they seem to be generally moving downward with 1970 showing about $150 million. The safest prediction would seem to be to project an average annual soft currency credit level of around $150 million.

U.S. Government administrative expenditures abroad seem likely to increase at a slow rate, say around $5 million annually, giving:

1970	1971	1972	1973	1974	1975
$340	$345	$350	$355	$360	$365

Putting these figures together in a summary table and adding gives the following picture of U.S.G. foreign currency and other assets holdings:

SUMMARY: SOFT FOREIGN CURRENCY TRANSACTIONS

	1970	1971	1972	1973	1974	1975
Receipts from sales of agricultural surpluses	260	160	60	10	0	0
Interest payments on loans	200	204	208	212	216	220
Repayment of principal	159	169	179	189	199	209
Other sources of for. cur.	10	15	15	15	15	15
	629	548	462	426	430	435
less disbursements for:						
Credits	150	150	150	150	150	150
Grants	162	150	150	150	150	150
U.S. Govt. expend.	340	345	350	355	360	365
	652	645	650	655	660	665
Total change in for. cur. and other assets (- is $ outflow)	-23	-97	-188	-229	-230	-230

The average increase in scheduled repayments of principal for 1966 to 1969 was $130 million. If this trend continues, repayments will be about as follows:*

$ millions	1970	1971	1972	1973	1974	1975
	1,420	1,550	1,680	1,810	1,940	2,070

*However, payments on as much as $8 billion in outstanding dollar debts of 11 countries could be rescheduled during the next five years. This would reduce scheduled repayments by perhaps as much as 50%. Putting all the items together gives the summary table as presented on page 1.

Robert D. Brown
4/8/71

Treas -- OASIA
B/P Projects
WD-5
April 22, 1971

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : Mr. F. Lisle Widman

DATE: April 22, 1971

FROM : Robert Brown

SUBJECT: U.S. Agricultural Export Projections

The agricultural export projections to 1975 of the USDA plus linear and log linear trend extrapolations are presented in my memo of April 9, 1971. These projections could be used in the trends in world payments project.

U.S. AGRICULTURAL EXPORT PROJECTIONS

U.S. agricultural exports follow a long run upward trend set by population growth, but as the attached chart shows, fluctuate widely from year to year both in volume and quantity. Fluctuations around the trend are frequently due to unforeseen weather effects on crop production around the world. For example, preliminary figures indicate that calendar year 1970 exports were valued at about $7.2 billion. This was about one billion dollars higher than expected because of unforeseen droughts in Russia and poor peanut crops in Africa. As a result of the droughts in the USSR, Russian sunflower seed crops were poor. The combination of the low supply of sunflower seeds and peanuts meant that feed producers had to look elsewhere for large volumes of oil bearing seeds. Because of unusually favorable weather conditions here and an artificially narrow price gap in the EC between U.S. soybean prices and competitive foreign commodities we were able to market our soybeans. Our wheat exports also rose considerably because of drastically reduced EC supplies. As a result, our agricultural exports were much higher than predicted.

The point of this example is that predictions of agricultural exports more than one production year out are practically meaningless except as indicators of expected trend values. A year ago the Department of Agriculture made a comprehensive survey of expected agricultural developments in every country, added them up, and predicted U.S.

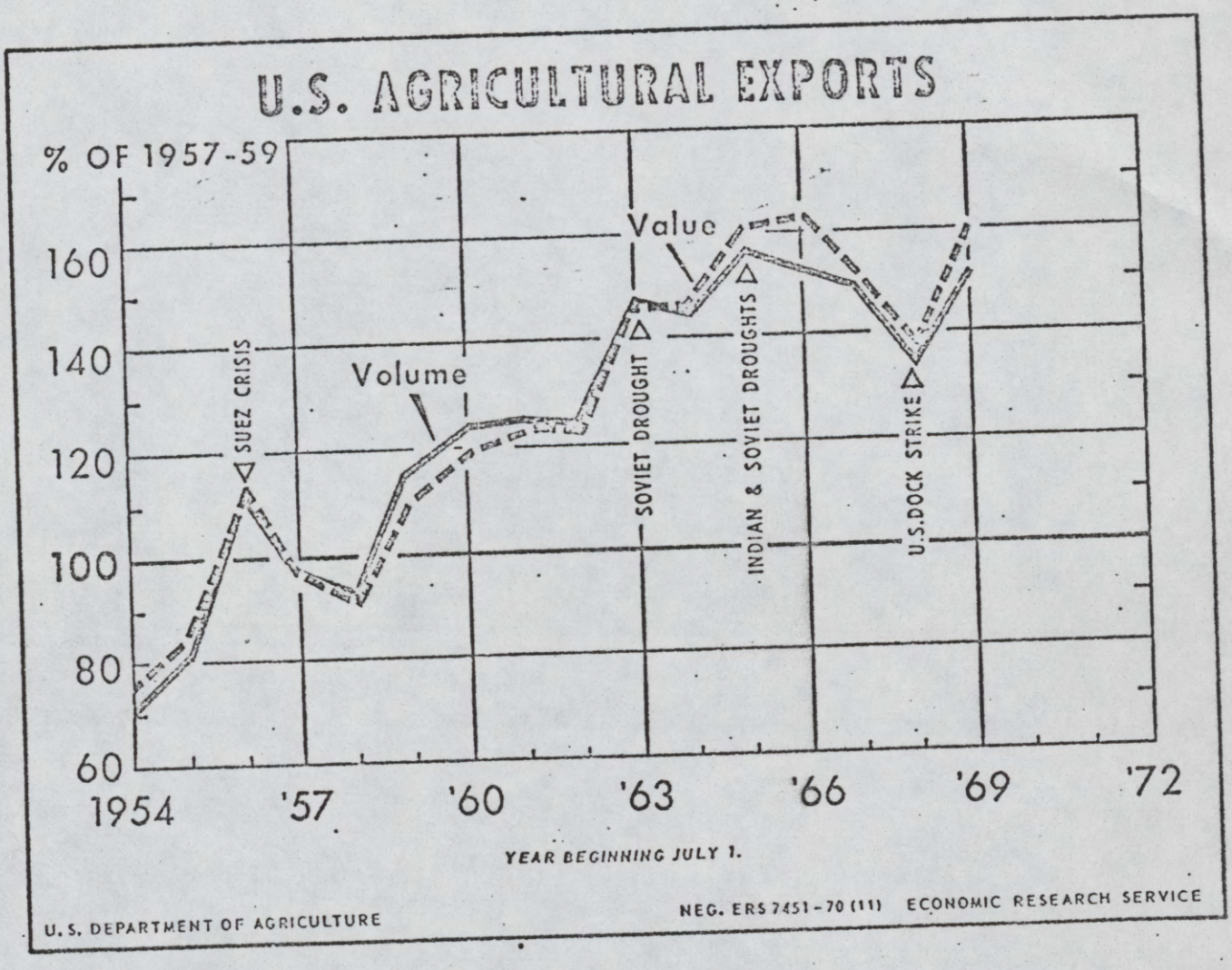
agricultural exports for the next five years. Even though its predictions for this last year fell far short of actual exports, it has not revised its estimates, primarily because of the futility of predicting key crop production for more than one year in advance. Therefore, the following Agriculture Department projected export figures should be taken as trend values rather than as expected exports. For comparison I've run linear and log linear trend projections. The log-linear estimate of annual growth was 3.8%. In view of last year's exports I think the log-linear figures are just as reasonable as Agriculture's estimates.

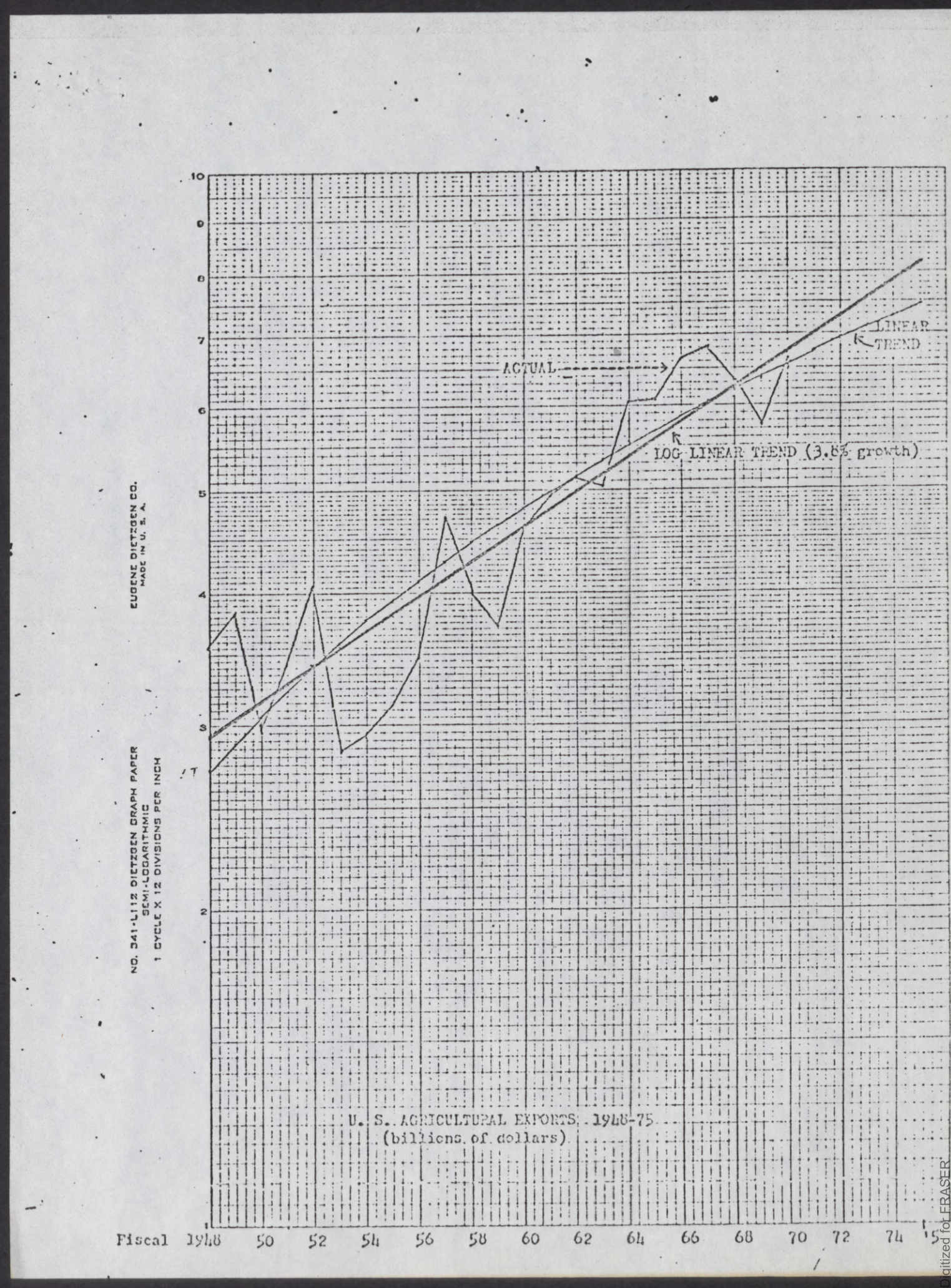
Projected Agricultural Exports 1971-75
(billions of dollars)

	Agriculture Dept. Projections	Linear Trend	Log Linear Trend
1970	$7.2 (6.051)*	$6.574	$6.766
1971	$6.211	$6.750	$7.027
1972	$6.385	$6.926	$7.299
1973	$6.520	$7.102	$7.581
1974	$6.670	$7.277	$7.874
1975	$6.820	$7.453	$8.178

* The Department of Agriculture estimated $6.051 billion for FY 70 agricultural exports. Actual FY 70 exports were valued at $6.7 billion and calander year figures were around $7.2 billion. For purposes of estimating future balances of payments, fiscal year projections should work as well as calander year projections because year to year differences in projected agricultural exports are small.

Robert D. Brown
4/9/71





U.S. Agricultural Export Projections

The figures for exports of agricultural products actually used in the projection were obtained by regressing agricultural exports against time for the base period 1960 - 1970. The trend was then forecast for the period 1971 - 1975.1/

1/ Prior to the trend estimation, the 1966 figure was adjusted downward by $100 million to reflect unusually high PL-480 deliveries and the 1969 figure was adjusted upward by $200 million to provide for the ODE-estimated effect of the 1969 dock strike on agricultural exports.

Jon M. Gaaserud
April 21, 1971

A Projection of the Accounts on Transportation, "Other Services", and Unilateral Transfers to 1975

This paper is an attempt to project forward to 1975 the balance on transportation, balance on "other services", and the outflow from unilateral transfers in the form of private remittances and government pensions.

The transportation balance consists of lines 6 and 17 in Table 1 of the quarterly Survey article on the balance of payments; "other services" consists of lines 9, 10, 19 and 20; and unilateral transfers of lines 27 and 30.

The projections are contained in the following table:

Table I

U.S. Balance of Payments, 1970 - 1975

($ billions)

	Actual	Projections				
	1970	1971	1972	1973	1974	1975
(1) Transportation Receipts	3.7	3.6	3.7	3.9	4.1	4.3
(2) Transportation Payments	-4.0	-4.0	-4.2	-4.4	-4.6	-4.8
(3) Transportation Balance	-0.3	-0.4	-0.5	-0.5	-0.5	-0.5
(4) "Other Services" Rec.	2.3	2.4	2.5	2.6	2.7	2.9
(5) "Other Services" Paym.	-1.5	-1.4	-1.5	-1.5	-1.6	-1.7
(6) "Other Services" Bal.	0.8	1.0	1.0	1.1	1.1	1.2
(7) Unilateral Transfers 1/	-1.4	-1.4	-1.5	-1.5	-1.6	-1.7
TOTAL (3), (6), & (7)	-0.9	-0.8	-1.0	-0.9	-1.0	-1.0

1/ Excluding U.S. Government economic grants

The projections were obtained by regressing the three accounts independently against time for the base period 1960-1970. The trends were then forecasted for the period 1971 to 1975.

Although it is clearly true that there are a number of economic variables which affect these accounts, the very high multiple correlation co-efficients ($\bar{R}$-squared) obtained from the regression on time indicate that these other variables may be largely offsetting. Nevertheless when the common assumptions which are to be developed for this exercise are available it would perhaps be useful to add other variables in order to see how much the results are altered.

One suggestion which commends itself is the inclusion of a dummy variable to measure the Middle East situation on the transportation account and in unilateral transfers. Since most services are a function of income, this too might be tried. However, for the present, the projection of these accounts using a time trend should provide a reasonable forecast.

Jon M. Gaaserud
April 13, 1971

Removal Notice

Citation Information

Document Type: Internal research - Treasury **Number of Pages Removed:** 8

Citations: Confidential: Projected Demands for Reserves of the Major Oil Producing Countries, April 8, 1971.

UNITED STATES GOVERNMENT

Memorandum

TO : Mr. F. Lisle Widman

DATE: April 22, 1971

FROM : Jon M. Gaaserud

SUBJECT: Projections for U.S. Trade in Commercial Aircraft

Attached is the letter I received on April 20, 1971, from Commerce which updates their projections of exports of commercial aircraft through 1975. It should be helpful to the balance of payments project on trends in world payments.

U.S. DEPARTMENT OF COMMERCE
Bureau of Domestic Commerce
Washington, D.C. 20230

April 19, 1971

Mr. John Gasserud
Office of the Assistant Secretary for International Affairs
Department of the Treasury
15th and Pennsylvania Avenue, N.W.
Washington, D.C. 20220

Dear John:

This is in response to your telephone request of April 6, 1971, for an updating of our last year's projections on exports of large commercial aircraft for each calendar year 1970 through 1975. On April 8th preliminary figures were telephoned to you. This letter will serve to verify the figures and give a short analysis of the five year trade.

Trade in Commercial Aircraft

	1970# *	1971	1972	1973	1974	1975
Exports	169/1,166.5	138/1,554.4	45/913.6	52/952.0	65/1,145.0	40/604.0
Imports	4/ 7.0	6/ 12.0	0/ 0	0/ 0	5/ 125.0	12/300.0
Balance	1,159.5	1,542.4	913.6	952.0	1,020.0	304.0

Notes:

1. # 1970 figures are actual
2. * Units/$ Million

The 1970 exports reflect the initial deliveries of Boeing 747's to foreign customers. In 1971 it is anticipated that 42 Boeing 747 aircraft will be exported, swelling the value of exports to $1.5 billion, an all-time high that will not be approached for at least ten years. During the year 1972, fewer exports of the Boeing 747 are expected, with only a few of the new DC-10 tri-jets scheduled for foreign delivery. In 1973 exports of 30 of these new wide-bodied jet transports, 16 of the Boeing 747's and none of the Boeing 707 and Douglas DC-8 types are anticipated.

During 1974, a vast reduction in foreign deliveries of DC-9 and Boeing 737 types will take place with exports of Boeing 747's and DC-10's remaining about equal to the previous year. We will also be faced in 1974 with the first imports of the high-value British/French Concorde supersonic transport,

NOTE: $250 million was added to the export figure for each year to take account of exports of used aircraft and exports of executive aircraft of manufacturers and other non-commercial aircraft.

5 aircraft valued at $125.0 million. During 1975, an additional 12 Concordes will be imported having a total value of $300.0 million, while we will be exporting fewer of the Boeing 747's and DC-10's than during the previous year.

The U.S. Industrial Outlook 1971, Aerospace, copies of which were forwarded to you on April 8, 1971, reported a reduction in demand for our large transports by our U.S. airlines. The additionally reduced demand by foreign airlines, plus the importation of the Concorde, will adversely affect both our overall balance of trade and the economic strength of the U.S. aerospace industry.

Sincerely,

Randy

Randolph Myers, Jr.
Aerospace Industry Specialist
Transportation Division

UNITED STATES GOVERNMENT

Memorandum

TO : Mr. Widman

DATE: April 22, 1971

FROM : Michael Keran MK

SUBJECT: Some Observations on Developing Forecasting Equations of the Current Account

Attached is an initial draft of a paper which I have called, "Some Observations on Developing Forecasting Equations of the Current Account." I would very much appreciate obtaining comments from others in the Treasury on this document. You may also find it useful in connection with the balance of payments project series.

Michael W. Keran
4/14/71

SOME OBSERVATIONS ON DEVELOPING FORECASTING EQUATIONS OF THE CURRENT ACCOUNT

In forecasting the balance of payments, the conventional procedure is to disaggregate the estimating process to as large an extent as possible within the conventional confines of the balance of payments identity.

Balance of Payments = Exports - Imports + Net Capital

Each item in this identity is usually broken down into as many categories as the data permit. A rationale for this procedure is that the finer the disaggregation of the balance of payments components, the "purer" the behavioral influences which can be measured. For example, the imports for consumer goods respond to changes in disposable personal income of households; imports of industrial goods respond to investment demand; imports of raw materials and semi-finished products respond to changes in inventories. It is generally assumed that disaggregating the data, thereby focusing in on the specific behavioral influences, will enhance our ability to forecast the balance of payments.

Such an assumption is not always valid. When one attempts to develop a forecasting model, it is necessary not only to forecast the endogenous components in the balance of payments identity, but also to forecast the exogenous variables in the equation. Thus, two sources of potential error emerge in

forcasting: one is the well-understood error between the dependent and independent variables, and the fact that the more disaggregated the model the larger the number of potential weak links. The second source of error is the less-understood one between the estimated value and the actual value of the independent variable. The more disaggregated the estimating procedure, the greater the number of exogenous variables and the greater the potential for error of the second type. Thus, even if disaggregated equations provide superior estimates of the individual components of imports, it may be inferior as a forcasting device to a more aggregative equation. The aggregative equation estimates total imports and therefore, requires knowledge of less structural detail and a smaller number of independent variables which must themselves be estimated.

As with any economic problem, we are faced in this situation with a trade-off at the margin between "structural richness" (presumably superior with the more disaggregated models), and forecasting efficiency (which is most likely achieved with the more aggregated models). This paper will test a very simple set of aggregated versus disaggregated models for (1) their structural richness, and (2) their forecasting efficiency.

STRUCTURAL RICHNESS

The most aggregative import equation feasible would say that nominal imports of goods and services are a function of current and lagged changes in domestic demand for goods and

services, measured by nominal GNP. Such an equation would take the following general functional form:

$$1)\ Im_t = \alpha_0 + \alpha_1 \sum Y_{t-i}$$

Where IM is nominal imports Y is nominal GNP. (N) equals the number of time periods in which loged values of Y effect current values of IM. We would expect α_1, to have a positive value.

A more structurally realistic formulation would be that total real imports of goods and services is a function of domestic real income, U.S. prices relative to foreign prices, and the domsetic GNP gap (to measure nonprice rationing). This could be written in the following general functional form:

$$2)\ Im_t^* = \alpha_0 + \alpha_1 \sum_{i=0}^{n} X_{t-i} + \alpha_2 \sum_{i=0}^{n} \left(\frac{WPI}{Pim}\right)_{t-i} + \alpha_3 \sum_{i=0} GAP_{t-i}$$

Where IM^* is real imports, X is real GNP, WPI is U.S. wholesale prices, Pim is U.S. import prices (a proxy for foreign export prices) and GAP is the difference between potential and actual real GNP.

The expected values of α_1 and α_2 are positive and α_3 is negative. This form would take into account income and substitute the effects on imports as well as any unusual demand pressures generated by how close the economy was operating to capacity.

There is no end to further disaggregation which could take place. However, one natural step would be to estimate

the equation for import goods only. The arguments used would be the same as those in explaining imports of goods and services.

In addition, these equations could be estimated either in the form of levels or changes; they could be estimated in linear form or log linear form. It was decided to estimate these equations only as changes in both linear and log linear form. The results are presented in Table I, and the print-out of the actual estimated values are given in the succeeding tables. The equation in linear change form with the highest R^2 (.74) was the most aggregative. Changes in the nominal value of the imports of goods and services related to changes in the nominal value of GNP. The next highest R^2 was achieved with the first step in disaggregation. Changes in the real value of goods and services related to the real value of domestic income, relative prices, and the domestic GNP gap. The coefficient with the lowest R^2 (.49) was the one with the greatest degree of disaggregation. The real value of imported goods as a function of real value of domestic income, relative prices, and the GNP gap. In general, the more disaggregation in the equation, the less the explanatory power. This ordering was also true of the log linear change form.

If our purpose is to provide an estimate of the overall level of imports, and we are not directly interested in the components of imports for their own sake; these results would clearly indicate a strong favorable bias toward the most agg-

regative equations. The acid test, however, of the utility of these equations is how well they actually perform in forecasting. For this purpose two of the equations (real and nominal imports of goods and services) was exposed to a number of ex post dynamic simulation experiments. In order to make the test as uniform as possible, the time periods for the simulation experiments were identical for both equations.

FORECASTING EFFICIENCY

The most straight forward way to test the forecasting ability of alternative import equations is with simulation techniques. Simulation requires an explicit division between exogenous and endogenous variables and an exact specification of the model builders assumptions about the relationships between them. In the following simulations the exogenous variables are monetary policy measured by changes in the money stock and fiscal policy measured by changes in government spending. (Tax variables were not found to be statistically significant and were, therefore, omitted from the list of exogenous policy variables). The accompanying flow diagram indicates the linkages which have been specified and statistically estimated between the exogenous policy variables and the other endogenous variables in the model.

The linkages for nominal imports are outlined in the top panel of the diagram. Monetary and fiscal influences (measured by changes in money and government spending) determine the nominal value of changes in GNP over a period of four quarters. Changes in GNP in turn determine the nominal value of changes

Table 1

U.S. IMPORT EQUATIONS

II/1953 - II/1970

Central Differences		Central Rates of Change	
Goods + Services		**Goods + Services**	
$\Delta IM_t = \underset{(4.0)}{-.307} + \underset{(13.9)}{.103}\,\Delta Y_{t-1}$	$R^2 = .74$ $SE = .35$ $DW = 1.30$	V $\Delta \text{Log} IM_t = \underset{(2.73)}{-3.63} + \underset{(10.03)}{1.93}\,\Delta \text{Log} Y_{t-1}$	$R^2 = .59$ $SE = 5.59$ $DW = 1.43$
$\Delta IM_t^* = \underset{(2.4)}{-.74} + \underset{(5.2)}{.26}\,\Delta X_{t-3} + \underset{(4.4)}{45.4}\,\Delta\left(\frac{WPI}{PIM}\right)_{t-3} - \underset{(1.9)}{.0064}\,GAP_{t-3}$	$R^2 = .64$ $SE = .37$ $DW = 1.40$	VI $\Delta \text{Log} IM_t^* = \underset{(1.5)}{1.63} + \underset{(9.1)}{1.68}\,\Delta \text{Log} X_{t-1} + \underset{(4.1)}{1.09}\,\Delta \text{Log}\left(\frac{WPI}{PIM}\right)_{t-1} \cdots - \underset{(2.0)}{41.49}\,\text{Log} GAP_{t-1}$	$R^2 = .58$ $SE = 5.50$ $DW = 1.31$
Goods only		**Goods only**	
$\Delta IM_t = \underset{(3.64)}{-.309} + \underset{(10.09)}{.082}\,\Delta Y_{t-1}$	$R^2 = .60$ $SE = .38$ $DW = 1.11$	VII $\Delta \text{Log} IM_t = \underset{(3.44)}{-7.54} + \underset{(8.34)}{2.67}\,\Delta \text{Log} Y_{t-1}$	$R^2 = .51$ $SE = 9.22$ $DW = 1.34$
$\Delta IM_t^* = \underset{(2.4)}{-.65} + \underset{(4.2)}{.20}\,\Delta X_{t-3} + \underset{(3.1)}{32.70}\,\Delta\left(\frac{WPI}{PIM}\right)_{t-3} - \underset{(1.05)}{.0038}\,GAP_{t-3}$	$R^2 = .49$ $SE = .40$ $DW = 1.18$	VIII $\Delta \text{Log} IM_t^* = \underset{(.38)}{-.74} + \underset{(7.2)}{2.36}\,\Delta \text{Log} X_{t-1} + \underset{(2.0)}{.93}\,\Delta \text{Log}\left(\frac{WPI}{PIM}\right)_{t-1} \cdots - \underset{(.56)}{21.26}\,\text{Log} GAP_{t-1}$	$R^2 = .4$ $SE = 9.6$ $DW = 1.2$

EQUATION NUMBER 1 0 1 0 2 3 1 1 0 0

		X3	CONSTANT	R-SQ./SE	DW(0)/DF
1	X1				
OLS	0.355171	-0.307446	0.736463	1.101797	
	13.939937	-3.960280	0.352674	60.000000	

ACTUALS	PREDICTED	RESIDUALS	D/J ERROR		RANGE -1.00 TO 2.60
0.0	0.427	-0.427	99999999.999	3	
0.350	-0.013	0.363	103.515	4	
-0.250	-0.419	0.169	-75.758	5	
-0.330	-0.513	-0.187	23.414	6	
0.150	-0.450	0.600	399.913	7	
0.250	-0.214	0.464	185.751	8	
-0.250	0.132	-0.382	152.872	9	
0.450	0.585	-0.135	-29.951	10	
0.650	0.792	-0.142	-21.797	11	
0.700	0.657	0.043	6.115	12	
0.750	0.486	0.264	35.134	13	
0.750	0.275	0.475	63.411	14	
0.250	0.093	0.157	62.645	15	
0.200	0.143	0.057	28.737	16	
0.0	0.295	-0.295	99999999.999	17	
0.450	0.453	-0.003	-1.793	18	
0.700	0.383	0.317	45.274	19	
-0.100	0.205	-0.305	304.594	20	
-0.100	-0.023	-0.077	77.004	21	
-0.200	-0.566	0.366	-183.247	22	
0.0	-0.690	0.690	99999999.999	23	
0.200	0.042	0.158	79.173	24	
0.650	0.799	-0.149	-22.990	25	
0.750	0.952	-0.202	-26.933	26	
0.750	0.359	-0.109	-14.523	27	
0.900	0.533	0.367	40.772	28	
0.150	0.044	0.106	70.501	29	
-0.150	0.277	-0.427	284.674	30	
0.100	0.551	-0.451	-451.164	31	
-0.200	0.091	-0.291	145.356	32	
-1.000	-0.313	-0.687	68.734	33	
-0.650	-0.359	-0.291	44.735	34	
0.150	-0.023	0.173	115.331	35	
0.300	0.525	0.275	34.337	36	
0.900	0.815	0.085	9.449	37	
0.500	0.893	-0.393	-78.503	38	
0.600	0.807	-0.207	-34.533	39	
0.350	0.626	-0.276	-79.004	40	
0.200	0.505	-0.305	-152.304	41	
0.100	0.411	-0.311	-311.474	42	
0.300	0.344	-0.044	-14.750	43	
0.700	0.455	0.245	34.933	44	
0.450	0.699	-0.249	-55.239	45	
0.350	0.846	-0.496	-141.712	46	
0.600	0.362	-0.262	-43.586	47	
0.600	0.815	-0.215	-35.827	48	
0.750	0.683	0.067	8.927	49	
1.050	0.753	0.297	28.297	50	
1.100	1.102	-0.002	-0.184	51	
1.050	1.216	-0.166	-15.793	52	
1.250	1.312	-0.062	-4.922	53	
1.500	1.573	-0.073	-4.849	54	
1.300	1.547	-0.247	-18.990	55	
1.650	1.237	0.413	25.060	56	
1.400	1.084	0.316	22.577	57	
0.550	0.880	-0.330	-59.929	58	
0.100	0.528	-0.428	-427.389	59	
0.150	0.735	-0.585	-389.250	60	
1.350	1.190	0.160	11.854	61	
2.600	1.384	1.215	46.772	62	
2.250	1.663	0.587	26.078	63	
1.950	1.842	0.109	5.559	64	
2.000	1.612	0.388	19.424	65	
1.450	1.076	0.374	25.791	66	
1.400	1.350	0.050	3.569	67	
1.450	1.433	0.017	1.167	68	
1.050	1.322	-0.272	-25.902	69	
1.000	0.854	0.146	14.625	70	
1.250	0.831	0.419	47.493	71	
0.500	1.067	-0.567	-71.135	72	

DURBIN-WATSON D STATISTIC = 1.30170

SUM OF SQUARED RESIDUALS = 8.42664

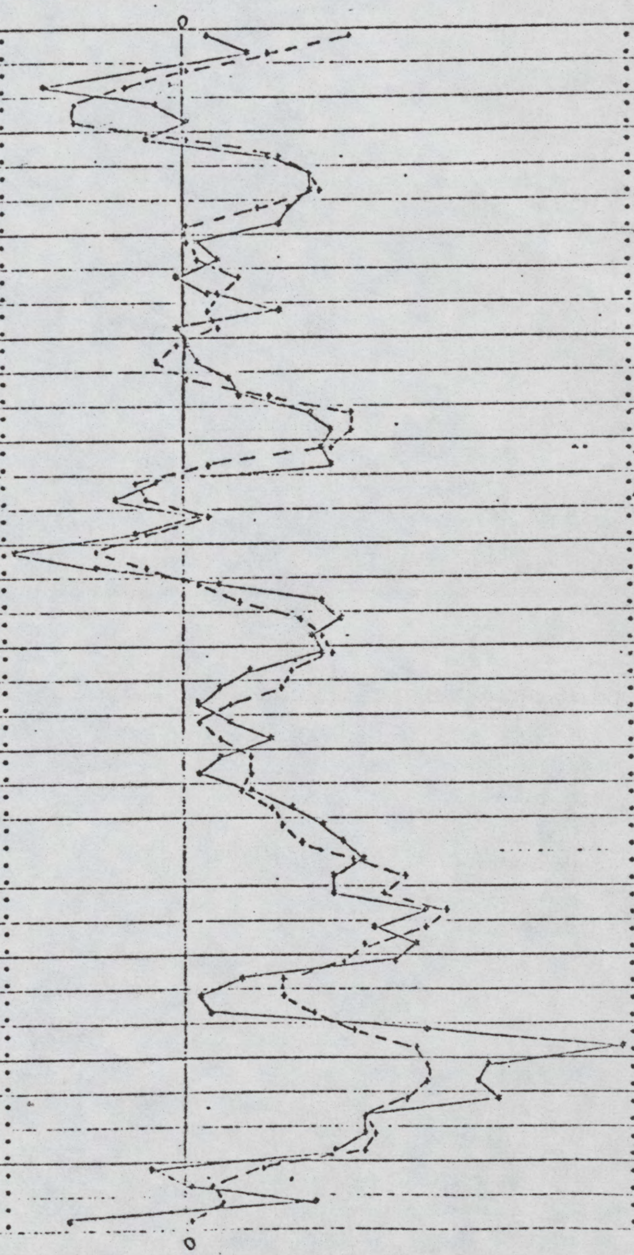
ESTIMATION NUMBER 3 0 0 0 10 11 12 13 17 18 19 29 30 31 1 1 0 0

	X1	X11	X12	X13	X17	X18	X19	X29	X30	X31	CONSTANT
3 OLS		0.084739	0.109240	0.013431	20.594357	7.214305	5.764211	0.050754	-0.013325	-0.045419	-0.738631
		5.624614	3.842215	0.847649	4.292472	1.341139	1.176025	3.391308	-0.637017	-3.057420	-2.890339

R-SQ./SE	DW(1)/DF
0.635314	1.475164
0.369613	60.000000

RANGE -0.94 TO 2.45

ACTUALS	PREDICTED	RESIDUALS	O/O ERROR	
0.061	0.369	-0.309	-506.117	5
0.377	0.480	-0.103	-27.175	6
-0.211	0.053	-0.263	124.561	7
-0.767	-0.291	-0.476	62.030	8
-0.127	-0.609	0.490	-372.910	9
0.017	-0.575	0.593	3487.377	10
-0.175	0.038	-0.213	121.540	11
0.509	0.541	-0.034	-6.609	12
0.730	0.727	0.002	0.341	13
0.756	0.796	-0.040	-5.236	14
0.629	0.453	0.176	27.990	15
0.548	0.021	0.527	96.211	16
0.125	0.039	0.086	68.737	17
0.205	0.095	0.110	53.580	18
-0.037	0.344	-0.381	1037.340	19
0.177	0.228	-0.051	-28.510	20
0.544	0.144	0.400	73.542	21
-0.010	0.199	-0.209	2093.139	22
0.058	-0.009	0.067	116.212	23
0.088	-0.142	0.230	262.447	24
0.260	0.051	0.209	80.361	25
0.352	0.490	-0.138	-39.253	26
0.759	0.964	-0.205	-27.039	27
0.843	0.953	-0.109	-12.966	28
0.816	0.841	-0.025	-3.134	29
0.862	0.181	0.681	78.961	30
-0.121	-0.255	0.134	-110.374	31
-0.352	-0.193	-0.160	45.289	32
0.099	0.151	-0.052	-52.159	33
-0.255	-0.193	-0.062	24.285	34
-0.936	-0.471	-0.465	49.679	35
-0.500	-0.207	-0.293	58.530	36
0.204	0.092	0.112	54.797	37
0.799	0.332	0.467	58.455	38
0.876	0.648	0.229	26.085	39
0.712	0.798	-0.086	-12.070	40
0.790	0.825	-0.035	-4.479	41
0.369	0.603	-0.235	-63.617	42
0.216	0.549	-0.333	-154.499	43
0.089	0.260	-0.172	-193.805	44
0.251	0.125	0.126	50.274	45
0.493	0.233	0.260	52.757	46
0.237	0.363	-0.126	-53.157	47
0.093	0.414	-0.322	-347.034	48
0.376	0.316	0.060	15.939	49
0.631	0.519	0.112	17.303	50
0.791	0.537	0.254	32.099	51
0.885	0.697	0.189	21.312	52
1.019	0.974	0.045	4.403	53
0.822	1.254	-0.431	-52.464	54
0.820	1.113	-0.293	-35.744	55
1.361	1.469	-0.108	-7.963	56
1.091	1.368	-0.277	-25.422	57
1.314	1.002	0.312	23.740	58
1.184	0.920	0.264	22.313	59
0.341	0.535	-0.194	-56.923	60
0.112	0.572	-0.460	-411.702	61
0.158	0.726	-0.568	-359.126	62
1.346	0.985	0.361	26.797	63
2.455	1.299	1.156	47.087	64
1.731	1.377	0.355	20.480	65
1.654	1.391	0.263	15.915	66
1.767	1.244	0.523	29.603	67
1.012	1.014	-0.003	-0.280	68
0.997	1.071	-0.074	-7.438	69
0.826	0.999	-0.173	-20.965	70
-0.162	0.424	-0.585	362.291	71
0.065	0.134	-0.069	-105.377	72
0.717	0.200	0.516	72.061	73
-0.628	0.037	-0.665	105.924	74



$\Delta I/I^*_t = -.74 + .26\,\Delta X_{t-3} + 45.4\,\Delta(\ldots)_{t-3} - .0064\,GAP_{t-3}$
(2.9) (5.8) (4.6) (1.9)
SE = .369
DW=1.40

DURBIN-WATSON D STATISTIC = 1.39637

SUM OF SQUARED RESIDUALS = 8.19703

EQUATION NUMBER 1 0 0 0 2 5 1 1 0 0

H.22-A

I	XI	XS	CONSTANT	R-SQ./SE	DW(D)/DF
OLS		0.045850	-0.339397	0.566999	1.111029
		10.086339	-3.644357	0.383175	67.000000

ACTUALS	PREDICTED	RESIDUALS	O/D ERROR		
-0.242	-0.077	-0.165	68.165	3	
-0.570	-0.413	-0.157	27.482	4	
-0.314	-0.550	0.236	-75.130	5	
0.329	-0.421	0.749	228.504	6	
-0.130	-0.236	0.105	-81.553	7	
-0.358	0.037	-0.395	110.364	8	
0.618	0.394	0.224	36.279	9	
0.438	0.557	-0.119	-27.135	10	
0.100	0.451	-0.351	-350.864	11	
0.622	0.316	0.306	49.142	12	
0.860	0.149	0.711	82.651	13	
0.108	0.007 ✓	0.101	93.935	14	
-0.198	0.045	-0.243	122.858	15	
0.094	0.166	-0.072	-76.077	16	
0.282	0.294	-0.012	-4.227	17	
0.248	0.235	0.013	5.319	18	
-0.064	0.034	-0.158	247.139	19	
0.082	-0.085	0.167	203.842	20	
-0.252	-0.513	0.261	-103.657	21	
-0.438	-0.611	0.173	-39.511	22	
-0.030	-0.034	0.004	-14.135	23	
0.702	0.563	0.139	19.805	24	
0.946	0.683	0.263	27.771	25	
0.734	0.610	0.124	16.915	26	
0.502	0.353	0.149	29.676	27	
0.204	-0.032	0.236	115.782	28	
-0.074	0.151	-0.225	304.345	29	
-0.264	0.367	-0.631	239.127	30	
-0.330	0.004 ✓	-0.334	101.360	31	
-0.842	-0.313	-0.529	62.770	32	
-0.512	-0.350	-0.162	31.636	33	
0.0	-0.085	0.085	99999999.999	34	
0.828	0.347	0.481	58.102	35	
0.918	0.575	0.343	37.342	36	
-0.310	0.535	-0.326	-105.271	37	
0.364	0.569	-0.205	-56.342	38	
0.300	0.426	-0.126	-42.133	39	
0.004	0.331	-0.327	-8169.610	40	
-0.118	0.257	-0.375	318.031	41	
0.276	0.204	0.072	26.002	42	
0.630	0.292	0.338	53.659	43	
0.336	0.493	-0.147	-43.688	44	
0.078	0.600	-0.522	-668.754	45	
0.418	0.612	-0.194	-46.385	46	
0.664	0.575	0.089	13.373	47	
0.650	0.471	0.179	27.501	48	
0.778	0.526	0.252	32.356	49	
0.868	0.801	0.067	7.659	50	
0.878	0.891	-0.013	-1.495	51	
0.840	0.967	-0.127	-15.064	52	
0.922	1.172	-0.250	-27.159	53	
0.810	1.152	-0.342	-42.223	54	
1.150	0.907	0.243	21.094	55	
1.000	0.787	0.213	21.283	56	
0.100	0.626	-0.526	-526.164	57	
-0.400	0.349	-0.749	187.238	58	
-0.200	0.512	-0.712	356.009	59	
1.350	0.871	0.479	35.501	60	
2.540	1.024	1.516	59.701	61	
1.964	1.244	0.720	36.674	62	
1.493	1.384	0.114	7.635	63	
1.236	1.203	0.033	2.672	64	
0.712	1.017	-0.305	-42.905	65	
0.700	0.997	-0.297	-42.445	66	
0.674	1.032	-0.358	-53.151	67	
0.580	0.975	-0.395	-68.049	68	
0.924	0.606	0.314	34.441	69	
0.970	0.430	0.540	55.620	70	
0.450	0.616	-0.166	-36.880	71	

RANGE -0.84 TO 2.54

DURBIN-WATSON D STATISTIC = 1.11103

SUM OF SQUARED RESIDUALS = 9.83717

H21-A1

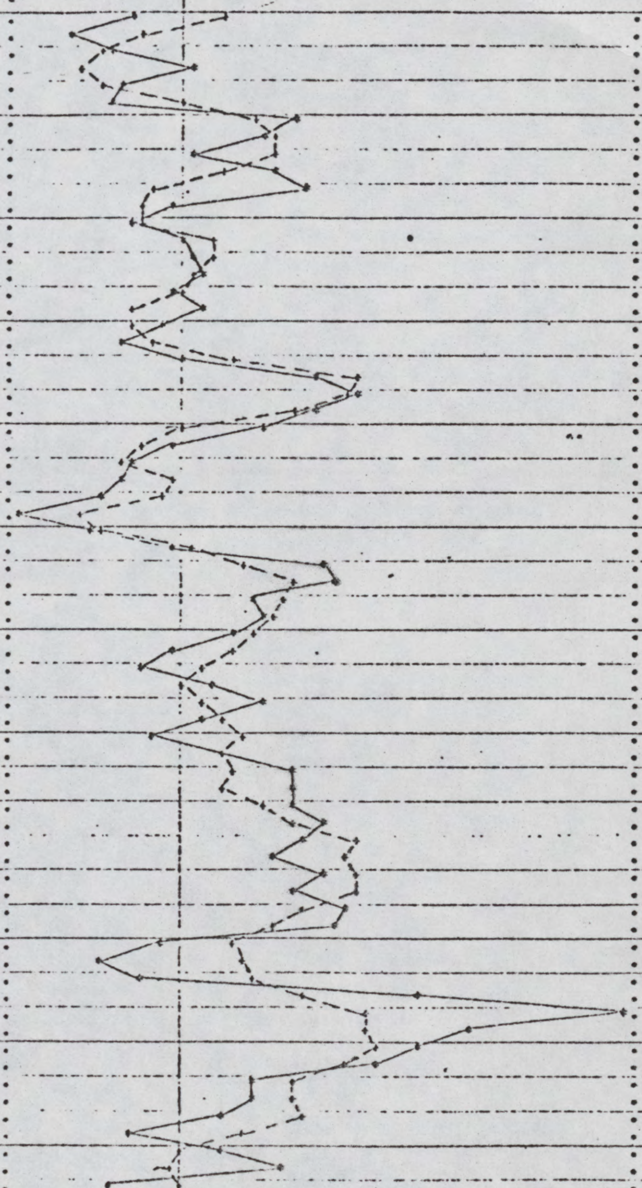
EQUATION NUMBER 1 0 1 0 10 11 12 13 17 18 19 29 30 31 1 1 0 0

X1 OLS	X11	X12	X13	X17	X18	X19	X29	X30	X31	CONSTANT
	0.073256	0.101398	-0.005762	11.123630	3.541073	5.431040	0.036138	-0.018282	-0.035433	-0.654102
	4.534964	3.325037	-0.330473	2.060079	1.473553	1.010251	2.860837	-0.811383	-2.206805	-2.358437

R-SQ./SE	DW(0)/DF
0.486253	1.176352
0.396448	59.000000

RANGE -0.80 TO 2.39

ACTUALS	PREDICTED	RESIDUALS	O/O ERROR	
-0.227	0.257	-0.484	213.187	5
-0.549	-0.143	-0.406	74.016	6
-0.291	-0.374	0.083	-28.513	7
0.145	-0.432	0.628	431.398	8
-0.279	-0.363	0.084	-29.964	9
-0.306	0.049	-0.355	116.009	10
0.651	0.461	0.190	29.181	11
0.489	0.570	-0.081	-16.467	12
0.138	0.564	-0.426	-308.324	13
0.542	0.259	0.283	52.264	14
0.725	-0.096	0.821	113.306	15
0.027	-0.131	0.158	579.908	16
-0.188	-0.150	-0.037	19.951	17
0.067	0.218	-0.150	-223.510	18
0.110	0.233	-0.123	-112.145	19
0.154	0.139	0.014	9.301	20
-0.007	0.069	-0.076	1065.576	21
0.179	-0.178	0.357	199.135	22
-0.069	-0.230	0.161	-232.735	23
-0.266	-0.093	-0.173	64.991	24
0.063	0.361	-0.297	-469.176	25
0.771	0.965	-0.194	-25.138	26
1.008	0.946	0.062	6.156	27
0.780	0.658	0.121	15.555	28
0.477	0.053	0.423	88.795	29
0.023	-0.157	0.180	791.675	30
-0.204	-0.272	0.068	-33.432	31
-0.261	-0.009	-0.253	96.608	32
-0.363	-0.055	-0.307	84.746	33
-0.800	-0.480	-0.320	39.957	34
-0.418	-0.341	-0.077	18.449	35
0.034	0.110	-0.076	-222.661	36
0.827	0.398	0.429	51.916	37
0.902	0.659	0.243	26.965	38
0.446	0.585	-0.138	-31.023	39
0.487	0.545	-0.058	-11.900	40
0.313	0.445	-0.132	-42.144	41
0.012	0.362	-0.350	-2812.719	42
-0.128	0.149	-0.277	215.799	43
0.245	0.068	0.177	72.169	44
0.498	0.171	0.327	65.583	45
0.199	0.292	-0.094	-47.122	46
-0.086	0.384	-0.470	545.455	47
0.273	0.266	0.006	2.347	48
0.679	0.320	0.359	52.853	49
0.674	0.298	0.376	55.788	50
0.667	0.493	0.174	26.060	51
0.812	0.665	0.147	18.115	52
0.720	0.980	-0.260	-36.153	53
0.552	0.907	-0.355	-64.212	54
0.832	1.009	-0.177	-21.272	55
0.673	0.962	-0.288	-42.858	56
0.922	0.691	0.232	25.144	57
0.852	0.561	0.291	34.159	58
-0.023	0.321	-0.344	1490.542	59
-0.365	0.393	-0.758	207.548	60
-0.176	0.418	-0.593	337.844	61
1.321	0.700	0.621	46.982	62
2.392	1.022	1.370	57.257	63
1.584	1.039	0.544	34.374	64
1.284	1.077	0.205	15.977	65
1.087	0.940	0.147	13.521	66
0.434	0.658	-0.224	-51.731	67
0.447	0.663	-0.216	-48.186	68
0.284	0.724	-0.440	-154.928	69
-0.219	0.399	-0.617	281.333	70
0.268	0.083	0.184	68.862	71
0.595	0.030	0.565	95.038	72
-0.331	0.075	-0.406	122.767	73



DURBIN-WATSON D STATISTIC = 1.17685

SUM OF SQUARED RESIDUALS = 9.27307

IV D (Goods only) CD

23

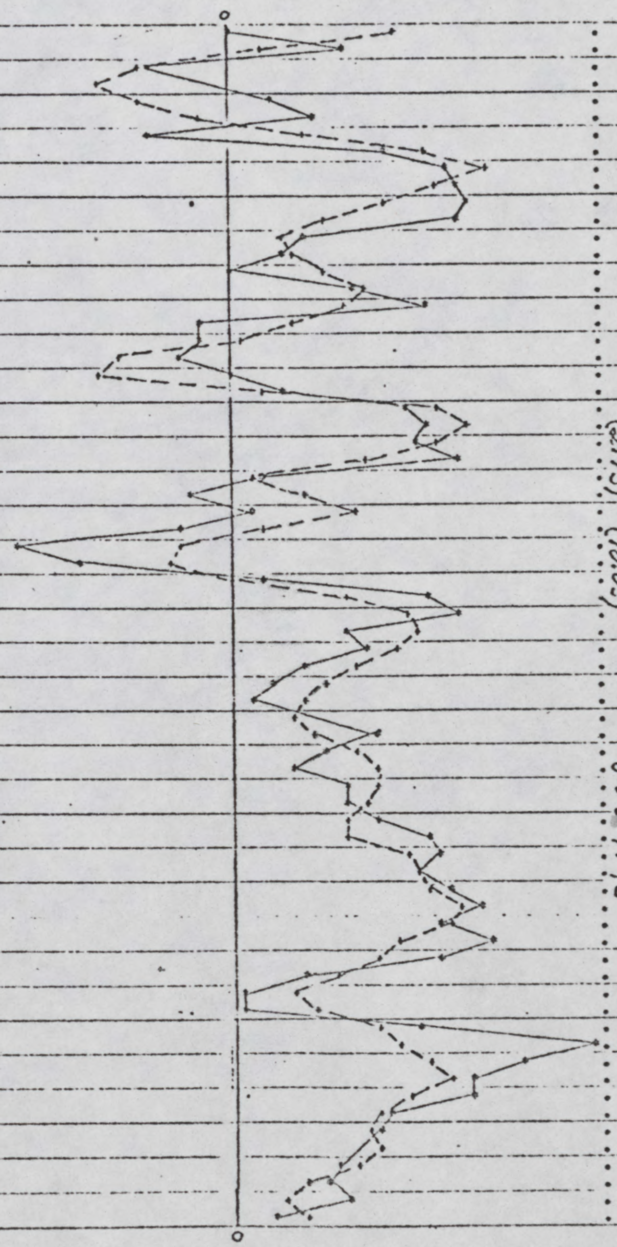
I CR

EQUATION NUMBER 1 0 1 0 2 3 1 1 0 0

	X1	X3	CONSTANT	R-SQ./SE	DW(0)/DF
OLS		1.034958	-3.632314	0.590424	1.431705
		10.033592	-2.734239	5.596721	63.000000

RANGE -14.04 TO 27.19

ACTUALS	PREDICTED	RESIDUALS	O/C ERROR	
0.0	12.394	-12.394	99999999.999	3
8.828	2.573	6.255	70.854	4
-5.364	-6.263	0.404	-6.886	5
-18.039	-9.737	-8.252	45.745	6
3.715	-6.516	10.231	275.408	7
6.643	-1.695	8.338	125.523	8
-5.933	5.601	-11.534	194.392	9
11.717	15.155	-3.439	-29.348	10
16.801	19.225	-2.424	-14.426	11
17.469	15.831	1.639	9.375	12
17.984	11.850	6.135	34.111	13
17.261	7.458	9.803	55.793	14
5.361	3.811	1.550	28.917	15
4.123	4.645	-0.521	-12.646	16
0.0	7.394	-7.394	99999999.999	17
9.202	10.248	-1.046	-11.369	18
14.954	8.713	6.240	41.731	19
-1.905	5.293	-7.193	377.650	20
-1.914	1.265	-3.178	166.076	21
-3.827	-7.877	4.050	-105.810	22
0.0	-9.973	9.973	99999999.999	23
3.950	2.525	1.453	35.518	24
13.019	15.746	-2.727	-20.945	25
15.019	18.093	-3.075	-20.475	26
14.168	15.836	-1.669	-11.778	27
16.873	10.050	6.823	40.433	28
2.580	1.911	0.675	25.957	29
-2.484	5.519	-8.003	322.136	30
1.695	9.752	-8.057	-475.433	31
-3.347	2.492	-5.840	174.464	32
-16.035	-3.706	-12.330	76.889	33
-10.847	-4.396	-6.451	59.474	34
2.758	0.635	2.124	76.997	35
15.374	9.215	6.150	40.362	36
16.873	13.148	3.725	22.081	37
8.654	13.975	-5.321	-61.489	38
10.250	12.367	-2.118	-20.660	39
5.772	9.422	-3.650	-63.238	40
3.200	7.491	-4.292	-134.137	41
1.587	6.052	-4.465	-281.295	42
4.742	5.018	-0.276	-5.821	43
11.282	6.390	4.891	43.353	44
6.938	9.496	-2.558	-35.884	45
5.272	11.234	-5.962	-113.078	46
9.052	11.168	-2.116	-23.380	47
8.885	10.298	-1.413	-15.906	48
10.882	8.423	2.458	22.589	49
15.115	9.040	6.074	40.189	50
15.310	13.083	2.227	14.543	51
14.054	14.144	-0.090	-0.637	52
16.235	14.817	1.418	8.735	53
19.008	17.421	1.588	8.352	54
15.640	16.640	-0.999	-6.390	55
19.173	12.731	6.442	33.599	56
15.664	10.714	4.950	31.599	57
5.676	8.386	-2.710	-47.743	58
1.005	4.630	-3.625	-360.775	59
1.490	6.565	-5.074	-340.438	60
13.420	10.454	2.965	21.302	61
27.185	12.603	14.582	53.640	62
22.133	14.962	7.171	32.398	63
17.715	16.281	1.435	8.098	64
17.628	13.677	3.951	22.415	65
11.985	11.127	0.858	7.160	66
11.214	10.613	0.601	5.361	67
11.308	11.064	0.245	2.163	68
7.914	9.884	-1.970	-24.839	69
7.323	5.792	1.532	20.918	70
9.094	3.828	5.266	57.903	71
3.502	5.636	-2.134	-60.922	72



CR: Goods + Services

$I\dot{h}_t = -3.63 + 1.93\,\dot{Y}_{t-2}$

(2.73) (10.03)

$R^2 = .59$

SE = 5.59

DW = 1.43

DURBIN-WATSON D STATISTIC = 1.43171

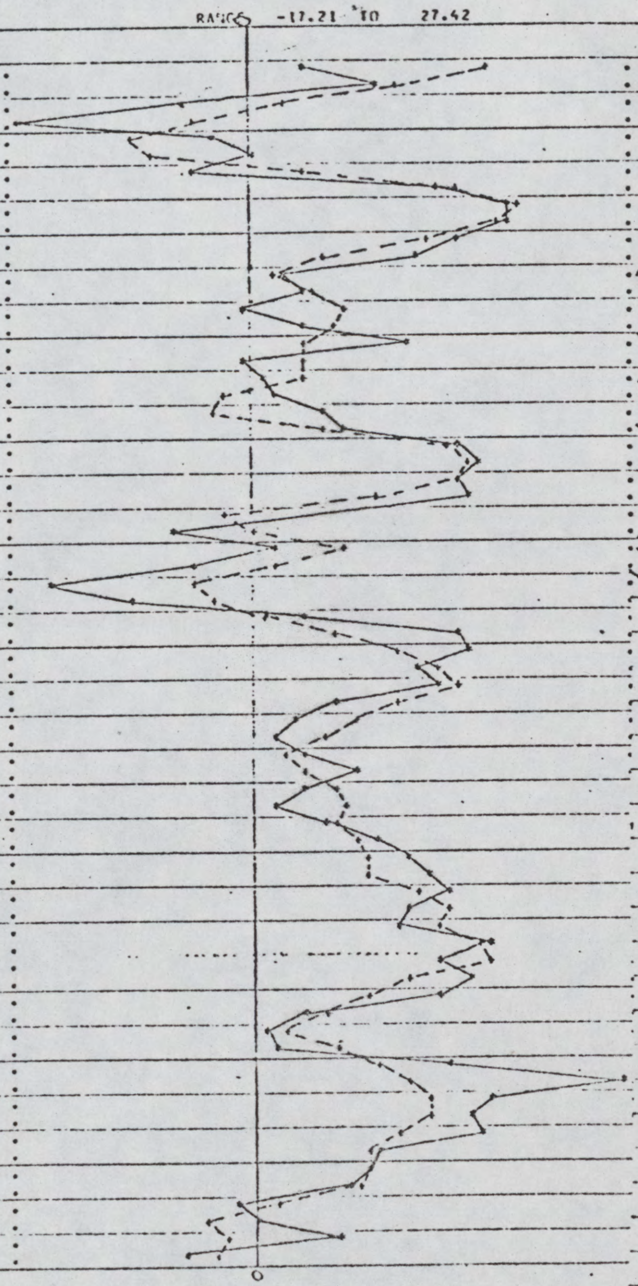
SUM OF SQUARED RESIDUALS = 2131.50592

NUMBER 6 0 1 0 4 12 14 19 2 1 0 0

2	X12	X14	X18	CONSTANT	R-SQ./SE	DW(D)/DF
	0.943140	0.612593	-23.338308	1.637131	0.583710	1.310649
	9.117477	4.374766	-1.942171	1.499114	5.499407	46.000000

RANGE -17.21 TO 27.42

ACTUALS	PREDICTED	RESIDUALS	O/O ERROR	
3.875	17.401	-13.526	-349.033	3
9.448	10.535	-1.047	-11.036	4
-4.906	2.333	-7.239	147.560	5
-17.206	-4.504	-12.702	73.821	6
-3.091	-9.182	6.091	-197.100	7
0.444	-7.522	7.966	1794.343	8
-4.249	3.922	-8.171	192.239	9
13.495	15.429	-1.934	-14.330	10
19.148	19.968	-0.819	-4.277	11
19.115	14.286	0.830	4.341	12
14.976	17.898	2.077	13.871	13
12.496	5.397	7.099	55.808	14
2.708	2.067	0.641	23.632	15
4.327	4.399	-0.572	-13.220	16
-0.775	6.713	-7.494	966.556	17
3.653	6.333	-2.680	-73.363	18
11.891	4.164	7.728	64.986	19
-0.199	4.236	-4.435	2223.522	20
1.163	3.807	-2.644	-227.335	21
1.769	-1.867	3.635	205.531	22
5.257	-2.342	8.099	154.073	23
7.135	5.460	1.675	23.479	24
15.310	14.425	0.884	5.775	25
16.888	16.293	0.595	3.522	26
15.327	15.142	0.185	1.206	27
15.933	9.354	6.579	41.292	28
-2.038	-1.772	-0.266	13.055	29
-5.743	-0.150	-5.593	97.393	30
1.695	7.162	-5.467	-322.557	31
-4.298	1.799	-6.096	141.833	32
-15.199	-4.265	-10.933	71.935	33
-9.517	-2.333	-5.683	66.730	34
3.788	1.301	2.487	65.648	35
15.074	6.615	8.459	56.115	36
15.407	10.497	5.910	36.021	37
12.441	14.122	-1.681	-13.513	38
13.625	15.057	-1.431	-10.502	39
5.927	11.392	-5.103	-85.234	40
3.409	8.115	-4.706	-133.036	41
1.391	5.369	-3.938	-283.449	42
3.898	2.754	1.134	27.232	43
7.749	3.613	4.137	53.381	44
3.612	6.193	-2.551	-71.463	45
1.383	6.880	-5.497	-397.502	46
5.664	6.134	-0.520	-9.184	47
9.523	7.679	1.849	19.410	48
11.755	3.483	2.872	24.430	49
12.882	8.616	4.266	33.114	50
14.409	12.315	2.094	14.534	51
11.218	14.851	-3.634	-32.392	52
10.750	13.833	-3.087	-28.718	53
17.871	17.011	0.860	4.810	54
13.678	17.424	-3.746	-27.389	55
15.821	11.398	4.423	27.956	56
13.931	8.207	5.724	41.087	57
3.703	5.212	-1.509	-40.705	58
1.195	2.807	-1.613	-134.957	59
1.681	6.120	-4.439	-264.114	60
14.742	9.339	5.442	36.818	61
27.424	11.202	16.222	59.153	62
17.866	12.905	4.961	27.770	63
15.970	12.688	3.282	20.549	64
16.760	10.685	6.074	36.244	65
8.925	8.544	0.379	4.244	66
8.594	8.635	-0.046	-0.533	67
6.949	7.662	-0.715	-10.285	68
-1.305	1.572	-2.877	220.441	69
0.523	-3.251	3.774	721.817	70
5.926	-2.203	8.129	137.181	71
-4.450	-2.163	-2.087	42.171	72



IN-WATSON D STATISTIC = 1.31265

OF SQUARED RESIDUALS = 1996.21496

III CR

CR: Goods & Services

$\dot{IM}_t = 1.63 + 1.18\,\dot{X}_{t-1} + 109\left(\frac{\dot{WPI}}{PIM}\right)_{t-2} - 41.49\,\dot{GNP}_{t-2}$

(1.5) (9.1) (4.1) (2.0)

$R^2 = .58$

SE = 5.50

DW = 1.31

EQUATION NUMBER 1 0 1 0 2 6 2 1 0 0

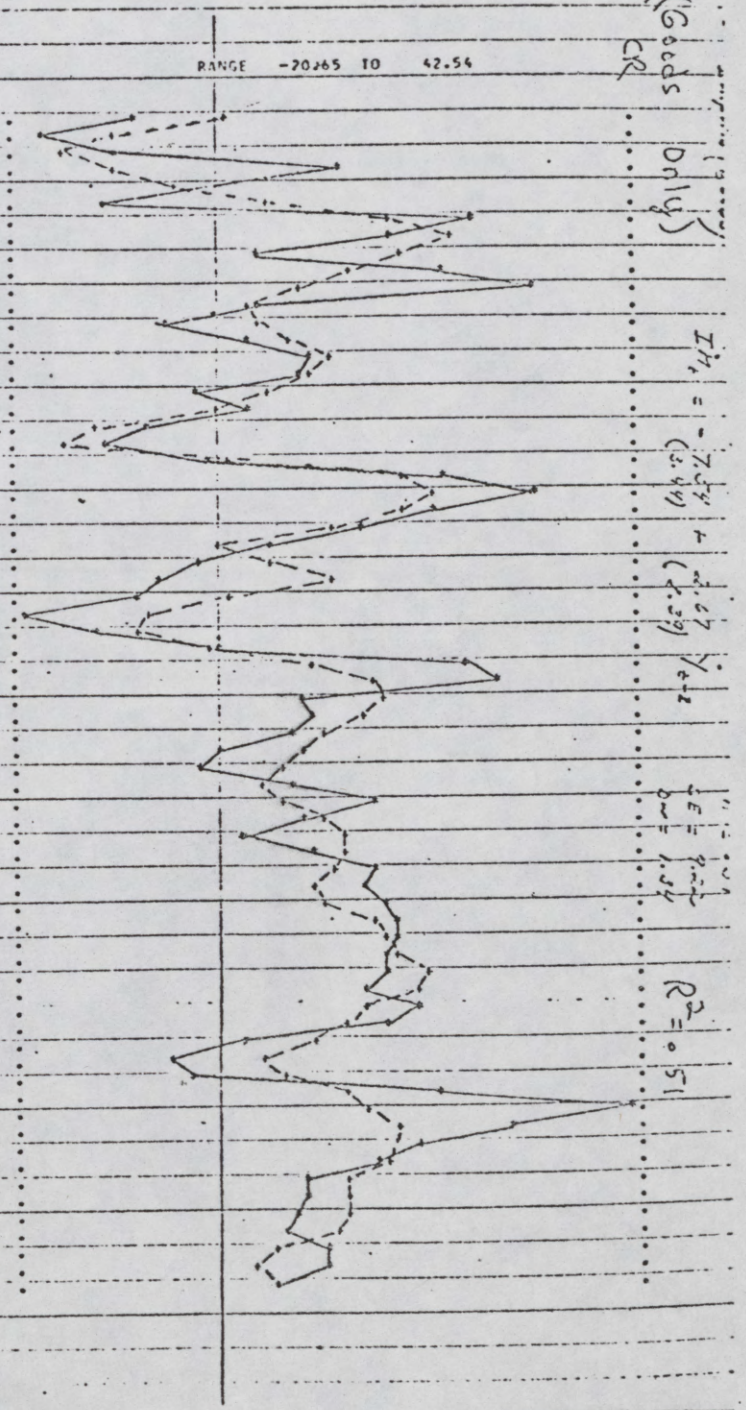
	X2	X5	CONSTANT	R-SQ./SE	DW(0)/DF
1					
OLS		1.497316	-7.535794	0.505112	1.336611
		8.390758	-3.443656	9.222169	67.000000

ACTUALS	PREDICTED	RESIDUALS	D/D ERROR	
-9.430	1.040	-9.470	112.340	3
-18.757	-11.178	-7.579	40.407	4
-11.340	-16.041	4.701	-41.452	5
12.993	-11.521	24.514	188.676	6
-5.370	-4.159	-0.211	4.169	7
-12.515	5.224	-17.739	141.742	8
25.631	13.429	8.202	30.799	9
17.633	24.053	-6.419	-36.406	10
3.636	19.363	-15.727	-432.538	11
23.378	13.860	9.517	40.710	12
32.759	7.791	24.968	76.217	13
3.493	2.750	0.742	21.249	14
-5.990	3.903	-9.894	165.155	15
2.934	7.688	-4.704	-157.627	16
9.135	11.647	-2.513	-27.505	17
7.850	9.526	-1.676	-21.351	18
-1.932	4.793	-6.724	348.078	19
2.467	-0.763	3.235	131.143	20
-7.569	-13.402	5.833	-77.063	21
-12.521	-16.299	3.778	-30.172	22
-0.953	0.976	-1.929	202.323	23
23.402	19.246	4.157	17.761	24
32.574	22.488	10.086	30.964	25
21.959	19.370	2.589	11.790	26
14.443	11.373	3.070	21.256	27
5.321	0.125	5.197	97.659	28
-1.914	5.111	-7.025	367.056	29
-6.514	10.961	-17.475	268.280	30
-3.477	0.429	-9.400	110.961	31
-20.654	-7.638	-13.016	63.020	32
-13.550	-8.591	-4.958	36.595	33
0.0	-1.639	1.639	99999999.999	34
25.916	9.804	16.112	62.170	35
28.528	15.654	12.874	45.128	36
8.315	16.798	-8.483	-102.013	37
9.571	14.576	-5.005	-52.293	38
7.721	10.505	-2.784	-36.059	39
0.098	7.837	-7.739	-7894.023	40
-2.351	5.848	-8.699	369.111	41
6.886	4.420	2.464	35.816	42
16.160	6.315	9.845	60.921	43
8.132	10.607	-2.475	-30.430	44
1.795	13.009	-11.214	-624.774	45
9.766	12.919	-3.152	-32.278	46
15.645	11.716	3.930	25.116	47
14.659	9.125	5.534	37.749	48
17.102	9.978	7.124	41.657	49
18.436	15.565	2.871	15.575	50
17.865	17.031	0.834	4.671	51
16.317	17.961	-1.644	-10.078	52
17.257	21.559	-4.302	-24.930	53
14.531	20.480	-5.949	-40.942	54
19.998	15.079	4.919	24.598	55
16.850	12.291	4.559	27.055	56
1.521	9.074	-7.553	-496.668	57
-5.903	3.882	-9.785	165.774	58
-2.935	6.557	-9.541	319.658	59
21.436	12.623	9.313	42.455	60
42.538	14.701	27.835	65.459	61
29.355	18.162	11.193	38.128	62
20.373	19.984	0.089	0.445	63
15.777	16.386	-0.609	-3.860	64
8.482	12.862	-4.381	-51.649	65
8.160	12.151	-3.991	-48.914	66
7.717	12.774	-5.057	-65.524	67
6.475	11.143	-4.668	-72.093	69
10.224	5.488	4.736	46.321	69
10.597	2.774	7.822	73.818	70
4.681	5.273	-0.592	-12.657	71

DURBIN-WATSON D STATISTIC = 1.33621

SUM OF SQUARED RESIDUALS = 5698.24328

RANGE -20.65 TO 42.54



H21-A2

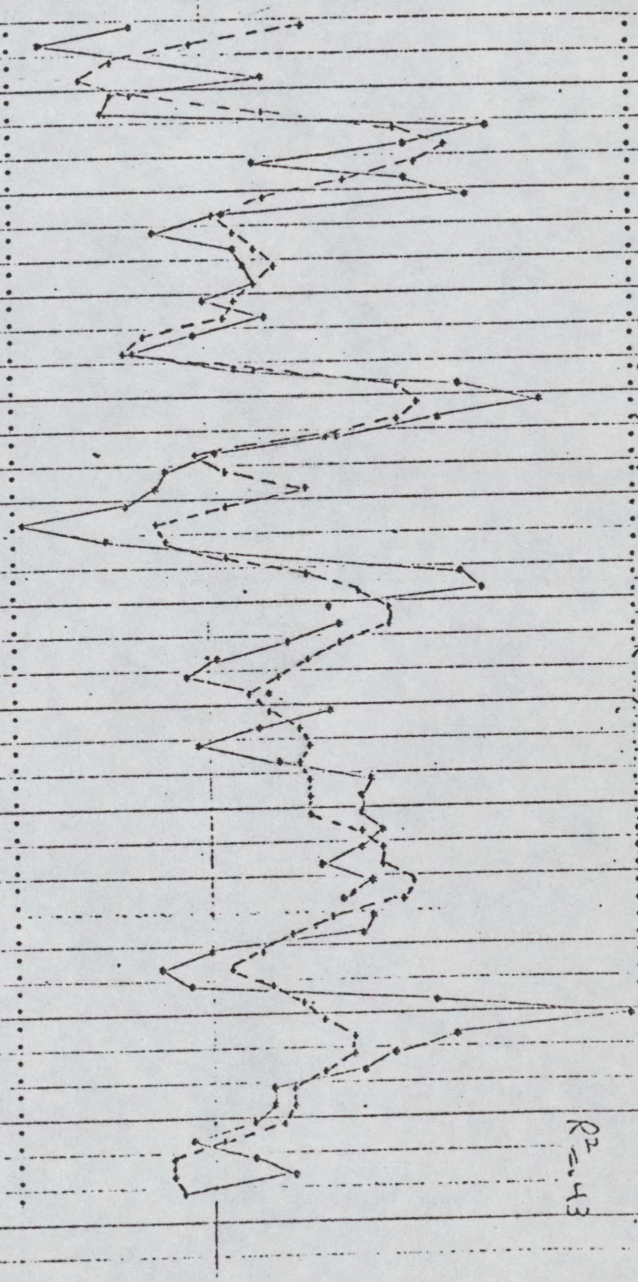
IV CR

LATICN NUMBER 1 0 1 0 4 12 14 13 2 1 0 0

	X2	X12	X14	X18	CONSTANT	R-SQ./SE	DW(U)/DF
OLS		1.322756	0.523700	-11.957774	-0.735107	0.430944	1.207924
		7.221200	1.970651	-0.568811	-0.381040	9.681852	65.000000

RANGE -19.86 TO 42.81

ACTUALS	PREDICTED	RESIDUALS	O/O ERROR	
-7.875	9.452	-17.327	220.032	3
-17.930	-1.692	-16.237	90.561	4
-10.440	-10.011	-0.429	4.111	5
5.578	-13.521	19.100	342.398	6
-10.588	-8.478	-2.110	19.927	7
-10.949	6.056	-17.005	155.311	8
28.647	19.654	8.993	31.392	9
19.997	24.619	-4.622	-23.111	10
5.089	21.222	-16.133	-317.020	11
20.231	14.380	5.851	28.921	12
27.365	5.118	22.246	81.296	13
0.887	-0.175	1.061	119.702	14
-5.806	2.254	-8.060	138.821	15
2.186	5.067	-2.881	-131.802	16
3.589	6.473	-2.884	-80.354	17
4.977	4.215	0.762	15.307	18
-0.227	2.843	-3.070	1352.038	19
5.681	0.948	4.734	83.320	20
-2.191	-7.622	5.431	-247.934	21
-7.922	-8.843	0.921	-11.628	22
2.052	4.881	-2.829	-137.844	23
25.902	19.037	6.866	26.505	24
34.730	21.342	13.387	38.547	25
23.198	19.182	4.015	17.310	26
13.522	11.603	1.918	14.186	27
0.579	-1.542	2.121	366.336	28
-5.191	1.696	-6.887	132.676	29
-6.514	9.570	-16.083	246.919	30
-9.372	1.403	-10.775	114.967	31
-19.863	-6.573	-13.290	66.909	32
-11.290	-5.497	-5.793	51.309	33
1.002	1.108	-0.106	-10.566	34
25.916	10.243	15.674	60.478	35
28.015	15.289	12.726	45.425	36
12.090	17.938	-5.848	-48.371	37
12.926	17.937	-5.011	-38.762	38
7.940	13.580	-5.639	-71.023	39
0.301	9.909	-9.608	-3190.287	40
-3.048	6.393	-9.442	309.727	41
6.024	3.641	2.383	39.554	42
12.473	5.372	7.100	56.927	43
4.720	8.978	-4.258	-90.203	44
-1.966	9.933	-11.899	605.345	45
6.355	9.253	-2.897	-45.574	46
16.329	10.093	6.236	38.188	47
15.562	9.911	5.651	36.313	48
14.831	9.810	5.021	33.856	49
17.511	14.833	2.677	15.290	50
14.934	17.619	-2.685	-17.981	51
10.828	17.194	-6.366	-58.736	52
16.137	20.511	-4.374	-27.105	53
12.587	19.351	-6.764	-53.738	54
16.623	11.684	4.939	29.710	55
15.099	8.128	6.971	46.171	56
-0.370	4.873	-5.243	1418.408	57
-5.726	1.496	-7.222	126.124	58
-2.803	5.256	-8.059	287.482	59
22.859	9.204	13.655	59.737	60
42.805	11.099	31.706	74.071	61
24.835	13.878	10.957	44.120	62
18.292	14.183	4.110	22.468	63
14.922	11.015	3.908	26.186	64
5.516	7.857	-2.341	-42.438	65
5.607	7.492	-1.885	-33.619	66
3.497	6.608	-3.111	-88.960	67
-2.621	0.732	-3.353	127.935	68
3.239	-5.320	8.559	264.224	69
7.384	-5.157	12.541	169.933	70
-3.868	-4.173	0.305	-7.884	71



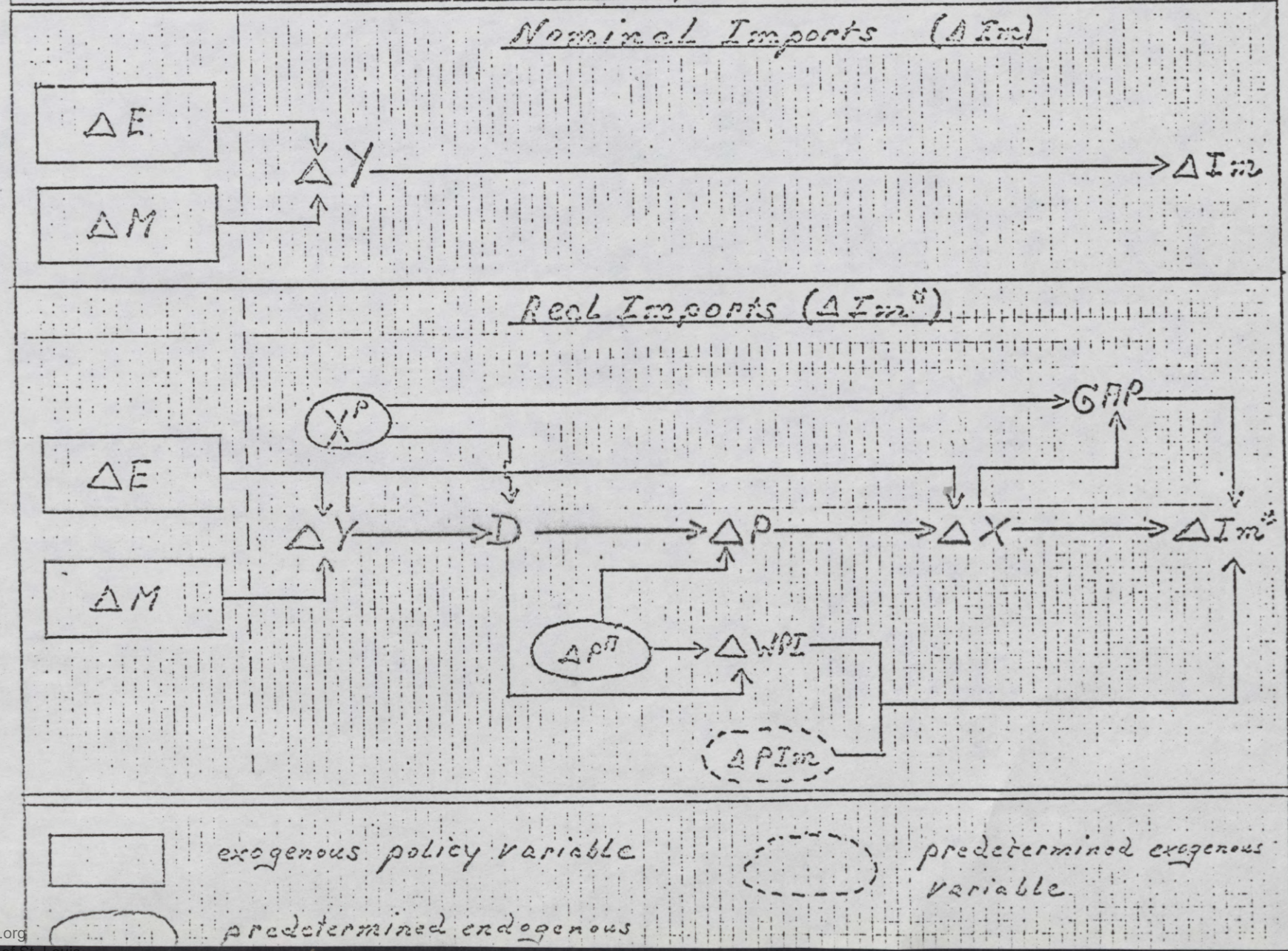
DURBIN-WATSON D STATISTIC = 1.20792

SUM OF SQUARED RESIDUALS = 6092.98739

I^{*}_{t} CR = $-.74 + 2.36 X_{t-2} + 9.3 \left(\frac{WPI}{PIH}\right)_{t-1} - 21.26\, CDR_{t-1}$
(.32) (7.2) (2.0) (1.56)

$R^2 = .43$ SE = 9.68 DW = 1.21

Flow Diagram of Policy Influences on U.S. Imports



in imports over two quarters.

The linkages for real imports are outlined in the lower panel of the diagram. Monetary and fiscal policy determine the value of changes in nominal GNP (ΔY). Given the difference between actual real output (X) and potential real output (XP) changes in nominal GNP determine the amount of "demand pressure" (D) in the economy. The amount of demand pressure and the degree of inflation expectations (Δp^a) will determine the current change in prices (Δp). Knowing the current change in prices and the current change in nominal GNP we can determine the current change in real GNP (ΔS). This value feeds directly into influencing changes in real imports (ΔIM^*).

Another source of influence on real imports is the GNP gap (GAP) which is determined from the changes in real GNP and the assumed capacity of the economy. The final source of influence on real imports is the ratio of foreign prices (measured by changes in U. S. import prices--Pim) relative to changes in U. S. wholesale prices (WPI). Wholesale prices are determined by the same factors which determine the general price index of the economy i.e. demand pressure and inflation expectations.

In evaluating these alternative import models it should be kept in mind that simulation with respect to nominal imports requires far less information about the interactions in the economy than does simulation of real imports. Undoubtedly this makes the real import model more realistic. However, the price one pays for realism is complexity and a greater potential

for the model to break down because of greater chance that one link in the chain is defective. In addition, the real import version of the model requires a greater amount of exogenous information. In addition to knowing the monetary and fiscal policy values one needs to know the level of foreign prices, And the capacity of the economy.

Simulation experiments were conducted on both the nominal and real import models. The type of simulations performed were ex post and dynamic. Ex post, means that the simulations were performed within the data period used to estimate the equations, i.e. 1953 to 1970. Dynamic means that the simulations were allowed to accumulate quarter after quarter and were not updated periodically to adjust for previous simulation errors. This in effect means that if the simulation tends to systematically error in one direction no actions were taken to put the simulation back "on track."

Table II shows the ex post dynamic simulation for nominal imports and table III for real imports. Simulation was commenced with the first quarter of 1953 and ran continuously through the first quarter of 1971. This is a simulation of 18 years. The actual values of the exogenous variables were used while only the simulated values of the endogenous variables were used in jountly determining the final simulated value of imports. It is reassuring to observe that neither import model drifted away from the actual value of imports in any systematic way. However casual inspection of the alternative simulations would seem to indicate

Table II

Ex Post Dynamic Simulation
Nominal Imports

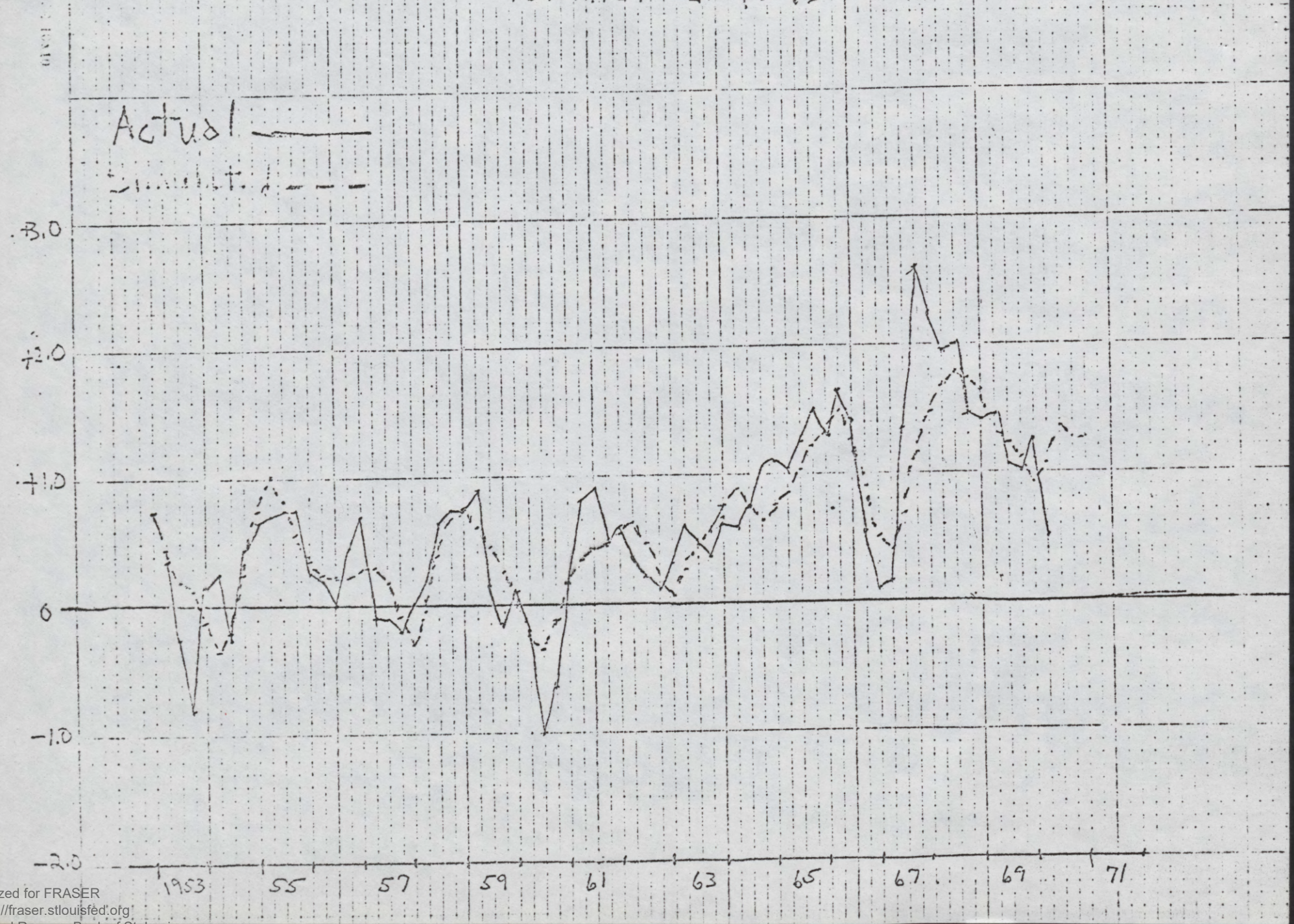
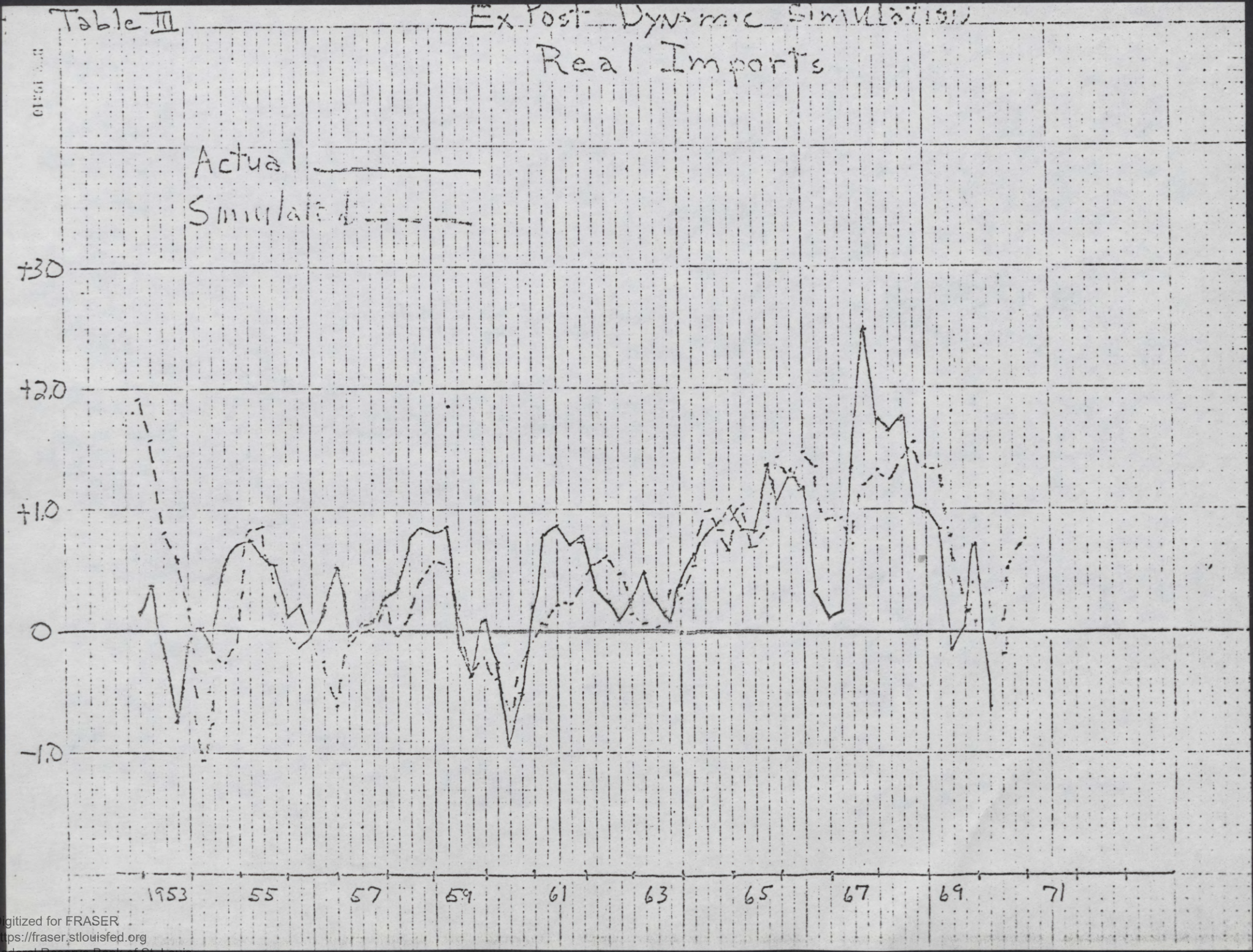


Table III

Ex Post Dynamic Simulation

Real Imports



that the nominal import simulation had a superior performance to the real import simulation. Apparently the additional exogenous information used to simulated real imports does not offset the additional complexity of the real import model.

EX ANTE DYNAMIC SIMULATIONS

The acid test of any economic model's usefulness is its ability to forecast the future. The fact that our two import models performed reasonably well in ex post simulation is reassuring and indicates that the various elements within the model interact in a realistic and viable way. However, the very nature of ex post simulation within the data period in which the model was statistically estimated implies that there were no "structural" shifts in the economic relationships which were postulated and estimated in the model. A major uncertainty in accepting the results of an ex ante simulation is the possibility that the behavior postulated and estimated within the model period may change in the period after the model was estimated. Even a relatively small shift in the behavior of the economic decision-making units involved can have a potentially large effect on the forecast. For example a shift in the marginal propensity to import from 10¢ to 12¢ on the dollar of income would lead to a 20% underestimation in import growth.

There are other pitfalls in ex ante simulations which can also lead the forecaster astray. The model will simulate forecast values for the endogenous variables in the model given specified valued of the exogenous variables in the model.

If the forecaster errs in his "forecast" of the exogenous variables he will also err in his forecast of the endogenous variables even if his model is perfectly specified and there has been no change in assumed behavior.

Internal Stability. We are interested in forecast values of imports -- not for their own sake but for what they imply for internal and external stability of the economy. In this section we will look at the consequences for internal stability and in the next section the consequences for external stability of alternative policy actions. The St. Louis monetarist's model provides a useful method of integrating, in an internally consistent way, our import forecasts with forecasts of the unemployment rate, inflation, and the amount of unused capacity in the economy.

If monetary policy is restrictive, i.e., 3 percent growth in the money stock from the second quarter of 1971 through the end of 1975, then imports will be at an annual rate of just under $80 billion at the end of 1975. The unemployment rate will be 7.4%. Prices will be falling at an annual rate in excess of 1.4% a year and the gap between potential output and actual output of the economy will be 10.5%. Clearly this set of policy assumptions will lead to unacceptable effects on the labor market and the level of real income in the economy.

Table 2

INTERNAL CONSEQUENCES OF ALTERNATIVE POLICIES

Tight Money (M=3)

	Imports	Unemp. Rate	Inflation Rate	GAP as % of Potencial GNP
1971 IV	64.29	6.1	3.9	7.6
1972 IV	68.3	7.1	2.4	10.4
1973 IV	72.1	7.6	.7	11.5
1974 IV	75.9	7.6	-.6	11.4
1975 IV	79.8	7.4	-1.4	10.5

Very Easy Money Policy (M=9)

1971 IV	65.8	6.1	4.0	6.5
1972 IV	76.1	5.5	3.7	3.9
1973 IV	87.7	4.8	3.4	2.2
1974 IV	100.1	4.1	3.5	0.0
1975 IV	113.7	3.5	4.0	-1.6

Moderately Easy Money Policy (M=6)

1971 IV	64.8	5.9	4.1	6.5
1972 IV	71.6	6.1	3.2	7.0
1973 IV	79.2	6.1	2.2	6.6
1974 IV	87.1	5.8	1.6	5.7
1975 IV	95.4	5.5	1.3	5.0

At the other extreme, if monetary policy is assumed to be relatively easy, i.e., money growth of 9%, would lead to the following effects by the end of 1975: Imports would rise to an annual rate of just under $114 billion. The unemployment rate would be at 3.5%. Prices would continue to rise at a 4% annual rate and the gap between potential output and actual output would be effectively zero. This easy money policy also has unfavorable implications for the domestic economy. The 4% inflation is high by American standards and would be considered economically and politically unfeasible. The 3-1/2% unemployment rate would certainly be acceptable, but it is generally considered now among many economists that if the unemployment rate falls below 4 to 4-1/2%, it would put such intolerable pressures on the domestic economy as to lead to a cumulative inflation.

A moderately expansionist monetary policy such as that implied by a 6% growth in the money stock would lead to import growth at a rate of about $95 billion at the end of 1975. The unemployment rate would be down moderately from its present level to 5.5%. Inflation would be effectively licked with an annual price rise of only 1.3% and the percentage of excess capacity in the economy at a moderate 5%.

Which of these alternative monetary policies would be pursued depends in the final analysis on the preferences of the policy maker. If he puts a very high priority on reducing domestic unemployment to the exclusion of all other domestic and international objectives, the expansionary policy would be appropriate. If the policy maker puts high priority on rapidly achieving domestic price stability to the exclusion of all other domestic goals, then the tight monetary policy would be appropriate. This would get inflation down to 1.2% by the end of 1972 and presumably policy could then be eased somewhat.

If the policy maker desired to achieve both a gradual return to price stability with the minimum cost in terms of unemployment, he would choose the moderately expansionary policy implied in a 6% growth in money.

External stability. To analyze the effects of alternative monetary policies on the external position of the U.S. economy, we must not only forecast movements in imports but also movements in exports and net capital transactions. In this exercise, we will ignore the capital account and focus on forecasting exports, and the current account of the balance of payments.

The basic export equation is as follows:

$$\ln Ex^{*} = \underset{}{4.35} + \underset{(18.21)}{0.0183(T)} - \underset{(39.92)}{0.313 \ln GAP} - \underset{(1.47)}{1.59 \ln\left(\frac{WPI}{Pim}\right)} + \underset{(6.05)}{0.114Z} \quad \underset{(3.39)}{}$$

$R^2 = .98$

$SE = .047$

The log of real exports ($\ln Ex^{*}$) is a function of a time trend (T), the log of the GNP gap (lnGAP) and the log of U. S. wholesale prices (WPI) relative to foreign wholesale prices -- which is measured by U.S. import prices (Pim), Z is a strike dummy. The real value of exports was computed by dividing the nominal value of exports of goods and services (as measured in the GNP accounts) by the U. S. Wholesale Price Index. This deflator was used in contrast to the U. S. Export Price Index because it is believed to be a more reliable measure of the price at which exports are sold abroad.

The time trend is a proxy for foreign demand for U. S. goods. The GNP gap is a measure of the nonprice incentives for exporters to sell at home rather than abroad and the relative price variable is a measure of the price incentive to sell at home rather than abroad; Z is a dummy variable which assumes the value of one when there is a long shoremen's strike and a zero at other times.

The use of a time trend rather than a measure of foreign income was decided upon for the simple reason that it is easier to forecast the time variable in simulation experiements than to forecast foreign demand of income. As a practical matter, foreign income has grown at a remarkably steady rate

---

1/ There are incentives on the part of both U. S. exporters and foreign importers to understate in some cases and overstate in other cases the value at which goods are transported.

over the 50's and 60's and a time variable is a perfectly suitable proxy under these circumstances. In addition, most forecasts of foreign income through the mid-70's would closely approximate a time trend and therefore the explicit use of such a variable would seem to be preferable to its implicit use.

The GNP gap variable is designed to capture the amount of demand pressure in the U. S. economy. If there is substantial amount of slack in the economy this should lead to an incentive for exporters to increase foreign sales and vice versa. The expected sign on this variable would, therefore, be positive. The larger the gap in the economy the higher the level of exports. The statistically estimated coefficient has the wrong sign but is fortunately not significant. We can infer from this that the slack in the economy does not seem to be a significant factor in export performance.

The relative price variable $(\frac{WPI}{Pim})$ captures the standard substitution effect. A rise in U.S. prices relative to foreign prices would reduce exports. The statistically estimated coefficient on this variable has the right sign and is highly significant statistically.

For forecasting purposes, we need to have the nominal value of exports rather than the real value of exports, and for that purpose the Wholesale Price Index (WPI)must also be forecast. As the WPI is generated from the monetarist model, the procedure raises no difficulties. In the following simulations, it is assumed that foreign prices rise at the same rate

7861.2

EXTERNAL CONSEQUENCES OF ALTERNATIVE MONETARY POLICIES

Billions of Dollars

Tight Money (M=3)

	Exports Annual	Imports Annual	Current Account Balance	Current Acc't Balance % GNP
1971	68.05	62.98	5.07	.48
1972	74.58	66.97	7.61	.70
1973	80.76	70.63	10.13	.89
1974	86.42	74.42	12.00	1.01
1975	91.79	78.30	13.49	1.09
	Very Easy Money Policy (M=9)			
1971	68.16	62.66	5.50	.522%
1972	75.22	72.11	3.11	.267%
1973	83.16	83.25	-.09	-.007%
1974	91.95	95.37	-3.42	-.241%
1975	101.41	108.55	-7.14	-.458%
	Moderately Easy Money Policy (M=6)			
1971	68.14	62.31	5.83	.558%
1972	74.83	69.02	5.81	.518%
1973	81.78	76.33	5.45	.452%
1974	88.88	84.08	4.84	.374%
1975	96.34	92.25	4.09	.295%

as U. S. wholesale prices so that relative prices are unchanged from the fourth quarter of 1970. However, because alternative monetary policies imply different wholesale prices in the United States, the forecasted value of exports varies substantially depending on which policy assumption is made. This can be seen by looking at Table 5. Nominal exports in 1975 are forecasted to be about $84 billion under the assumption of tight money. Exports are forecasted to be $101 billion in 1975 under the assumption of very easy money policy. Under both sets of monetary policy assumptions, real exports (in 1958 dollars) are identical at $76 billion in 1975. The Wholesale Price Index which is used to compute nominal exports is forecast to be 118.0 in 1975, with tight monetary policy and a much higher 132.9 with very easy monetary policy.1/

Using the same assumptions about monetary policy as in the previous section, we can simulate the effects on the current account. If monetary policy is tight (3% growth in the money stock between the second quarter of 1971 and the fourth quarter of 1975) the current account balance will

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1/ It perhaps strains our credibility to assume foreign wholesale prices will rise not only proportionately to U. S. wholesale prices, but even proportionally with respect to alternative assumptions about U. S. wholesale prices. Obviously, a modification of our simulation procedures allowing for the effect of changing relative prices on real exports would add more realism to our forecast. Such a simulation procedure is now being worked on and will be submitted at a later date. We would assume that allowing relative prices to very would tend to make the surplus larger with tight money and the deficit larger with very easy money.

register a $13.5 billion surplus, which will be equal to almost 1% of GNP by 1975. If, on the other hand, we follow a very easy monetary policy (9% growth in money stock) the current account will be in excess of a $7.0 billion deficit by 1975, which would be almost 1/2% of GNP.

If a moderately easy monetary policy (6% growth in the money stock) is followed, there will be a current account surplus of about $4 billion 1975, which will be approximately 0.3% of nominal GNP in that year.

Internal and external balance. Taking both the internal and external consequences of alternative policy assumptions would lead me to choose the moderately easy monetary policy represented by a 6% growth in the money stock. In terms of domestic effects, this policy would give us a gradual return to price stability, a gradual reduction in the unemployment rate, and only a moderate loss of potential output caused by the economy running below its full employment capacity. On the external side, a moderately easy monetary policy would lead to current account surpluses of approximately 0.5 to 0.6% of GNP through 1973 and gradually declining current account surpluses through 1975.

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If a moderately easy monetary policy (6% growth in the money stock) is followed, there will be a current account surplus of about $4 billion 1975, which will be approximately 0.3% of nominal GNP in that year.

Internal and external balance. Taking both the internal and external consequences of alternative policy assumptions would lead me to choose the moderately easy monetary policy represented by a 6% growth in the money stock. In terms of domestic effects, this policy would give us a gradual return to price stability, a gradual reduction in the unemployment rate, and only a moderate loss of potential output caused by the economy running below its full employment capacity. On the external side, a moderately easy monetary policy would lead to current account surpluses of approximately 0.5 to 0.6% of GNP through 1973 and gradually declining current account surpluses through 1975.

UNITED STATES GOVERNMENT

Memorandum

Treas -- OASIA
B/P Projects
W/D - 17
April 28, 1971

TO : Balance of Payments Project Team

FROM : F. Lisle Widman

SUBJECT:

Attached is a memorandum prepared by Herbert Grubel on "The Attainment of U.S. Payments Equilibrium Through Differential Rates of Price Increases."

This paper has been prepared in connection with Project D of the Balance of Payments Project Series--the project on adjustment. Mr. Grubel would welcome comments or suggestions.

Herbert G. Grubel
OASIA Research

Treas - OASIA
B/P Projects
W/D - 17
April 28, 1971

Preliminary

The Attainment of U.S. Payments Equilibrium Through Differential Rates of Price Increases

Economic theory and available statistical evidence imply that the U.S. trade balance is an increasing function of the rates at which prices and incomes rise in the rest of the world, given the corresponding rates of increase in the United States. In the following parts of this paper the empirical evidence on these relationships produced by Houthakker and Magee (REStat., May 1969) is presented and then used to provide estimates on price changes required for the attainment of different levels of a U.S. surplus on merchandise account under various assumptions about rates of income growth in the United States and abroad.

I. Existing Empirical Evidence

Houthakker and Magee based their calculations on the following model and data:

$$\log M = a + b \log Y_{us} + c \log (P_r/P_{us}) + u \qquad (1)$$

where M = U.S. imports in constant prices,

Y_{us} = U.S. income in constant prices

P_r = price index of U.S. imports

P_{us} = index of U.S. wholesale prices

$$\log X = c + d \log Y_r + e \log (P_{xr}/P_{xus}) + v \qquad (2)$$

where X = U.S. exports in constant prices,

Y_r = weighted index of income in 26 countries importing from the United States,

P_{xr} = index of export prices of 26 countries,

P_{xus} = index of U.S. export prices.

For sources of the data and justification of their use, see the article, p. 112. In order to simplify the following analysis and projections it is assumed that $PR = P_{us}/P_r = P_{xus}/P_{xr}$. This assumption implies identity of indices of U.S. import prices and foreign export prices on the one hand and indices of U.S. export prices and U.S. wholesale prices on the other. The assumption probably is realistic in the long run and whatever deviations that do exist should have relatively minor influence on the results.

The estimated equations are

$$\log M = 4.98 + 1.51 \log Y_{us} - .54 \log PR$$

$$\log X = 12.18 + .99 \log Y_r + 1.51 \log PR$$

The size of standard errors, correlation coefficients, Durban-Watson statistics, etc. are given in the article and are of no particular interest for the present purposes of analysis. The relationships are statistically significant and theoretically defensible.

II. Use of the Evidence

Differentiation of equations (3) and (4) and using the general fact that elasticity ($E_{x,y}$) is defined and mathematically derivable as

$$E_{x,y} = d(\log Y)/d(\log X) = (dY/Y)/(dX/X)$$

gives

$$dX/X = .99\ dY_r/Y_r + 1.51\ dPR/Pr \qquad (5)$$

$$dM/M = 1.51\ dY_{us}/Y_{us} - .54\ dPR/PR \qquad (6)$$

Therefore, the change in the trade balance (dX - dM) is equal to

$$dX - dM = (.99 \text{ of } Y_r/Y_r + dPR/PR)\ x - (1.51\ dY_{us}/Y_{us} - .54\ dPR/PR)\ M \qquad (7)$$

Assuming a 1970 level of U.S. merchandise exports of $43 billion X = 43 and imports of $40 billion M = 40, equation 7 becomes

$$dx\text{-}dM - 42.6\ dY_r/Y_r + 86.5\ dPR/PR - 60.4\ dY_{us}/Y_{us} \qquad (8)$$

which can be rearranged into

$$dPR/PR = (dX\text{-}dM - 42.6\ dY_r/Y_r + 60.4\ dY_{us}/Y_{us})/86.5 \qquad (9)$$

This equation was used to calculate the statistics found in Table 1. The four different blocks of figures in this table apply to different sizes of the merchandise balance dX-dM = C at constant prices and levels of $0, 5, 10, 15 billion, respectively. In each block the variables $A = dY_r/Y_r$ and $B = dY_{us}/Y_{us}$ show assumed growth rates of real GNP in the rest of the world and the United States, respectively, at annual growth rates of 3, 4, 5, 6, 7, 8 percent, compounded for five

Table 1

Simulation of Relative Price Changes

C EQUALS 0

	A = .159	.217	.276	.338	.403	.467
B = .159	.033	.004	-.025	-.055	-.087	-.119
B = .217	.073	.045	.016	-.015	-.047	-.078
B = .276	.114	.086	.057	.026	-.006	-.037
B = .338	.158	.129	.100	.070	.038	.006
B = .403	.203	.175	.145	.115	.083	.051
B = .467	.248	.219	.190	.160	.128	.096

C EQUALS 5

	A = .159	.217	.276	.338	.403	.467
B = .159	.091	.062	.033	.002	-.030	-.061
B = .217	.131	.102	.073	.043	.011	-.021
B = .276	.172	.144	.115	.084	.052	.021
B = .338	.216	.187	.158	.127	.095	.064
B = .403	.261	.232	.203	.173	.141	.109
B = .467	.306	.277	.248	.217	.185	.154

C EQUALS 10

	A = .159	.217	.276	.338	.403	.467
B = .159	.148	.120	.091	.060	.028	-.003
B = .217	.189	.160	.131	.101	.069	.037
B = .276	.230	.201	.172	.142	.110	.078
B = .338	.273	.245	.216	.185	.153	.122
B = .403	.319	.290	.261	.231	.199	.167
B = .467	.363	.335	.306	.275	.243	.212

C EQUALS 15

	A = .159	.217	.276	.338	.403	.467
B = .159	.206	.178	.149	.118	.086	.054
B = .217	.247	.218	.189	.158	.126	.095
B = .276	.288	.259	.230	.200	.168	.136
B = .338	.331	.303	.273	.243	.211	.179
B = .403	.377	.348	.319	.288	.256	.225
B = .467	.421	.393	.364	.333	.301	.270

years and giving the shown growth factors of .159, .217, .276, .338, .403 and .467.

Thus, the statistics should be interpreted as follows. Assuming that the United States desires a surplus of $5 billion on merchandise account in 1971 prices by the end of 1975 and that the rest of the world and U.S. real incomes grow at a compound rate of 6 and 4 percent, respectively, then the relative price change required dPR/PR = .043. This figure is circled in Table 1.

It is recalled that $dPR/PR = d(P_r/P_{us})/(P_r/P_{us})$ so that given price indices in 1971 in both regions equal to 100, the 1975 ratio of $P_r/P_{us} = 1.043$. Under the assumption that U.S. wholesale and export prices will have risen an average, non-compounded 2 percent per year, export prices in the rest of the world will have had to rise at an average non-compounded rate of about 3 percent.

i.e. $P_r = 1.043 \cdot P_{us} = 1.043 \cdot 110 = 114.73$

$dP_r = 14.7$ for 5 years

The $5 billion surplus will be worth $5.5 billion in U.S. prices and $5.7 in rest of the world prices.

Negative numbers shown in Table 1 indicate that the desired merchandise balance can be attained with the growth of U.S. prices exceeding those abroad. As can be seen, this takes place at low U.S. surpluses and high foreign and low U.S. real income growth rates.

III. Interpretation and Projections

This section is not complete and the text contains only suggestions for further work which can be carried out after the validity of the basic calculation has been checked and the suggestions are considered to be worthwhile.

1) Projections

An estimate of required price developments can be made by using projections of U.S. growth and price changes and foreign growth made elsewhere. Similar projections can be made by assuming that the relative rates of growth in the United States and the rest of the world over the past decade will be repeated.

2) Elasticities

The calculation can be used to show the sensitivity of the required relative price changes to assumptions about the real rates of growth. Thus, measure on one axis the rate of foreign GNP growth and on the other the required rate of price changes and plot the functional relationship for different U.S. growth rates and merchandise surpluses. See Figure 1.

3) Interpretations

Estimate the relationship between wholesale, export and consumer price or GNP deflator indices in the United States and abroad. If there are systematic relationships, all of the calculations and discussions can be reinterpreted to show the effects on the trade balance for the more commonly used inflation measures.

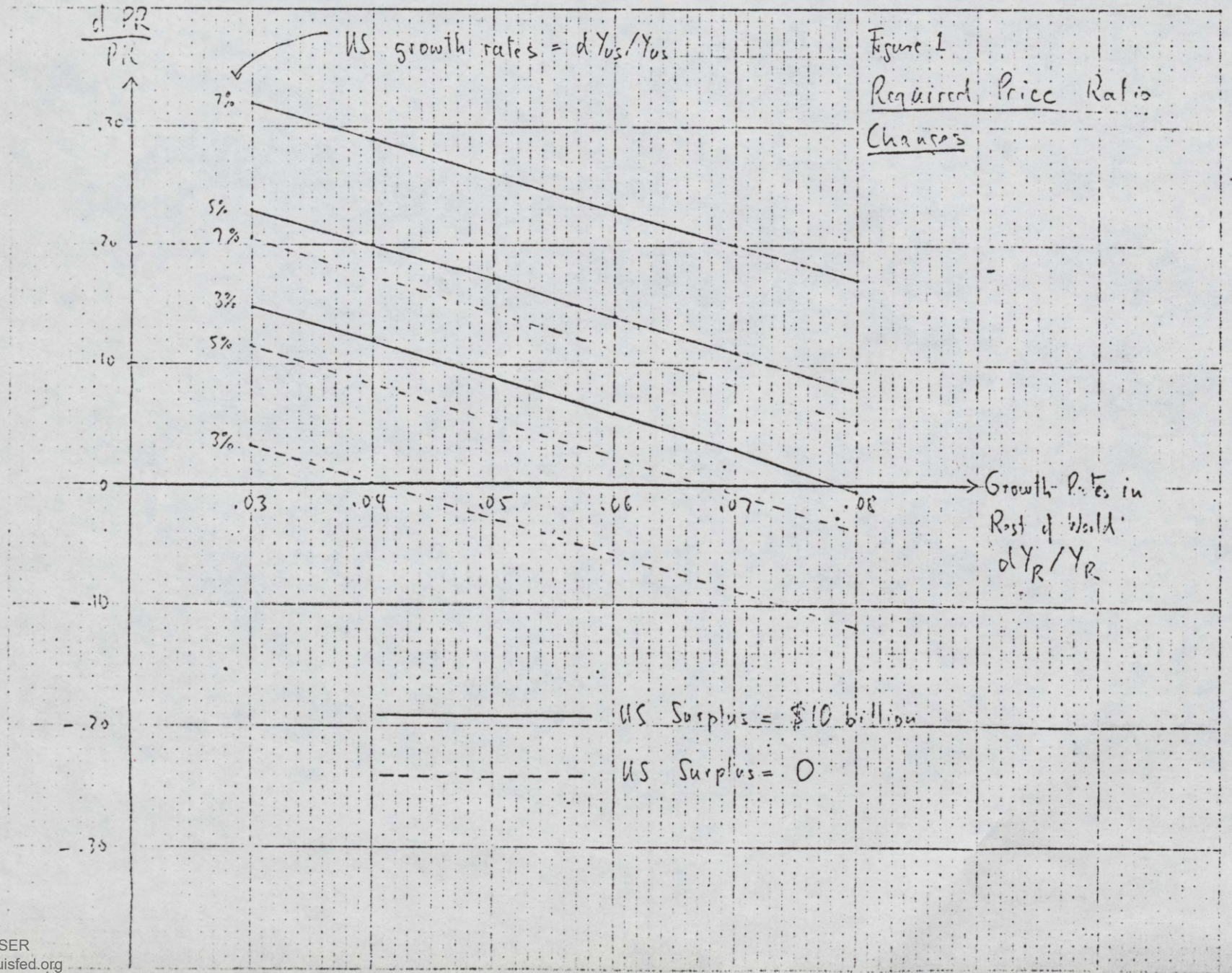

Figure 1

Required Price Ratio Changes

4) Further Refinements

The Houthakker and Magee article has estimates of income and price elasticities of U.S. trade with about 15 individual countries. The basic estimate presented above could be refined by the use of these country statistics. However, the value of the refinement depends critically on the availability and accuracy of forecasts for GNP growth in these countries. Moreover, certain difficulties exist in breaking down the all-over foreign price effect into its individual country components.

April 27, 1971

UNITED STATES GOVERNMENT

Memorandum

Treas - OASIA
B/P Projects
WD - 18
April 28, 1971

TO : Balance of Payments Project Team

FROM : F. Lisle Widman

SUBJECT: Canadian Trade Equations

Since November 1970, work has been undertaken to formulate demand equations for U.S. exports to and imports from Canada as a part of the worldwide export and import forecasting exercise. The process has included both a priori theoretical formulations and ad hoc attempts to specify the equations. Numerous variables were introduced in the regression equations on a trial basis and were retained or excluded on the basis of t-tests on their coefficients, or indications of multi-collinearity observed in the simple correlation matrix. The attached paper by Robert C. Fauver contains a review (although not exhaustive) of the various approaches that have been examined. Mr. Fauver would appreciate critical comments and suggestions for future refinements.

Treas - OASIA
B/P Projects
WD - 18
April 28, 1971
Robert C. Fauver

CANADIAN TRADE EQUATIONS

An Interim Status Report

This paper is designed to review various approaches to the problem of formulating demand equations for U.S. exports to and imports from Canada. The fundamental variables entering import demand functions have been discussed in the literature, so therefore their theoretical foundations are quite well known and will not be discussed in this paper.

Comparison with OBE Equation

a. Eliminate time trend.

The use of a time dummy in the Treasury-OBE equation leaves much to be desired. Generally speaking, time dummies are

employed in regression analysis to represent some unspecified parameter or parameters in the system. They are used, for instance, to represent technological changes or structural changes that took place over the period of observation. Thus, the dummy variable represents a parameter for which quantification is impossible. In essence, the dummy removes linear trends that appear in any of the independent variables. This across-the-board ? trend removal is extremely unappealing in that the trend (e.g., a trend in the relative price ratio) could be peculiar to the particular time period being analyzed. For forecasting purposes, there are no a priori reasons to expect such a trend to continue into the future.

It seems much more logical to specifically eliminate trends (linear or log) from only those variables that, one would expect on a priori grounds to be subject to trends. Thus, one would not expect a trend in a capacity utilization variable or in a relative price variable (at least in the long run run). The Treasury-OBE form of the demand equation includes the time-trend dummy. Thus, it removes even adventitious trends from any or all of the independent variables. For these reasons, the time dummy has been discarded from our Canadian regression estimations.

b. Use of non-seasonally adjusted data.

Prior (and present) attempts by Treasury-OBE to forecast exports and imports utilize seasonally adjusted data. This data has undergone seasonal adjustment performed by the Bureau of the Census X-11 seasonal adjustment program. On the basis of an article by Jim Stephenson of the Fed specifically evaluating the Bureau of the Census X-11 seasonal adjustment method and several conversations concerning the general concept of seasonal adjustment it was decided to construct equations utilizing non-seasonally adjusted data. The major problem with seasonal adjustment programs concerns the degrees of freedom digested by the methods of adjustment (e.g., the X-11 uses approximately 3M-1 d.f. for each adjusted variable in the regression equation; where M = the periodicity of the data). The alternative of using quarterly dummies was therefore tried on a priori and statistical "purity" grounds.

c. Inclusion of a supply variable.

Until recently, most attempts at forecasting trade balances considered only the demand side of the problem. Unless one argues that the supply of exportables is infinitely elastic, then the

supply of exportables, at least theoretically, should be included in forecasting trade balances. Two basic approaches exist for including supply constraints. A simultaneous equation system produces the more complete method of considering both supply and demand conditions. A secondary approach is to postulate a proxy independent variable that can be included in the basic demand equation. The assumption is that the proxy captures the major elements of supply constraints on the ex-post dependent variable.

In the case of trade with Canada, including a measure of capacity utilization in the regression equation may satisfactorily capture the supply effects. For example, one postulates that the level of exports to Canada is affected not only by demand variables but also by the availability of exportables. Hence one could include a capacity utilization variable to measure the effect of U.S. demand pressures on the availability of goods for export. Ideally, one would include as the independent variable a measure of capacity utilization in the export sector.

On a priori grounds one would expect the sign of the capacity utilization coefficient to be negative. This would indicate either that some sort of a queuing system exists where domestic orders are filled before foreign or that domestic suppliers left foreign orders unfilled during periods of high capacity utilization.

It is possible, howevever, that our close ties with Canada may obscure the supply effects. For instance, if the two economies follow similar cyclical trends, then during boom periods, the increased Canadian demand for imports may swamp the supply effects. In this case, the sign of the regression coefficient may be negative or insignificant.

U.S. Exports to Canada

Given the assumption of a positive marginal propensity to import, one would expect a positive correlation between Canadian income and imports. Should the structure of imports be heavily weighted by manufacturing goods then one could expect a stronger correlation to exist between industrial production and imports.

Secondly, there probably exists a correlation between demand pressure in Canada and Canadian imports. As the Canadian economy approaches full capacity utilization, the demand for imports increases. Similarly, during recessions, domestic suppliers likely replace foreign suppliers. This capacity utilization relationship rests, in part, on the assumption of imports being substitutes for domestically supplied goods.

Depending on the relevant price elasticities, the relative movement of Canadian prices vis-a-vis U.S. prices should help to explain U.S. exports to Canada. On similar grounds, the movement of U.S. prices in relation to other foreign suppliers could be expected to alter the supply source of Canadian imports. The prices included in the demand function should be then U.S. export prices, world export prices, and Canadian prices. In practice, however, wholesale prices are often substituted for export prices due to data limitations.

The ability to import depends to some extent upon the availability of foreign exchange. One would expect, a priori, that the availability would exert a greater impact on less developed countries than on developed countries. Various methods exist for introducing a proxy for foreign exchange availability into the explicit demand function. Given the dominant role of the U.S. in Canadian external trade, U.S. imports from Canada could serve as a proxy for foreign exchange availability. Official foreign exchange reserves could also be used. The choice, here, lies in the decision of whether it is the stock or the flow of foreign exchange that affects imports. U.S. direct investment in Canada could be entered into a demand function to serve two purposes. First, direct investment could

serve as a proxy for foreign exchange availability. Secondly, to the extent that subsidiary firms import capital equipment, semi-finished goods, or processed goods, it captures part of the effect of direct investment on Canadian demand for U.S. exports.

The basic Canadian import demand function suggests then that U.S. exports to Canada are a function of Canadian income or industrial production, some measure of capacity utilization, relative prices (Canada and U.S.) relative supplier prices (U.S. and rest of the world), U.S. direct investment, U.S. exports from Canada, and the exchange rate.

As a basic reference point, the Treasury-OBE world export equation was applied to the specific case of U.S. exports to Canada. The basic forecasting equation purports that exports depend on industrial production, imports, direct investment capacity utilization, relative prices, and time. The result obtained from this run had a satisfactory $\bar{R}^{-2}$ statistic, several non-significant t-tests on coefficients of individual independent variables, a low Durbin-Watson statistics, and multicollinearity among several of the independent variables.

Appendix A of this paper contains the results of several "better" equations obtained during this exercise. Depending on one's preference for purity some of these equations give better fits than what we consider to be the "best" equation. Perhaps

for forecasting purposes one should not worry about the use of seasonally adjusted data or a time dummy variable. Such a choice, however, necessitates the addition of several caveats to the results.

Our "best" equation appears below. It regresses the level of exports on various independent variables. The figures in parentheses below the coefficients are t-test ratios.

$$(1)\quad \hat{X} = 1438.6 - 1.02USGAP_t + 0.051\ GAGNP_t - 10.8CAU_{t-2} -$$
$$(6.67) \qquad (1.68) \qquad (24.9) \qquad (5.63)$$
$$10.6RP_{t-1} + 0.09DI_{t-2} + 69.1Q_1 + 135.5Q_2 - 28.5Q_3$$
$$(4.54) \qquad (1.33) \qquad (2.05) \qquad (5.97) \qquad (1.07)$$
$$R^2 = .972 \quad F = 246.5 \quad SEE\ BAR = 39.4 \quad SPCBAR = 4.13$$
$$DW = 1.62$$

The independent variables are as follows:

USGAP - The ratio of actual to potential USGNP

CAGNP - Canada GNP

CAU - Canadian capacity utilization

RP - ratio of US to Canadian wholesale prices indices

DI - US total direct investment flows to Canada

X - US non-agricultural exports to Canada

Q_1, 2, 3, Quarterly dummies

SEEBAR - Standard error if the estimate (adjusted for degrees of freedom)

SPCBAR - percentage standard (adjusted for degrees of freedom)

All of the variables have the hypothesized signs and with the exception of U.S. direct investment, the coefficients are significantly different from zero. The coefficients for the supply effects variable (USGAP) is significant only at low confidence levels It does, however, carry a negative sign indicating that as domestic demand pressures increase the level of exports declines. This would seem to substantiate the queuing concept discussed earlier.

Since the coefficient of direct investment was not significantly different from zero, equation (1) was reestimated, omitting direct investment as an independent variable. The following results were obtained:

$$(2)\quad \hat{X} = \underset{(6.98)}{1502.0} - \underset{(1.65)}{1.01}USGAP + \underset{(25.5)}{0.052}CAGNP - \underset{(6.10)}{1144}CACAU_{t-2} - \underset{(4.81)}{11.2}PP_{t-1}$$

$$+ \underset{(2.06)}{70.0}Q_1 + \underset{(6.27)}{141.0}Q_2 - \underset{(1.12)}{30.1}Q_3$$

$$\bar{R}^2 = .971 \quad F=277.1 \quad SEEBAR = 39.7 \quad SPCBAR - 4.16 \quad DW = 1.61$$

In order to obtain rough estimates of the price and income elasticities pertaining to exports to Canada equation (2) was reestimated in double log form. The coefficient of relative prices was -1.37 and the coefficient on Canadian GNP was 0.64.

An alternative specification of the same demand function appears below:

$$(3)\quad X^* = 660.7 + .10CAGNP^* - 11.1CAU_{t-2} 5.94RP_{t-1} + .11DI_{t-2} +$$

$$\begin{array}{ccccc} (2.68) & (6.52) & (6.38) & (2144) & (1.47) \end{array}$$

$$661.Q_1 + 115.9Q_2 + -117.4Q_3$$

$$\begin{array}{ccc} (2.90) & (7.07) & (5.20) \end{array}$$

$$R^2 = .895 \quad F = 68.1 \quad SEEBAR = 41.0 \quad DW = 1.90$$

Where:

X^* = deviations from log trend of exports

$CAGNP^*$ = deviations from log trend of Canadian GNP

Here again direct investment is insignificant but the coefficient carries the hypothesized sign. All of the variables carry the expected coefficient signs. The amount of the variation in the dependent variable that is explained by this specification is inferior to the amount explained in (1). The demand pressure variable (USGAP) was tried but was found to be insignificant.

U.S. Imports from Canada

Many of the problems connected with estimated U.S. demand for Canadian exports are similar to those discussed above concerning the Canadian demand for our exports. Rather obviously we are merely looking at another demand for imports, hence the same theoretical arguments are applicable. Similarly, the reservations expressed above concerning the use of a time-dummy variable, seasonally adjusted data, and the exclusion of supply considerations in previous OBE-Treasury work are still held. Our estimation equations shall therefore exclude a time-dummy variable, use seasonally unadjusted data (with quarterly dummies to remove fluctuations), and attempt to include supply conditions variables (or proxies).

The following is our currently preferred equations:

$$\hat{M} = \underset{(4.29)}{1045.8} + \underset{(36.6)}{8.27GNP} + \underset{(1.13)}{.91\,GAP} - \underset{(4.83)^{t-2}}{12.4RP} - \underset{(4.38)}{11.2CAUCA} -$$

$$- \underset{(1.02)}{41.3Q} \quad \underset{(1.16)}{+30.^{2}Q2} + \underset{(.926)}{28.3Q3}$$

$\bar{R}^2 = .986$ F = 606.8 SEEBAR = 39.8 SPCBAR = 3.99 D.W. = 1.09

Where:

M	=	U.S. imports from Canada excluding autos
GNP	=	U.S. Gross National Product
GAP	=	Potential - actual GNP
RP	=	U.S. wholesale prices divided by Canadian wholesale prices
CAUCA	=	Canadian capacity utilization
Q 1,2,3	=	Quarterly dummies

At first glance, the relative price term's coefficient appears to possess the wrong sing. The negative sign, however, is probably the result of an inelastic price elasticity. In this case, the negative coefficient merely applies to the money level of imports, and not necessarily the real level. If Canadian prices rise, given an inelastic price elasticity the money level of imports will also rise.

All of the variables are significant with the exception of the GAP variable, which is not only insignificant but also has the wrong sign.

Treas -- OASIA
B/P Projects
WD-19
April 28, 1971
Robert D. Brown

To: Balance of Payments Project Team

From: F. Lisle Widman

Subject: U.S. Imports of Natural Gas from Canada

Attached is a brief study of U.S. Imports of Natural Gas from Canada which has been prepared by Robert D. Brown. Mr. Brown has initiated several studies of the structure of U.S. demand for "raw material" imports from Canada in an attempt to draw a picture of U.S. raw material trade with Canada to 1975. He plans to look at the following items: crude petroleum, natural gas, newsprint, wood, iron ore, ferrous concentrates and scrap, non-ferrous ore and concentrates, and nickel.

Mr. Brown would appreciate comments and suggestions.

Treas -- OASIA
B/P Projects
WD-19
April 28, 1971
Robert D. Brow

U.S. Imports of Natural Gas from Canada

Summary

Our imports of natural gas from Canada jumped several hundred percent in 1958 with the opening of a U.S.-Canadian pipeline. Because gas is sold to U.S. purchasers under long-term contract (generally 25 years) there is little short-term variation in price. Consequently, price plays essentially no part in determining short-term demand. In trying to "explain" the variation of U.S. gas imports, I therefore classified explanatory variables into three groups:

1. U.S. short-term demand determinants such as industrial activity,
2. long-term factors to explain the upward trend in gas imports, and,
3. variables determining the U.S. supply of natural gas.

In 1968 and 1969 our imports of gas increased by 35 percent. Previous years' increases had been around 10 to 15 percent.

The jump in demand is generally attributed to short U.S. supplies as evidenced by declining proven reserves of natural gas. While gas production increased during 1968 and 1969, reserves fell for the first time in the industry's recent history. There is little likelihood of increasing domestic reserves during the next five years because of the slow pace of exploration. Therefore, our imports of natural gas from Canada are expected to increase considerably through 1975. The precise monetary effect this will have on the balance of payments is difficult to determine because our trade figures value imports at "local market value" which may or may not approximate the cost to U.S. purchasers under long-term contract. It seems reasonable to assume though that these value figures are a rough lower limit on the U.S. dollar outflow for imports of Canadian gas since Canadian law provides that domestic producers cannot export at a price lower than that charged to domestic customers. The Canadian government also sets limits on the amount of gas which may be exported based on estimated surpluses of gas reserves over anticipated needs. However, the Canadian gas industry is expanding and appears well able to meet our gas requirements for at least the next few years.

Results of Regression Analysis:

The explanatory variables I tried were:

A. Economic activity indicators:

1, Federal Reserve Board Manufacturing Production Index (MPI)

2. U.S. Capacity Utilization Indicator
3. New Construction Activity (deflated with index of construction costs)
4. New Housing Units (NHU)

B. Long-term growth Indicators:
1. Total U.S. population (POP)
2. Number of Households

C. Domestic Supply Indicators
1. Volume of domestic gas production
2. Volume of domestic gas reserves
3. Volume index of domestic proven reserves (DGR)
4. Per capita production of natural gas
5. Per capita reserves of natural gas

The dependent variables were annual Census Bureau figures for the volume and local market value stated in U.S. dollars of natural gas imported from Canada from 1958 through 1969.

Regressions against all likely linear and log linear combinations of the explanatory variables provided only one set of equations with reasonable fits, regression coefficients and forecasts of future imports. The "best" fit included a constant term and two variables:

1. VOG = -3,392.40 + 30.27 POP - 18,50 DGR

and

2. VAG + -841.777 + 7.695 POP - 4.937 DGR.

Where: VOG = volume of gas imported in billions of cubic feet

VAG = value of gas imported in millions of U.S. dollars (local market value)

POP = U.S. population in millions

DGR = 1958 based index of estimated proven U.S. natural gas reserves.

All regression coefficients were significantly different from zero at the 95% level and 95% confidente limits did not change their signs. The multiple R^2 was 96% and significant for both equations. The Durbin-Watson statistic indicated no auto correlation problem. Attached are charts which show the closeness of fit, forecast volumes and values of annual imports through 1975, and 95% confidence limits on the predictions.* The equations forecast an average 15% increase in imports during the next few years. This is slightly higher than the Federal Power Commission's 1969 estimate of an 11% annual increase. For population figures for 1970 through 1975 I used Census Bureau projections. For 1970-1975 domestic gas reserves I assumed that reserves would continue to decline at 6%, the average rate of decline since 1968, since relief of our domestic reserve shortage seems unlikely because of the lead time required to find and market new gas reservoirs.

A real problem in this analysis was the shortness of the time series. This left little flexibility in dealing with collinearity or autocorrelation in equations involving more than real explanatory variables. On the other hand my main purpose has been to "predict annual imports through 1975 based on the key variables rather than to develop a more detailed demand model which working with quarterly data might allow. The fact remains that population growth providds

//

the most reasonable explanation for the upward trend in gas consumption and imports, and that the key factor in our future needs for gas imports from Canada now appear to be our own decreasing gas reserves.

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* The 95% confidence limits on the predictions, Y_i, are:

$$\hat{Y}_i \pm S_{\hat{y}}^2 t_{k,\ .975}$$

Where S_y^2 = the variance of the predicted Y,

$$= \left[\frac{\Sigma (Y_i - \hat{Y}_i)^2}{N-K} + ii' \text{th element of:} \left[X' \left(\frac{\Sigma (Y_i - \hat{Y})^2}{N-K} \right) (X'X)^{-1} X \right] \right]$$

The matrix ... $\left[\frac{\Sigma (Y_i - \hat{Y})^2}{N-K} (X'X)^{-1} \right]$ is the

variance - covariance matrix of the regression coefficients.

N = number of observations

K = number of dependent variables including the intercept.

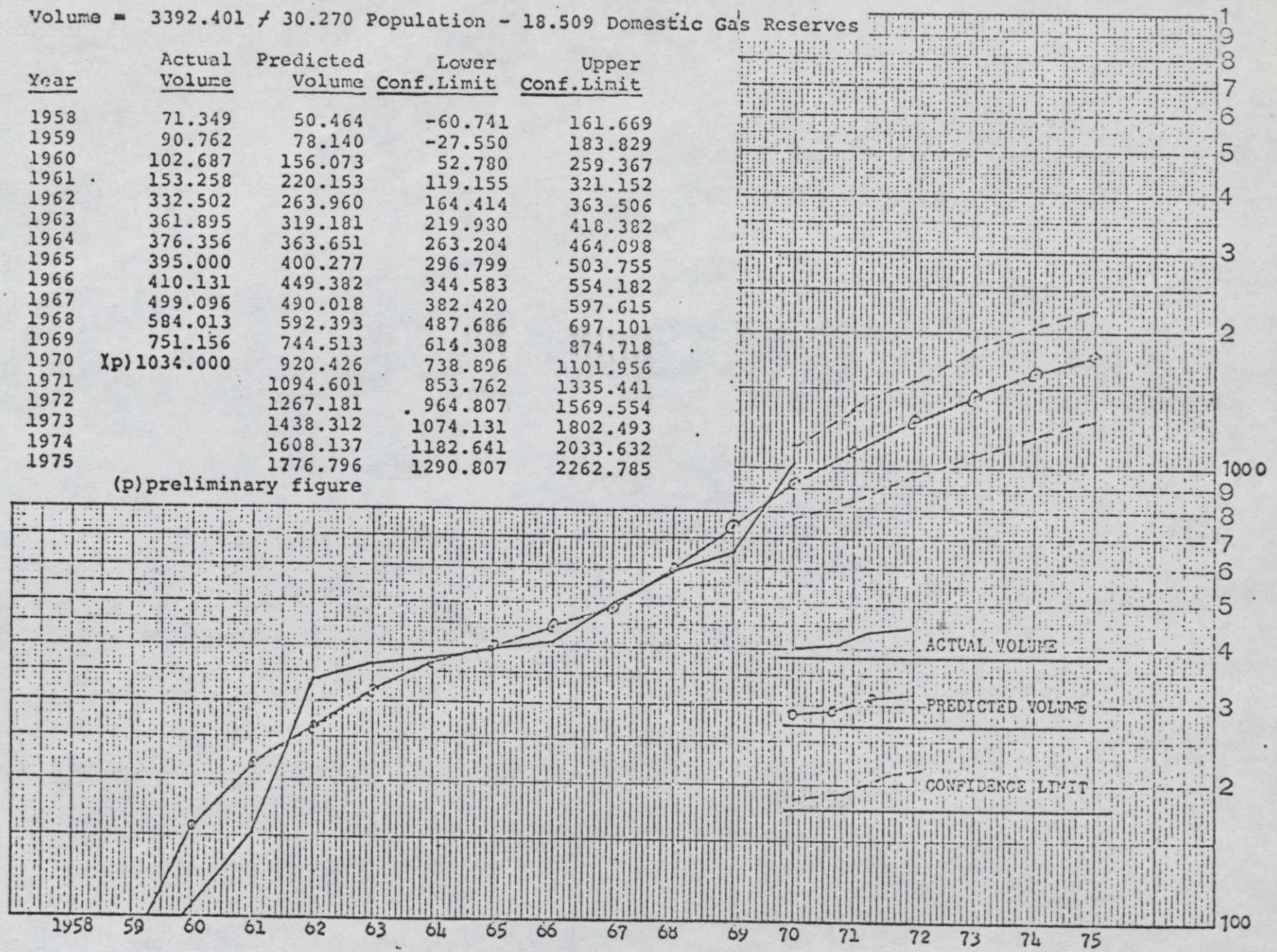
$t_{k,.975}$ is the 95% t distribution value for N - K degrees of freedo

U. S. Imports of Canadian Gas - 1958-1975 (Billions of Cubic Feet)

Volume = 3392.401 / 30.270 Population - 18.509 Domestic Gas Reserves

Year	Actual Volume	Predicted Volume	Lower Conf.Limit	Upper Conf.Limit
1958	71.349	50.464	-60.741	161.669
1959	90.762	78.140	-27.550	183.829
1960	102.687	156.073	52.780	259.367
1961	153.258	220.153	119.155	321.152
1962	332.502	263.960	164.414	363.506
1963	361.895	319.181	219.930	418.382
1964	376.356	363.651	263.204	464.098
1965	395.000	400.277	296.799	503.755
1966	410.131	449.382	344.583	554.182
1967	499.096	490.018	382.420	597.615
1968	584.013	592.393	487.686	697.101
1969	751.156	744.513	614.308	874.718
1970	Yp) 1034.000	920.426	738.896	1101.956
1971		1094.601	853.762	1335.441
1972		1267.181	964.807	1569.554
1973		1438.312	1074.131	1802.493
1974		1608.137	1182.641	2033.632
1975		1776.796	1290.807	2262.785

(p)preliminary figure



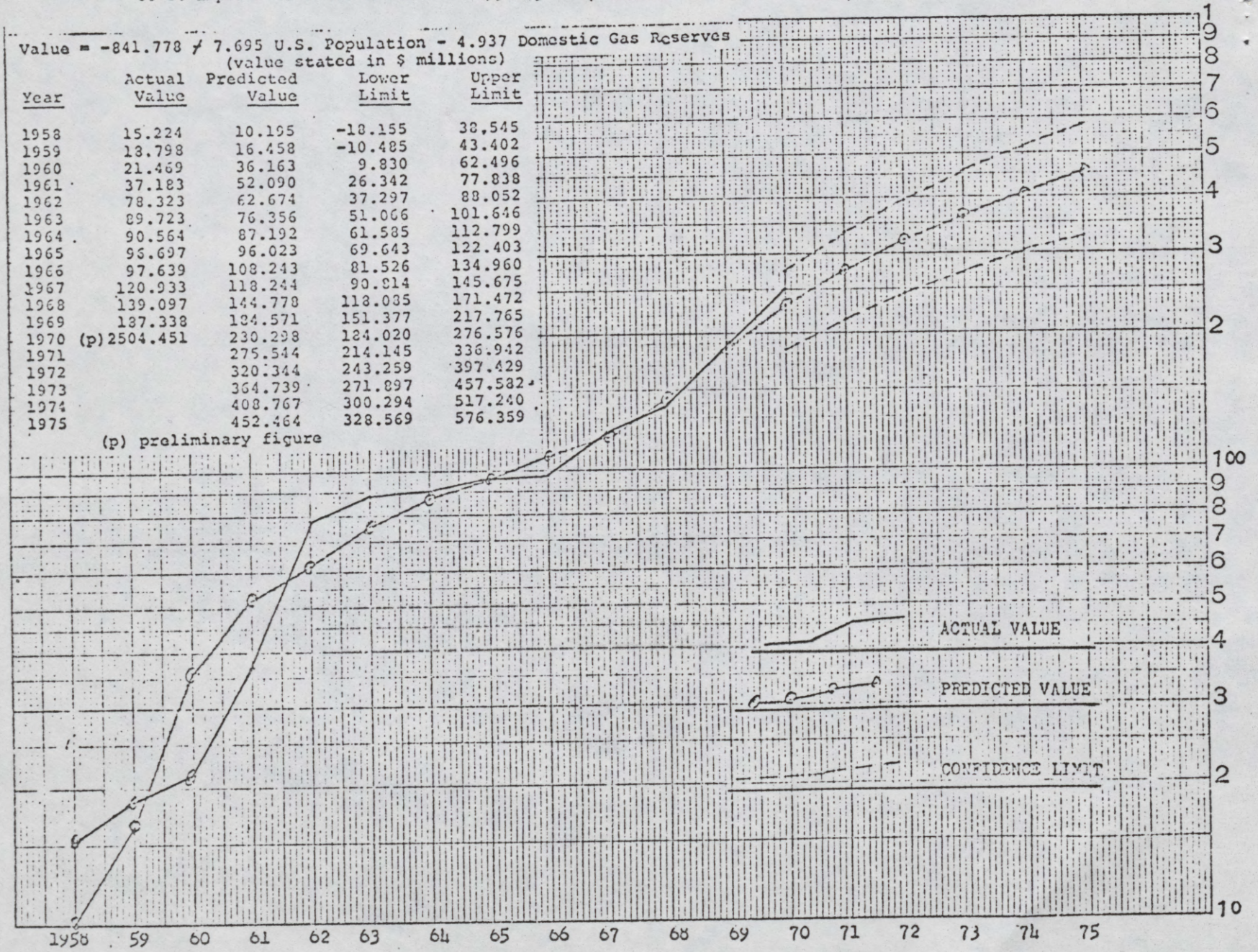
U. S. Imports of Natural Gas 1958-75 (Millions of U. S. Dollars)

Value = -841.778 + 7.695 U.S. Population - 4.937 Domestic Gas Reserves

(value stated in $ millions)

Year	Actual Value	Predicted Value	Lower Limit	Upper Limit
1958	15.224	10.195	-18.155	38.545
1959	13.798	16.458	-10.485	43.402
1960	21.469	36.163	9.830	62.496
1961	37.183	52.090	26.342	77.838
1962	78.323	62.674	37.297	88.052
1963	89.723	76.356	51.066	101.646
1964	90.564	87.192	61.585	112.799
1965	96.697	96.023	69.643	122.403
1966	97.639	108.243	81.526	134.960
1967	120.933	118.244	90.814	145.675
1968	139.097	144.778	118.035	171.472
1969	187.338	184.571	151.377	217.765
1970	(p)2504.451	230.298	184.020	276.576
1971		275.544	214.145	336.942
1972		320.344	243.259	397.429
1973		364.739	271.897	457.582
1974		408.767	300.294	517.240
1975		452.464	328.569	576.359

(p) preliminary figure



To: Balance of Payments Project Team

From: F. Lisle Widman

Subject: U.S. Imports of Newsprint from Canada

Attached is a brief study of U.S. Imports of Newsprint from Canada (1948-75), which has been prepared by Robert D. Brown. Mr. Brown has initiated several studies of the structure of U.S. demand for "raw material" imports from Canada in an attempt to draw a picture of U.S. raw material trade with Canada to 1975.

Mr. Brown would appreciate comments and suggestions.

Treas -- OASIA
B/P Projects
WD-20
April 28, 1971
Robert D. Brown

U.S. Imports of Newsprint from Canada

(1948-75)

The purpose of this paper is to investigate the major determinants of U.S. demand for newsprint imports from Canada with the intent of forecasting U.S. annual imports of newsprint through 1975.

In a 1969 article* D. D. Detomasi published results of a study in which he concluded that the U.S. price elasticity of demand for Canadian newsprint was somewhere between -.5 and -.8. However, Department of Commerce authorities on the pulp and paper industry argue that price plays no important part in determining the quantity of newsprint imported into the U.S. because most Canadian producers are associated with or are owned by major U.S. publishers or paper companies. Naturally, the U.S. parents turn to their own Canadian sources first in meeting their newsprint requirements. In any case, real prices paid are negotiated on an individual contract basis and are usually not made available to the public. Thus, announced prices are considered indicative only at an upper limit on real newsprint prices. However, a new factor reducing the Canadian share of the growing U.S. market is the rapidly increasing capacity of southern U.S. newsprint producers who hold no interest in Canadian production and who are able to capture a regional

*"The Elasticity of Demand for Canadian Exports to the United States", D. D. Detomasi, Canadian Journal of Economics, Vol. 3, August, 1969. pp. 416-926.

market by providing area users an assured long-term supply. While Canadian newsprint is of higher quality it is vulnerable to transportation delays because of strikes and weather.

Thus, it would seem that the quantity of newsprint imported would be a function of population growth or other trend factors, cyclical economic activity and U.S. production of newsprint.

In regression analysis I tried following explanatory variables: (annual Bureau of Census data - 1948-70).

(USPOP) 1. U.S. population - to account for the general upward trend in the economic activity indicators

2. Economic activity indicators

(ADLIN) a. newspaper ad linage

(NEWSAD) b. newspaper ad index

(MAGAD) c. magazine ad index

USNNP) d. U.S. net national income

(USPPR) 3. Volume of U. S. newsprint production

Dependent variables were the volume and quantity of newsprint imports from Canada for 1948-'70.

Of the 15 or so statistically acceptable equations generated by linear and log linear regression of tonnage of newsprints imports against various appropriate combinations of these variables the following equations seemed best in terms of demonstrating the effects of all three major determinants, i.e., trend, cyclical activity, and the U.S. supply.

1)* VOL = -4729.219 + 1.779 ADLIN + 38.753 USPOP - 1.025 USPPR
(1432.62) (.366) (9.7143) (.303)

R^2 = .93 F = 81.54 D.W. = 1.7584

2)* VOL = 4.330.0827 + 100.318 TREND -.9078 USPPR
(245.027) (40.377) (.396)

(Numbers in parentheses are standard errors. 95% confidence limits on the regression coefficients are approximately $B_i \pm 2.093 (S.E._{B_i})$

R^2 = .909 F = 60.39 + 3.431 USNNP
(1.38) D.W. = 1.755

Both equations produce forecasts of newsprint imports in 1975 of about 7 million tons. 95% prediction limits on this forecast range from approximately 6.5 million tons as a lower limit to 8 million tons as an upper limit. (The method of calculation of prediction limits is shown in my paper on natural gas imports.)

Regressions of values of newsprint imports against the same combinations of variables produced no equations which included explicitly trend, cyclical, and domestic supply factors. The best of the statistically acceptable equations was:

3) VAL = 128.554 + 3.42 NEWSAD + 2.948 MAGAD - .0673 USPPR
(21.72) (.477) (.324) (.0289)

R^2 = .986 F = 438.19

D.W. = 1.89

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* Regression coefficients estimated after 1st order Markov scheme transformation to reduce autocorrelation of the residuals.

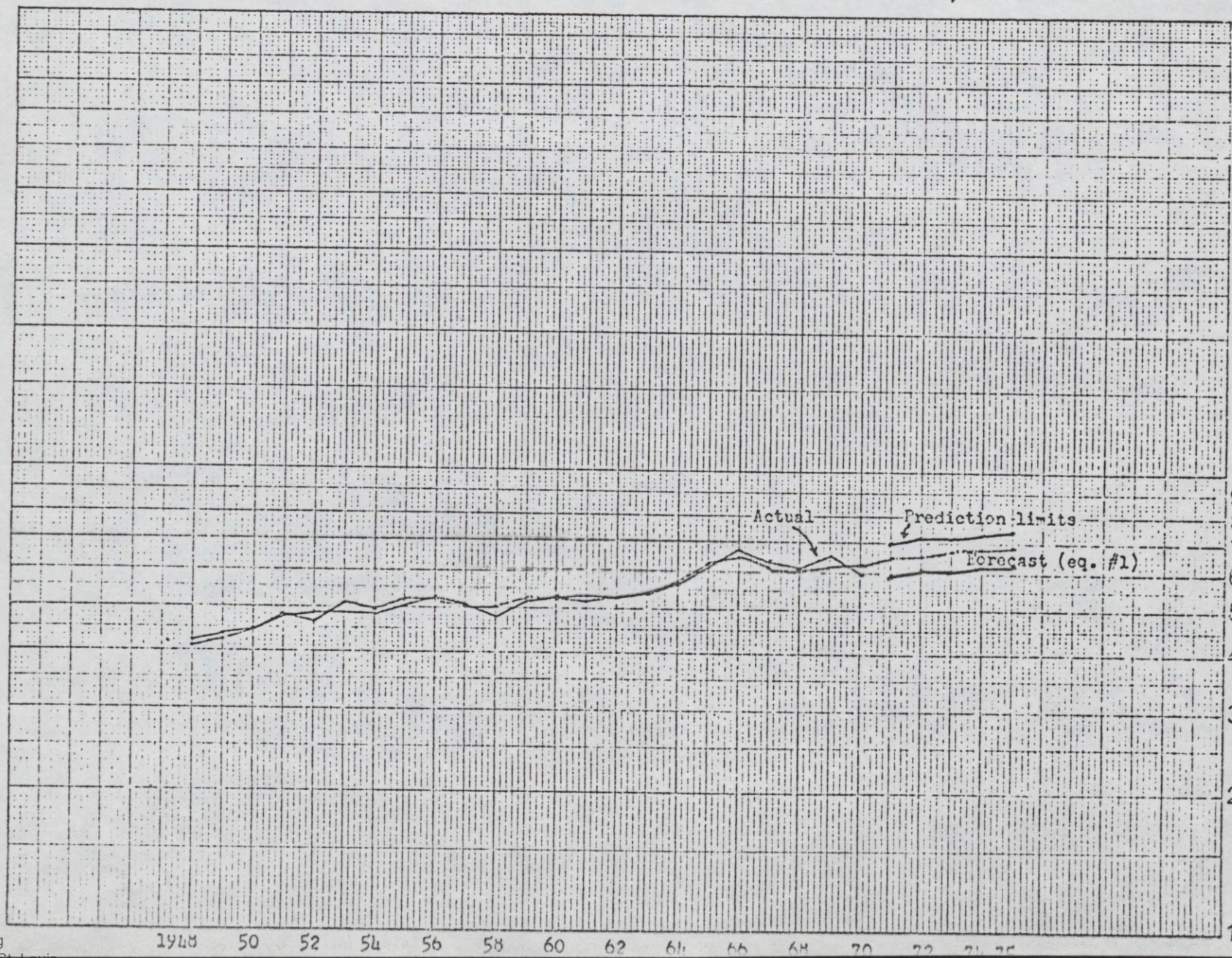
This as well as most of the other value equations projected the value of 1975 newsprint imports at about $1.1 billion current U.S. dollars. The above equation generated a forecast of $1.146 billion with prediction limits of $1.087 to $1.204 billion.

However, as always, predictions are only as good as the underlying assumptions and estimates of the "explanatory" variables in the forecast periods. Specifically, I have assumed that 1971 will be the bottom or near bottom of the current recession and that domestic economic activity will increase steadily through 1975 with about a 3% average rate of inflation.

Should the rate of inflation be higher one could reasonably expect the nominal value of newsprint imports to be higher but because the volume of newsprint imports appears to be essentially unrelated to price I would not expect the rate of inflation to have a direct impact on the volume brought in. Thus, unless the economy fails to recover at a steady pace (the assumption underlying projected values for advertising linage and U.S. newsprint production) newsprint tonnage can be expected to reach the seven million mark by 1974 or 1975. Attached are graphs showing actual volumes and values of newsprint imports and forecasts generated by the equations described in this paper.

Attachments

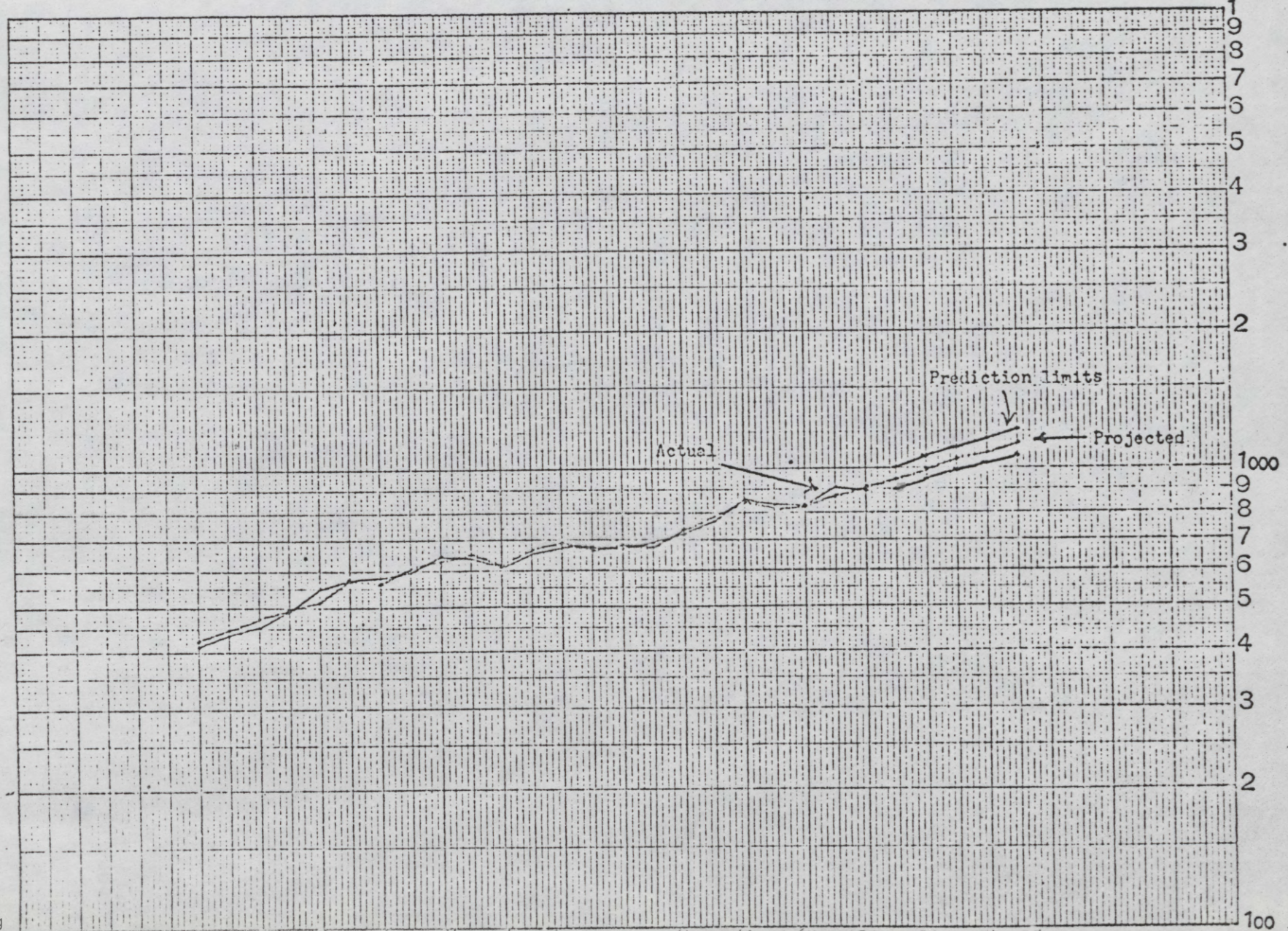
Volume of U. S. imports of newsprint from Canada 1948-75 (millions of tons)



NO. 32,110. 20 DIVISIONS PER INCH (200 DIVISIONS) BY 2 3¼-INCH CYCLES RATIO RULING

CODEX BOOK COMPANY, INC. NORWOOD, MASSACHUSETTS.
PRINTED IN U.S.A.

Value of U. S. imports of newsprint from Canada 1948-75 (millions of U. S. dollars)



OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : Deputy Assistant Secretary Cates DATE: May 25, 1971

FROM : Jerry M. Newman

SUBJECT: U. S. Financing of Major Canadian Projects and Impact on Canadian Balance of Payments

Several Canadian proposals have just recently surfaced which could set the tone of U. S.-Canadian financial relations in the 1970's. These involve plans for developing in Canada several major hydroelectric projects and a gaseous diffusion plant, which would necessarily have to be financed in large part by foreign capital.

The largest of these is the proposal rather suddenly announced by Quebec Prime Minister Bourassa several weeks ago. Bourassa indicated that Quebec intended to proceed with plans to develop a major hydroelectric power complex in the north at James Bay. According to the limited information available the complex would require a total capital investment of $6.0 billion spread over ten years. Press reports indicate Con Ed might well contract for 20% of the 10 million kilowatts to be produced at James Bay. Quebec is proceeding with its studies of the project which they hope to complete by the end of the summer, with work on the project to commence shortly thereafter. The U. S. Embassy informed me today that the National Assembly of Quebec has already appropriated $26 million to begin the infrastructure work connected with the project.

Nova Scotia and New Brunswick authorities announced several weeks ago that their provinces were also formulating plans to erect major hydroelectric complexes using waters of the Bay of Fundy. These projects could be combined. The Nova Scotia proposal would reportedly require financing in the neighborhood of $2.0 billion.

UNITED STATES GOVERNMENT

Memorandum

TO : Balance of Payments Project Team DATE: May 27, 1971

FROM : F. Lisle Widman

SUBJECT: U.S. Financing of Major Canadian Projects and Impact on Canadian Balance of Payments

Attached is a memorandum prepared by Jerry M. Newman which notes plans currently under consideration in Canada which would materially affect that country's balance of payments with the U.S. These plans involve resource development for export to the U.S. which will be financed to a large extent by U.S. capital.

According to an article in the Financial Times of Canada:

"Both the Fundy project and James Bay have, until recently, been considered unlikely areas for immediate development. Costs were held to be uneconomically high in both cases. In addition, Fundy's technical problems are formidable and James Bay is both distant and isolated.

Political pressures combined with a power shortage in the U. S., apparently pushed the three provinces into changing their cautious attitudes. But none of them is close to final arrangements on technical details or financing."

The British Newfoundland Corporation (perpetrators of the $1.0 billion hydroelectric project at Churchhill Falls, into which U. S. capital of over $0.5 billion will ultimately flow) has also recently sought GOC sanction of a proposal to construct a gaseous diffusion plant which could cost another $1.0 billion.

While the financial plans for these projects have not yet been worked out, it is generally acknowledged that foreign capital in the magnitude of several billion dollars would have to be solicited to help finance these projects, much of which would have to come from the U. S.

It is increasingly clear that U. S. requirements for raw materials and energy will alone generate proposals for large scale projects in Canada in the coming years, which would imply substantial input of U. S. capital. These cases would seem to have the effect of increasingly minimizing the effect of the exchange rate on the Canadian balance of payments by increasing the proportion of price inelastic trade in Canada's export sector. Thus the adverse impact on Canada's price elastic exports of a higher exchange rate could be largely offset by the expansion of its price inelastic exports. An example of U. S. financing of export oriented projects in Canada was the recently approved plan for a $300 million expansion of the Iron Ore Co. of Canada to produce ore for the major U. S. steel companies which own IOC. In addition to Ex-Im Bank financing of the U. S. content, U. S. insurance companies are to provide $150 million of the project's total cost.

These new proposals for hydroelectric plants and a gaseous diffusion plant are now under serious consideration in Canada. The nature of the financial arrangements which are worked out for these projects may set the pattern for other large scale projects which will surely follow and will in large part determine the level of U. S. capital flows to Canada in the 1970's. While it is difficult to argue, for example, that Con Ed should look to U. S. sources for electricity, there is also the question of whether the U. S. balance of payments can tolerate unlimited over-draft rights for Canada to develop these resources.

Regarding the latter point, we have prepared some informal and rough estimates of the Canadian balance of payments position for the period 1971-75, in connection with the Treasury study for C.I.E.P. on the U. S. balance of payments. These are attached as Tab A.

Our projections call for a strong Canadian trade position throughout the period, but large interest and dividend payments should result in a current account deficit for the period as a whole. Continued substantial borrowings of long-term capital are likely and the basic surplus could average about $800 million annually.

These estimates do not include any financing for the large projects now under consideration, but reflect what we would estimate as a "normal" level of borrowing by Canadian companies and general budget or "program" financing by Canadian provinces.

The estimates of the Canadian trade surpluses might be somewhat on the low side, especially if the deterioration in the automotive trade account were to continue. We have assumed that no major new capacity will be installed in Canada and that sourcing in Canada will not increase appreciably. Since Canadian plants are now approaching optimum capacity utilization, we have assumed a small 4% annual increase in Canadian automotive exports and over-all trade balance in this sector.

Because of these assumptions our estimates of Canada's trade surplus are somewhat lower than implied by the trend lines for exports and imports (Tab B). Extrapolation of the

1961-70 trend in exports and the 1961-69 trend in imports (both ex autos) would result in a trade surplus of $2.5 billion in 1975 (vis our estimate of $1.6 billion). This would raise the basic balance surplus from $1.2 billion to $2.1 billion.

The Canadians claim they have not made any projections of their balance of payments, but now admit that there has been a structural change in the balance of payments. They informally estimate that this year's current account surplus will reach $750 million (down from $1.2 billion in 1970) which if realized will mean a basic balance of at least $1.5 billion (vis $2.0 billion in 1970).

We would not anticipate any significant change in the proportion of the Canadian surpluses which can be attributed to the bilateral position with U. S. which has remained fairly steady in recent years.

Assuming this factor does not change appreciably (after adjusting for the statistical discrepance in the two countries data) the U. S. payments position with Canada (on a U. S. basis) which would be implied by our projections for Canada's global balance of payments could develop as follows:

	($ U.S. millions)	
	1971	1975
Trade	-1,800	-1,000
Current Account	-685	600
Long-term Capital	-550	-1,400
Basic Balance	-1,235	-800

(- equals U. S. debit)

Implementation of several large projects in Canada during this period would probably add several hundred million dollars to the capital outflow projected for 1975 and the U. S. bilateral basic balance deficit could exceed $1.0 billion.

You may wish to flag this issue to Messrs. Volcker and Petty. Perhaps a U. S. policy is required on financing major projects in Canada, in view of their implications for the U. S. balance of payments. One approach would be to limit IET exempt financing by the U. S. to the U. S. content of these projects only.

cc: Messrs. Widman, Schaffner and Reynolds

CANADA

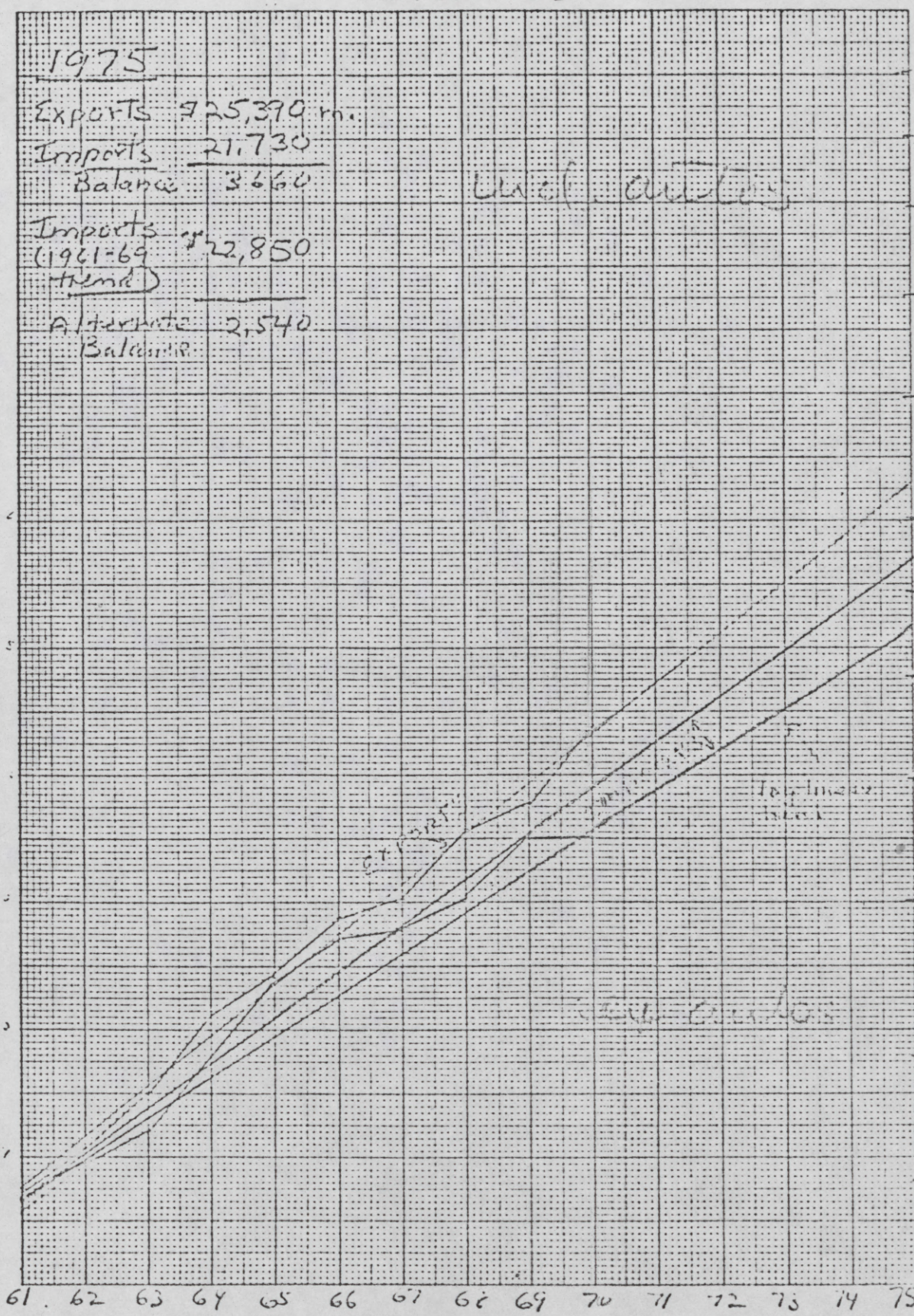
Balance of Payments Projections

(millions of dollars)

	Actual	Forecasts					
	1970	1971	1972	1973	1974	1975 A.	1975 B. 1/
Trade Balance	2,865	2,785	1,500	950	1,235	1,600	2,500
Current Account Balance	1,240	935	-425	-1,150	-1,000	-675	225
Long-term Capital	777	550	900	1,250	1,650	1,900	1,900
Basic Balance	2,015	1,485	475	100	650	1,225	2,125

Source: 1970 Data - OECD Secretariat
1/ Projection based on log linear extrapolation.

III. Canadian Trade
1961-1975



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UNITED STATES GOVERNMENT

Memorandum

TO : Balance of Payments Project Team DATE: May 27, 1971

FROM : F. Lisle Widman

SUBJECT: U.S. Imports of Woodpulp from Canada

Attached is a brief study of U.S. Imports of Woodpulp from Canada, which has been prepared by Robert D. Brown. Mr. Brown has initiated several studies of the structure of U.S. demand for "raw material" imports from Canada in an attempt to draw a picture of U.S. raw material trade with Canada to 1975.

Mr. Brown would appreciate comments and suggestions.

U.S. Imports of Woodpulp from Canada

There are three basic uses of woodpulp: (1) for making general and specialized types of paper, (2) for making building materials, and (3) for making textiles and synthetic fibers. For each one of these uses there are many grades and strengths of pulp, each being sold at a different price. About 96% of our recent pulp imports have come from Canada, but our total pulp imports account for only 5 to 10% of our total pulpcconsumption. Canadian pulp is most valued for its greater strength due to its longer fibers. The rest of our pulp imports are from Scandinavia and are for highly specialized uses. Thus, U.S. demand for Canadian pulp is partly residual, that is, demand left over after U.S. production capacity has been used to meet domestic pulp demand; and partly specialized, i.e., where only long fiber pulp will suffice and cannot be found at comparable prices domestically.

Therefore, the hypothesis I have used in forecasting U.S. imports of wopdpulp is that the quantity imported is a function of domestic economic activity, relative prices, and relative supply conditions in the U.S. and Canada. Finding a variable to represent relative prices has been most difficult because of the lack of actual price data. Published price series are generally either "posted prices", which are no more than price ceilings established within the industry, or unit values

obtained merely by dividing aggregate "quantities" of pulp imports by aggregate value figures.

Neither series adequately represents the actual prices observed by decision makers. However, it is thought that pulp prices in the U.S. and Canada often fluctuate in response to increases in capacity over demand so that, for example, as Canadian capacity increases faster than U.S. capacity one might expect Canadian pulp prices to fall or not rise as fast as U.S. prices. Also, if Canadian capacity increased more rapidly than U.S. capacity one might expect Canada to meet more residual U.S. demand not met by domestic production. To account for these factors in U.S. demand for Canadian pulp I have computed a first-of-year ratio of total Canadian pulp production capacity to U.S. capacity. Also, part of the relative price structure observed by U.S. importers naturally depends on the exchange rate which fluctuated over much of the period from 1948 to the present and so I have included the Canadian/U.S. exchange rate, expecting that changes in the ratio would be positively correlated with changes in pulp imports. I also tried U.S. pulp capacity utilization as indicators of domestic supply tightness, but they generally tested insignificant. I have tried three different economic activity indicators: (1) current net national income, (2) the index of industrial production, and ad linage in 52 major U.S. cities. Ad linage seems most directly relevant to pulp imports because it is a significant indicator of demand for paper, as well as a sensitive indicator of general economic activity.

To explicitly account for trend I tried using either U.S. population or a simple linear trend variable.

Since my objective is forecasting rather than demand equation identification per se I have ignored the possible identific ation problem arising out of U.S. ownership of pulp production facilities in Canada. However, the signs of all coefficients fit the hypothesis I stated above in my explanation of the choice of explanatory variables.

Statistical criteria for acceptance of a given regression were 5% Theil-Nager table limits for the Durbin-Watson ratio and standard t-Table tests for the regression coefficients. Out of all economically plausible regressions of the above listed variables the following linear equations were statistically acceptable.

Q-Quantity of pulp imports in millions of tons. V-Value in millions of $ U.S. Nos. 4 & 6 are log linear equations. S.E.'s in ().)		Constant Term	Linear Trend	U.S. Population	Ad linage in 52 U.S. Cities	Index of Industrial Production	Can./U.S. Exchange Rate - End of June	Can./U.S. Pulp Production capacity ratio	'A' if data transformed to reduce autocorrelation	R^2 D.W.
1	Q	-4.298 (.882)	.033 (.015)		.001 (.00026)		3.1615 (.740)		A	2.19
2	Q	-4.324 (1.05)	.124 (.010)				1.959 (.704)	.062 (.014)	A	2.20
3	Q	-11.462 (1.685)		.047 (.0047)			1.824 (.811)	.071 (.0176)	A	2.00
4	Ln Q	0.0		3.437 (.454)			1.05 (.437)	1.679 (.469)		.906 1.86
5	V	-636.25 (103.07)			.205 (.014)		323.536 (108.125)			.933 1.738
6	Ln V	0.0			2.07 (.177)		1.05 (.466)			.902 1.7899

The assumptions made in quantity forecasts were:

1. Population would increase over the next few years at about 1% annually.
2. Canadian pulp production capacity would increase slightly to about 50% of U.S. capacity based on current estimates of industry expansion plans.
3. The U.S. dollar would depreciate vis-a-vis the Canadian dollar by about 3% to about 1$Cn/1$ U.S.

Forecasts using alternative rates of 1.10$Cn/1.00RU.S. and .90$Cn/1.00$U.S. are also shown.

Equations #5 and #6 generate forecasts of the value of pulp imports -- based on the assumption that:

1. Real GNP will grow at about 4% over the next four years and ad linage will grow at the same average pace.
2. The Canadian/U.S. exchange rate will follow the course indicated in the assumptions used for the quantity forecasts.

As Table I shows, the elasticity of demand with respect to the exchange rate for the given estimates of equation 3 is about .45, while the constant elasticity estimated by equations 4 and 6 is 1.05. Least squares estimating techniques with available data enable one only to assert with confidence that any of the elasticities estimated here lie somewhere between approximately .08 and 2.024.

Alternative exchange rates have a slightly greater effect on total value forecasts of equation 5 (see Table B) but since exchange rate movements probably do not correspond to price movements it is worth while seeing what the forecast quantities shown on Chart I would be worth with alternative unit values. Table C shows what each quantity forecast at alternative exchange rates would be worth given unit values ranging from $125. U. to $140. In terms of current pulp price prospects the average unit value of pulp imports could be expected to level off between $135 and $140. Assuming that the Canadian/U.S. exchange rate stays in the present range around 1:1. Table III shows that (given these assumptions) pulp imports in 1975-would be valued at $550 to $580 million.

OASIA

Robert D. Brown
5/25/71

TABLE A

Effects on 1975 Pulp Import Quantity Forecasts[1] of Alternative Exchange Rates

$Canadian:$U. S.	.900/1.000	1.000/1.000	1.100/1.000
Millions of tons	3.945	4.128	4.311
% Change in tonnage	4.64	4.43	

TABLE B

Effects on 1975 Pulp Import Value Forecasts[2] of Alternative Exchange Rates

$Canadian:$U.S.	.900/1.000	1.000/1.000	1.100/1.000
U.S. $millions	477,1620	509.5157	541.869
% Change in value	6.78	6.35	

TABLE C

Total Pulp Import Values[3]

1975 Tonnage Forecasts	Unit Value Alternatives ($U.S./Ton) $125.	$130.	$135.	$140.	Assumed Exchange Rate
3.945	$493.125	$512.85	532.57	552.300	$Cdn.900/$1.000
4.128	$516.000	536.64	557.28	577.920	$1.000/$1.000
4.311	$538.875	560.43	581.985	603.540	$Cdn.1.100/$1.0

1/ Equation No. 3
2/ Equation No. 4
3/ Equation No. 3 forecasts of quantity at different exchange rates.