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Use of a Theoretical Model to Study Some Problems
   of Foreign Borrowing           J. Herbert Furth

      The development of backward countries is one of the main
objects of American foreign lending. In this connection, the first
question concerns the amount of capital to be newly invested, and the
length of time over which the investment program is to be distributed.
Once the annual sum of required new investment is determined, certain
other problems arise: how much of the necessary capital can be ex-
pected to come from domestic sources; how is the remainder, to be met
by foreign sources, to be repaid; and how will the investment program
affect the country's national income.

      In the case of one particular country,[1]/for which a long-
range investment study has been undertaken, an attempt has been made
to answer these questions by means of a model, based upon the known
characteristics of the economy at the time of the program's start and
upon estimates of probable changes within the next ten years. The
problem of economic fluctuations was disregarded, constant prices were
assumed, and conditions further simplified by postulating linear pro-
gressions in all cases in which such a postulate was consistent with
other data. It was also assumed that all new capital would be used
for productive purposes, i.e., for the ultimate production of consumers'
goods and services. The model therefore was not meant to show the year-
by-year changes likely to occur, but merely to indicate the general trend
which might be expected in the absence of disturbing factors.

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[1]/ The country must remain unnamed since the lending policy of the
   United States in regard to this country is still under discussion.

The evaluation of the expected increase in national income was tackled first because domestic savings as well as the development of the balance of payments depend upon changes in national income. It was tempting to use multiplier analysis in this connection, but this attempt was given up because of the uncertainty of "leakages" and the impossibility of deciding over what period the investment multiplier might be expected to exercise its full force. The model was based, therefore, upon available empirical studies showing the relationship between changes in national income and national capital. Two such studies were used, one by Colin Clark[1] and the second by E. H. Stern.[2] The Clark formula shows the relation between income per occupied person (y) and capital per occupied person (x) as follows: log y = 2.884 - 1.108 log x + 0.323 (log x)$^2$. Differentiating that formula, we find:

$$1/y \cdot dy/dx = -1.108/x + (0.323 \cdot 2 \log x)/x$$
$$dy/dx = y/x \cdot (0.646 \log x - 1.108)$$
$$dy = y/x (0.646 \log x - 1.108)dx$$

Solving this equation on the basis of y = 300 (the figure assumed by Clark in the case of the country in question), dy = 0.249 dx. On the basis of this formula, it might thus be expected that the income per occupied worker would increase by about 25 dollars for each 100 dollars per worker invested.[3]

Clark's formula has the great advantage that it expresses the increment in terms of occupied persons, and therefore permits one to take into consideration the influence of an increase in the labor force. Clark points out, however, that his formula is based upon comparison of countries with very different economic conditions, and that the data do not even refer to the same period for all countries. He cautions rightly against applying his formula for deriving the ratio of changes in national income as a result of changes in the national capital for any single country. For these reasons, the Stern formulas appear to be preferable since they are derived from changes in national income and capital for individual countries. Their shortcomings lie in the fact that Stern has made no effort to separate an increase in income due to growth in capital per worker from an increase due to an increase in the labor force, and that none of the countries he considers is exactly comparable to the country for which the problem in question has arisen.

Nevertheless, his formulas can be adjusted so as to exclude the probable effect of an increase in the labor force, and when this is done, a reasonably close resemblance to the Clark formula appears. Stern's formula for the United Kingdom for the period 1924-38 relates

[1] The Economics of 1960 (1942), p. 74.
[2] Economica, August 1945, p. 163.
[3] The monetary unit chosen by Clark is the dollar of purchasing power for the average period 1925-34.

net national output (y) with national capital employed (x)[1]/by the
equation:

$$x = 3.27y + 4,660$$
$$\therefore y = (x - 4,660)/3.27 = 0.306x - 1,425$$
$$dy = 0.306dx$$

In order to eliminate the influence of the increase in the
labor force during that period, it is assumed that the increase in
the labor force was proportionate to that in the total population,
and that without any increase in capital the national income would
have changed in about the same proportion as the labor force. The
increase in population during the 14 years in question was 5.7 per
cent, and so the increase in national income to be attributed to the
increase in capital is estimated at $dy = 0.306dx/105.7 = 0.29dx$.

For the Union of South Africa in the period 1922-38, the
Stern formula gives the following results:

$$x = 1.89y - 349$$
$$y = (x + 349)/1.89 = 0.53x + 185$$
$$dy = 0.53dx$$

The increase in population during approximately the same
period (1921-37) was 41 per cent, and so the formula has to be adjusted
as follows:  $dy = 0.53dx/141 = 0.376dx$.

Since the country in question is far less industrialized than
the United Kingdom, but far more developed than the Union of South Africa,
it is fair to assume that the relation for that country would lie some-
where between these two extremes. In order to be conservative, and in
view of the fact that the Clark formula gives a relation somewhat lower
than the Stern formulas, the ratio for the country in question has been
estimated at $dy = 0.30dx$. This means that for every 100 dollars per
worker newly invested, national income per worker is expected to in-
crease by about 30 dollars.

This formula in turn has to be readjusted to permit the
estimate of the increase in national income due to the increase in the
labor force expected to occur within the next ten years. This increase
has been estimated at 13 per cent for the country in question. National
income at the beginning of the period was about 8.33 n (the symbol n
denoting the amount to be invested in each year). In the tenth year of
the program, national income is expected to be increased by 9 · 0.30 n
due to the increase in capital on the basis of the formula developed in
the preceding paragraph,[2]/so that it would amount to about 11.03 n if
the increase in the labor force were disregarded. Including that in-
crease, national income would be 11.03 n · 1.13 or about 12.47 n. The
total increase of about 4.14 n would amount to almost exactly 50 per
cent of the national income at the beginning of the period.

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1/ In the original, the symbols y and x are used in reverse order.
   Figures are in millions of pounds sterling.
2/ It is assumed that the increase in capital raises (real) income in
   the year following the inflow.

Domestic savings were about 4 per cent of national income at the beginning of the period, and have been estimated to increase by about 16 per cent of the increase in income. During the first year, they are therefore assumed to be about 0.33 n, and during the tenth year about 0.99 n. This means that during this last year practically the entire amount of new investment would be covered from domestic sources. National income is expected to increase during the intervening period almost linearly, and in this case total new investment during the period would be covered to about 65 per cent from domestic sources, and to about 35 per cent by capital inflow from abroad. Since total new investment during the period would be 10 n, domestic savings are thus expected to reach about 6.5 n. For the particular country with which the study deals, the inflow of foreign capital is expected to include reparation deliveries as well as credits. The country's reparation claims (net of the amount needed for reconstruction purposes) are estimated at about 0.5 n. Foreign credits are therefore calculated at 0.35 · 10 n minus 0.5 n, or about 3 n.

It is estimated that foreign credits will be repaid in such a manner that the yearly service charges, including both interest and capital installments, amount to about 5 per cent of the credit outstanding.[1]/ During the first year, the charges on foreign credits would thus be 5 per cent of 0.67 n (n minus 0.33 of domestic funds), or about 0.03 n, and these would gradually increase until they reached 5 per cent of 3 n, or about 0.15 n during the tenth year. At the end of the period, the charges on foreign credits would thus represent only about 3.6 per cent of the increase in national income.

The transfer of these charges into the creditor country will depend mainly upon the ability of the debtor country to maintain an adequate export surplus.[2]/ The exports of the country in question regularly amount to about 11 per cent of its national income, and are expected to increase in the same ratio as the national income. During the tenth year of the period, exports are therefore estimated to be about 0.11 · 12.47 n, or about 1.37 n. The service charges on the new debt of 0.15 n annually would thus amount to about 11 per cent of total exports. Since in pre-war years imports were about 20 per cent lower than exports, the charges on the new credits could be met without difficulty as long as imports did not increase more rapidly than national income or exports.

The division of the increased national income among the various classes of the domestic population cannot be estimated without additional assumptions. If charges on domestic capital are computed at the same level as those upon foreign credits, they would amount to about 0.3 n at the end of the period. This would mean that the increase in national income of about 4.14 n minus 0.15 n (charges on foreign debt) and minus 0.3 n (charges on domestic capital), or a remainder of about 3.69 n, would be available as additional income of labor and management. By making further assumptions as to the country's social policy, the share of labor can be estimated and the rise in labor income as compared to the pre-war level computed.

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1/ This represents a maturity of 31 years at 3 per cent interest.
2/ The terms exports and imports cover all current receipts and expenditures in the country's balance of international payments, excluding debt charges.

## Currency and Foreign Exchange Conditions
### in Post-war Poland                    Hans J. Dernburg

A uniform zloty currency of the Polish National Bank
(Narodwy Bank Polski) is now circulating in the Polish state, having
been introduced into the following three regions:

(1) The former Government General where during the occupation
period the zloty currency of the Bank Polski, Poland's pre-war central
bank, had been exchanged for the zloty currency of the German-sponsored
Bank Emisyjny in Cracow at the rate of one to one. For the end of 1944,
the circulation of the "Cracow zloty" has been estimated at 12 to 15
billion zlotys.

(2) The territories which the Germans had annexed from Poland
during the war and where they had exchanged the zloty currency of the
Bank Polski for reichsmark currency at the rate of one mark for two
zlotys. For the end of 1944, the circulation of reichsmark currency in
this region may be estimated at the equivalent of 9 to 11 billion Cracow
zlotys.[1]

(3) The formerly German territories east of the Oder-Neisse
rivers now under Polish administration where reichsmark currency was
the traditional medium of exchange. Monetary circulation in this area
may have reached at the end of 1944 the equivalent of an estimated
8 to 10 billion Cracow zlotys.[2]

Total monetary circulation in the three regions making up
the present Polish monetary area may thus have amounted to 29 to 36
billion zlotys at the end of 1944; the lower figure is probably closer
to reality than the higher figure. During the liberation period, the
Russian armies issued occupation ruble currency at the rate of one
ruble = one zloty, but the amount issued does not seem to have been
significant.

Beginning in January 1945 with the exchange of the currencies
circulating in the area of the former Government General, all the curren-
cies mentioned (zlotys of the Bank Emisyjny, reichsmarks, and occupation
rubles) were exchanged for the zloty notes of the new Polish National
Bank which now constitute the only medium of exchange and legal tender
of the new Poland. While the ruble currency was exchanged in full at
the rate of one to one, zlotys of the Bank Emisyjny in Cracow and
reichsmarks were withdrawn under conditions which reduced currency
circulation very drastically. The upper limit for the exchange of
zlotys in the Government General was 500 zlotys per person; somewhat
higher amounts were permitted for business undertakings (except in the
western part of the Government General). The exchange took place at
the ratio one to one. Zloty notes in excess of the amount permissible
for exchange were deposited compulsorily with the authorities. The

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[1] The lower figures for the areas in which reichsmark currency circu-
lated take into account the flight of money coincident with the
departure of Germans during the later stages of the war and the
early occupation period.

upper limit for the exchange of reichsmarks in the territories formerly
annexed by Germany was fixed at 500 reichsmarks, and the parity between
the zloty and the mark was fixed at two reichsmarks to one zloty. All
physical persons 18 or more years old were entitled to that exchange,
with the exception of German citizens and citizens of German-allied
nations. No special provisions were made for business enterprises.
As in the case of the exchange of zloty notes, the German marks in
excess of the amount admissable for exchange were placed in blocked
accounts. After the Poles assumed administration of the territories
east of the Oder-Neisse rivers, reichsmark currency circulating therein
was exchanged for the new zloty currency reportedly under the same con-
ditions. If former German citizens were excluded from the exchange in
these territories also, the exchange operation must have amounted to a
virtual repudiation of all existing currency.

In view of the extremely high prices existing in Poland, the
exchange operation as a whole has deprived the people--possibly perma-
nently--of practically all their currency reserves. In the former
Government General, the cost of a pound of butter in January 1945 was
250 zlotys, so that in this region a person could have salvaged from
the exchange not more than the equivalent of two pounds of butter.
Where reichsmark currency was exchanged, the holder would have received
no more than the equivalent of a single pound of butter.

Into the vacuum created by the exchange operation, a con-
siderable volume of new currency has been pumped. Statements of the
new Polish central bank have not yet been made available, but a Polish
estimate places the circulation of zloty notes for November 1945 at
14 billion zlotys. Considering current high prices, however, the volume
of notes reported does not appear high as compared with pre-war standards.
The cost-of-living index has recently reached about 8,000 (on a base of
1938 = 100); at this level of prices, 14 billion zlotys would be worth
no more than 175 million zlotys at 1938 prices. This figure may be
compared with a circulation of 1.9 billion zlotys in 1938.

The cost-of-living index (1938 = 100) rose under German occu-
pation to 7,000 in May 1944. After reaching a peak in the liberation
period of 21,000 in January 1945, it dropped to 13,022 in March and
8,241 in August 1945 (latest available figure). The drop in prices
has not been attributed to deflationary financial measures but mainly
to improved transportation, which has permitted the movement of more
ample supplies to markets. The cost-of-living index numbers reflect
prices on the free market, which under the system prevailing in Poland
is not a "black market." The Polish Government attempts to regulate
only some 20 per cent of the national food supply. This portion is
sold at the fixed low prices for rationed goods, while the remaining
80 per cent finds its way into the unprohibited free market at very
much higher prices. For example, a pound of butter on the free market
cost 250 zlotys in January 1945 and 120 zlotys in August, compared with
the ration price of 35 zlotys. This dual price structure, which is also
characteristic of other countries in the Russian orbit, undoubtedly
affects the validity of the reported index numbers in evaluating the
price level as a whole.

The degree of inflation indicated for Poland by various data has not been reflected in any formal shift in foreign exchange quotations for the zloty. Before the war, the ruble and the zloty were at par and both were valued roughly at 19 United States cents on the basis of the official rate of $1 = 5.30 rubles. These relationships continued as the basis for financial transactions in the liberation and early post-liberation period. The exchange of German currency for zloty currency at the rate of 2 reichsmarks = 1 zloty is in line with the rate of 2 reichsmarks = 1 ruble at which the Russians introduced Allied military mark currency in occupied Germany. All these rates were out of touch with reality. They overvalued the zloty against the reichsmark and probably also against the ruble, and the cross rate of 5 zlotys to the dollar greatly overvalues the zloty against the dollar.[1]

No exchange rates between the zloty and other currencies have yet been established to cover all transactions with foreign countries. However, internal rates have been set for special transactions with respect to the dollar, the pound sterling, and the Swedish krone. A rate of 100 zlotys to the dollar has been established for remittances from abroad through individuals and of 110 zlotys for remittances through charitable institutions. The rate of 100 zlotys to the dollar is also the diplomatic rate. Warsaw black market rates for dollar notes are considerably higher and show a rising tendency. Dollar notes were traded at 250 to 300 zlotys for the dollar in early October, 450 zlotys in mid-December 1945, and 480 to 560 zlotys in early January 1946. Rates in provincial centers are even higher.

It should be realized, however, that under the present conditions external exchange rates have little practical importance. Poland's foreign trade has become a state monopoly and most of her post-war foreign trade has been conducted on the basis of barter agreements. Such agreements have been concluded with six countries--the U.S.S.R., Sweden, Denmark, Norway, Hungary, and Rumania.[2] An external exchange rate for the zloty does not enter these agreements. The Russo-Polish agreement is transacted in terms of pre-war rubles or zlotys. The agreements with Sweden, Denmark, and Norway are transacted in the three respective krone currencies, those with Hungary and Rumania in United States dollars. In general, export and import trade with each agreement country will be of equal value. The agreements with Norway and Sweden, however, contemplate a balance in favor of Poland to be made available in krone currencies freely convertible into dollars. Although an external zloty exchange rate does not enter the agreements, an underlying internal rate becomes apparent, nevertheless, when the prices agreed upon with the foreign country are related to domestic prices. A fictitious illustration may explain the point. Let us assume that under the Polish-Rumanian agreement Poland agrees to exchange 1 ton of coal valued for purposes of the agreement at 8 dollars against 4 bushels of wheat at 2 dollars per bushel, and let us further assume that the Polish domestic price for coal is 2,400 zlotys per ton and that for wheat 1,000

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[1] This cross rate is based on the rate of 2 reichsmarks = 1 zloty and the rate of 10 reichsmarks to the dollar at which Allied military marks were introduced by the Americans in Germany.

[2] Further agreements are expected for Austria, Czechoslovakia, Finland, Italy, and Switzerland.

zlotys per bushel.  In this case, the underlying exchange rate in
connection with Polish coal exports may be considered 300 zlotys per
dollar, while that for Polish wheat imports may be considered 500 zlotys
per dollar.  This fictitious illustration suggests that under barter
conditions different real exchange valuations may underlie the trade in
different goods, and that different rates may prevail for imports and
exports.

In this connection, the following statement of the Polish
Finance Minister made in August 1945 may be recalled:

"For the time being ours will be only an internal
and closed currency.  We have no intention of circu-
lating it abroad, nor do we see any need for it at
present.  We do not intend to establish general foreign
exchange rates of the zloty, but when necessary we shall
fix--ad hoc or for a certain period of time--a special
rate of exchange for individual transactions or groups
of transactions, for example for the duration of an
agreement with a foreign country.

"The rate of exchange will be determined in the
first place by comparing the values of goods covered
by the transaction on both sides calculated in the
respective currencies.  We can thus apply different
rates of exchange for different transactions with the
same country.  This will not prove difficult, inasmuch
as foreign trade has become a state monopoly and will
be based principally on compensatory agreements."

The intention to establish differing rates of exchange has since been
denied but the statement discloses the completely different exchange
conditions which may prevail when a country's trade is based principally
on barter arrangements.


## Dual Currency in Hungary                                J.H.F.

The Hungarian Government, in an attempt to bring some order
into the monetary chaos, has established a "tax pengö," the value of
which will be computed daily on the basis of changes in prices in a
way similar to the computation of the dollar exchange rate.  This new
currency will therefore be stable both in terms of domestic purchasing
power and of dollars.  No notes or coins denominated in that currency
will be issued, however.  It will be merely an accounting unit, the use
of which will be compulsory for computing taxes, repaying savings
deposits, and making out bills to be discounted by the National Bank.
For all other transactions, either tax pengö or ordinary pengö may be
used.  Commercial banks now charge 10 to 15 per cent daily for loans
in ordinary pengö, a rate that corresponds approximately to the daily
expansion of the currency and its devaluation in terms of goods and
foreign exchange.

The experiment repeats an action taken in Hungary in February 1924, when the depreciating crown was supplemented by a "savings crown." That measure did not have appreciable results, but it was applied for only four months and the shortness of the period precluded a final judgment on its merits. This time the introduction of the tax pengö may help to increase tax receipts, which in recent months have covered only 5 per cent of all Government expenditures. It will not materially affect certain other basic causes of the Hungarian inflation, among which is the diversion of a very large share of the nation's industrial production from domestic markets by the Russian occupation authorities. Such diversion has been estimated to account for as much as 90 per cent of the output of certain industries. As in 1924, only international action is likely to restore the Hungarian monetary system. The "tax pengö" may, however, play a certain role as the precursor of a stabilized currency unit.


## Japanese Deficit Financing

A. B. Hersey

Allied Headquarters in Tokyo last week refused the Japanese Government permission to borrow 14 billion yen from the Bank of Japan. According to newspaper reports, the requested sum represented the fiscal deficit during November and December. The precise terms of the directive are not available. The Japanese Government was told to balance its budget as soon as possible and in the meantime was apparently forbidden to borrow from other banks as well as from the Bank of Japan.

The immediate occasion for this directive was an application from the Japanese Government under an order of November 24 which forbade it to borrow or extend credit without permission of Allied Headquarters.

The sum of 14 billion yen involved in the recent application, supposedly as the deficit for a two-month period, was just one-sixth of the originally budgeted deficit for the fiscal year April 1945-March 1946, which had called for total expenditures of nearly 102 billion yen[1]/and revenues of not quite 18 billion yen. The request for 14 billion yen from the Bank of Japan appears at first glance unexpectedly large for two reasons.

In the first place, Japanese Government projections of the national income and of its allocation between the governmental deficit, private capital formation, and consumer expenditures had indicated a much smaller gap between taxes and governmental expenditures than was apparently called for by the fiscal budget, not only for the current fiscal year but also in the preceding year 1944-45. The fiscal budget may have included expenditures that would be made and financed outside Japan, or there may have been other undisclosed reasons for the discrepancy. In 1944-45, for example, the budgeted deficit was 58 billion yen while the national-income-and-savings program called for only $33\frac{1}{2}$ billion yen of government expenditures to be met out of "savings" (including purchases

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1/ Including "general account" expenditures of 27 billion yen and emergency military expenditures of 85 billion yen, less duplications of 10 billion yen.

of bonds by the banks). Because of the progress of inflation, the lower
of these two figures was probably exceeded. The actual increase in the
national government's long-term debt during fiscal 1944-45 is roughly
estimated at 40 to 50 billion yen.[1]

| Fiscal year ending March 31 | Deficit spending | | Actual increase, long-term debt | Outstanding debt, end of fiscal year |
|---|---|---|---|---|
| | Budget | National savings plan | | |
| | (Billions of yen) | | | |
| 1942-43 | 17.4 | 17.0 | 15.0 | 55.4 |
| 1943-44 | 26.6 | 21.0 | 22.1 | 77.6 |
| 1944-45 | 58.2 | 33.5 | 40-50? | 118-128? |
| 1945-46 | 84.1 | 47.2 | ? | ("about 170" at Nov.30, 1945)[2] |

Following this line of reasoning, and allowing for an acceler-
ation of the inflationary increase in costs during 1945, the national
savings plan estimate of deficit spending in the current fiscal year,
which was only 47 billion yen (as against the budget deficit of 84
billion yen), would undoubtedly have been surpassed had the war continued.
However, if the growth of the Government debt has actually averaged as
much as 5 to 7 billion yen since last March, there must have been a con-
siderable growth of various types of relief and emergency expenditures
to fill the gap left by disappearing munitions expenditures. Black
market prices have of course been mounting rapidly, but it is not known
how greatly the costs of goods and services purchased by the Government
have been affected. Occupation costs have averaged less than 200 million
yen a month.

The second reason why the Japanese Government's request for
14 billion yen from the Bank of Japan might be considered unexpectedly
high is that a large part of the growth of the debt, at least up to
March 1945, was absorbed by the postal savings system. For example, in
the fiscal year 1943-44, postal savings increased by 6 billion yen while
the Government debt grew by 22 billion yen. In 1944-45, postal savings
increased 11 billion yen. The absorption of Government bonds by corpo-
rations and other investors, other than the banks and postal savings
system, appears also to have been at least as large as the amounts taken
by postal savings. Some of the purchases of bonds by banks were also
based on growing time deposits, partly representing payroll deductions
and other "forced savings." If it is now necessary for the Government
to borrow as much as 7 billion yen a month from the banks (or from the
Bank of Japan alone), new cash savings of wage earners and business
would appear to have dried up altogether.

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[1] The increase in a 20-month period from March 31, 1944, to November
30, 1945, was about 92 billion yen. Balancing the rise in costs
due to inflation against the decline in war production in 1945, it
seems reasonable to assume that something like half the increase
occurred in the 12 months through March 1945.

[2] According to the Japanese Minister of Finance in an interview on
December 3, 1945.

If this is what has happened, it may be explained by the collapse of industrial production and the high prices now ruling in black markets. Perhaps the Government's savings campaign has broken down completely. The groups now enjoying excess cash income are likely to be limited to farmers and others selling on the black markets.

Early accounts of the first draft of the budget for 1946-47 are not very enlightening. General taxation is expected to raise 8.9 billion yen and other unidentified revenues an additional 7 billion yen. Expenditures in the ordinary budget are placed at 12.6 billion yen, but this excludes "sums needed for the relief of Japanese repatriates, for the readjustment of local finances, for reparations and indemnities,.... for the coal subsidy, for wage increases, for the rail freight subsidy" and for "insurance and other welfare measures because of the suspension of the military pension system." Early plans called for indemnities of the order of magnitude of 50 to 100 billion yen to business corporations for loss of their properties abroad and for war damage, but Allied Headquarters has agreed only to the payment of 3.4 per cent interest on certain indemnities to munitions companies estimated at a sum of 46.4 billion yen.

The consolidation of accounts in one general fund has been ordered and an audit of Government finances will be undertaken. Meanwhile, Allied Headquarters has imposed a limit of 2 billion yen a month or spending by the Japanese Government.

## Effect of Income Changes on American Imports

### Randall Hinshaw

It is now well established that the volume of American imports is sensitive to changes in the level of American national income, and moves with income in a consistent pattern. It is not so clear that this is also true of the various import subdivisions or of individual commodities. While it can be assumed that there is no uniformity in the degree to which different types of imports respond to income changes, one would hope that the behavior of any particular import with respect to income were reasonably consistent so that, given the level of national income, one might obtain at least a rough notion of the amount of the item that would be imported.

The ensuing study is concerned with the relation between the level of real national income and the volume of various types of imports, as grouped by the Department of Commerce. The Department of Commerce divides imports into five categories: (1) crude materials, (2) crude foodstuffs, (3) manufactured foodstuffs, (4) semi-manufactures, and (5) finished manufactures. Imports of these groups for selected years are shown in Table 1.

### TABLE 1

### AMERICAN IMPORTS BY GROUPS FOR SELECTED YEARS

#### (Millions of Dollars at Actual Prices)

|  | 1929 | % | 1932 | % | 1937 | % |
|---|---|---|---|---|---|---|
| Crude Materials | 1,559 | 35.4 | 358 | 27.1 | 971 | 32.3 |
| Crude Foodstuffs | 539 | 12.2 | 233 | 17.6 | 413 | 13.7 |
| Manufactured Foodstuffs | 424 | 9.6 | 174 | 13.1 | 440 | 14.6 |
| Semi-Manufactures | 885 | 20.1 | 217 | 16.4 | 634 | 21.1 |
| Finished Manufactures | 994 | 22.6 | 341 | 25.7 | 551 | 18.3 |
| Total Imports | 4,399 | 100 | 1,323 | 100 | 3,010 | 100 |

It will be noted that while the proportions in which the various categories were imported were roughly the same in 1937 as in 1929, the pattern was substantially different in 1932. As will soon become clear, this shift in the proportions is largely explained by changes in the level of American real income.

Chart 1 shows the relation of American national income (at constant prices) to the total volume of American imports for the period 1920-37. Both variables are expressed as indexes on a 1937 base. It is clear from a cursory inspection of this chart that, over the period studied, a given percentage change in the level of real national income was accompanied by approximately the same percentage change in the volume of total imports. That is to say, the income elasticity of demand for imports was about unity. As calculated in the conventional manner, the income elasticity obtained from this data is actually 1.00.

        Also of interest from a statistical point of view is the
marginal propensity to import, which is the fraction of an increment
of income spent on imports. For the period covered in Chart 1, this
was found to be .041. The latter information may be translated into
the statement that an increase of 1 dollar in the national income may
be expected to result in an increased expenditure of about 4 cents on
imports.

        Since the Department of Commerce publishes volume indexes for
each of the import subdivisions, it is possible to examine the relation-
ship between real income and each of these variables. Charts 2 through
6, which are constructed in the same way as Chart 1, show the various
relationships. Owing to special circumstances, the periods covered are
not in all cases exactly the same. Thus the year 1919, while included
in Charts 2 through 5, is not included in Charts 1 and 6, because the
low imports of finished manufactures in that year largely reflected the
effect of the war on European exports. Similarly, in Chart 3, the years
1935-37 are omitted because of the drouth, which resulted in very high
imports of foodstuffs. Finally, the years 1938 and 1939 were included
in Charts 3 and 4 (Chart 3 also includes 1940), since the advent of war
showed little tendency to affect imports of foodstuffs. In the case of
the other items, the behavior after 1937 appears to have been substantially
altered by the approach of hostilities.

        It is clear at a glance that the response of these various
import categories to income changes was by no means uniform. For example,
it is apparent that imports of crude foodstuffs were relatively insensi-
tive to (though definitely affected by) changes in national income, while
imports of semi-manufactures were highly sensitive to income changes.
That is to say, the income elasticity of demand for crude foodstuffs is
low, while the income elasticity of demand for semi-manufactures is high.
In the case of the other groups, the corresponding elasticities are more
nearly in the neighborhood of unity, but even here there is considerable
variation. The respective income elasticities and other information are
shown in Table 2.

## TABLE 2

### RELATION BETWEEN INCOME AND IMPORTS, BY GROUPS

|  | Period Covered | Income Elasticity | Marginal Propensity to Import |
|---|---|---|---|
| Crude Materials | 1919-37 | .781 | .011 |
| Crude Foodstuffs | 1919-40[1]/ | .406 | .002 |
| Manufactured Foodstuffs | 1919-39 | 1.133 | .006 |
| Semi-Manufactures | 1919-37 | 1.486 | .013 |
| Finished Manufactures | 1920-37 | 1.109 | .008 |
| Total Imports | 1920-37 | 1.000 | .041 |

1/ Excluding 1935-37, because of drouth.

It will be seen that for the manufactured and partially manu-
factured items (manufactured foodstuffs, semi-manufactures, and finished
manufactures), the income elasticity of demand is above unity, while for
the crude items (crude materials and crude foodstuffs) the income
elasticity of demand is less than unity. That is to say, for the former
items, a change in the level of real income results in a more than pro-
portionate change in the volume of imports, while for the latter items,
a change in income induces a less than proportionate change in imports.

These results are substantially in accord with what would
have been expected on a priori grounds. It is generally assumed that
the income elasticity of demand for crude foodstuffs is low, and this
is amply supported in the present analysis. It is also widely believed
that the income elasticity of demand for manufactures is above unity.
This is also shown to be the case. What is perhaps more striking is
the still higher elasticity figure for semi-manufactures. The reason
for this may be that imports of semi-manufactures are probably more
sensitive to income and price expectations than are imports of finished
manufactures.

As previously noted, out of every additional dollar of national
income, about 4 cents is spent on imports. Of this 4 cents, approximately
1 cent (see Table 2, column 3) is spent on crude materials, a little over
a cent on semi-manufactures, a little less than a cent on finished manu-
factures, three-fifths of a cent on manufactured foodstuffs, and one-fifth
of a cent on crude foodstuffs.

Because of differences in the income elasticity of demand for
the various import groups, the proportions in which the groups are im-
ported tend to vary from prosperity to depression. Thus crude foodstuffs,
for which the income elasticity is low, formed a considerably higher per-
centage of total imports in 1932 than in 1929 or in 1937, while semi-
manufactures, for which the income elasticity is high, formed a sub-
stantially lower percentage of total imports in 1932 than in the other
two years.

It is tempting to use the equation obtained in computing the
foregoing regressions to estimate the post-reconversion level of imports
at full employment. Making estimates on this basis involves an almost
reckless degree of extrapolation, but the results are of considerable
interest if they are not taken too seriously. Everett Hagen and Nora
Kirkpatrick have estimated that at full employment, and at 1944 prices,
the United States would produce, after reconversion, a gross national
product of 200 billion dollars. This would correspond to a net national
product, at 1944 prices, of about 165 billion dollars. In terms of the
1937 level of prices, which is here used as a base, the Hagen-Kirkpatrick
figure would correspond to a national income of 135 billion dollars (a
real income 89 per cent greater than in 1937).

If past relationships between income and imports are applied
to the much higher level of income here contemplated, the results are as
shown in Table 3.

## TABLE 3

### ESTIMATED AMERICAN IMPORTS AT FULL EMPLOYMENT

#### (Millions of Dollars)

|  | 1937 Import Prices | 1944 Import Prices | Percentage Composition |
|---|---|---|---|
| Crude Materials | 1,708 | 2,391 | 31.3 |
| Crude Foodstuffs | 468 | 655 | .8.6 |
| Manufactured Foodstuffs | 730 | 1,022 | 13.4 |
| Semi-Manufactures | 1,461 | 2,046 | 26.8 |
| Finished Manufactures | 1,084 | 1,517 | 19.9 |
| Total Imports | 5,522[a] | 7,730[a] | 100 |

[a]Total imports were estimated, not by adding the subdivisions, but by using a separate regression equation. Since the periods covered in the various estimating equations are not exactly the same, estimated total imports are not exactly equal to the sum of the estimated import groups.

The figure of 7.7 billion dollars for American imports at full employment is somewhat higher than other estimates that have been made in the recent past. In the Department of Commerce publication, Foreign Trade after the War (October 1943), a figure of 6.3 billion was suggested for the year 1948, and this figure was repeated in an article by one of the co-authors in the Survey of Current Business for November 1944.[1] In the latter article, additional imports of 1 billion dollars were estimated to result in the event of "substantial" tariff reduction. A figure of 5 billion dollars for American imports in 1950 is offered in the National Planning Association report, America's New Opportunities in World Trade (November 1944), and an additional billion dollars in imports is estimated if certain recommended policies, including tariff reduction, are instituted. A year ago, I estimated post-reconversion American imports at 7 billion dollars.[2] Neither the latter figure, nor the figure in Table 3, assume any change in American tariff policies.

It will be noted that, at full employment, estimated imports of crude foodstuffs comprise a much smaller proportion of total imports than at pre-war levels of income (particularly depression levels). This is in accord with the widely held theory that as real income grows, a smaller proportion of the total income is spent on food. From this, it is sometimes concluded that, as the real income of the world increases, the terms of trade of agricultural countries will tend gradually to deteriorate in relation to the industrial nations.

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[1] August Maffry, "Foreign Trade in the Post-War Economy," Survey of Current Business, November 1944.

[2] "The Level of American Imports after the War," December 1944.
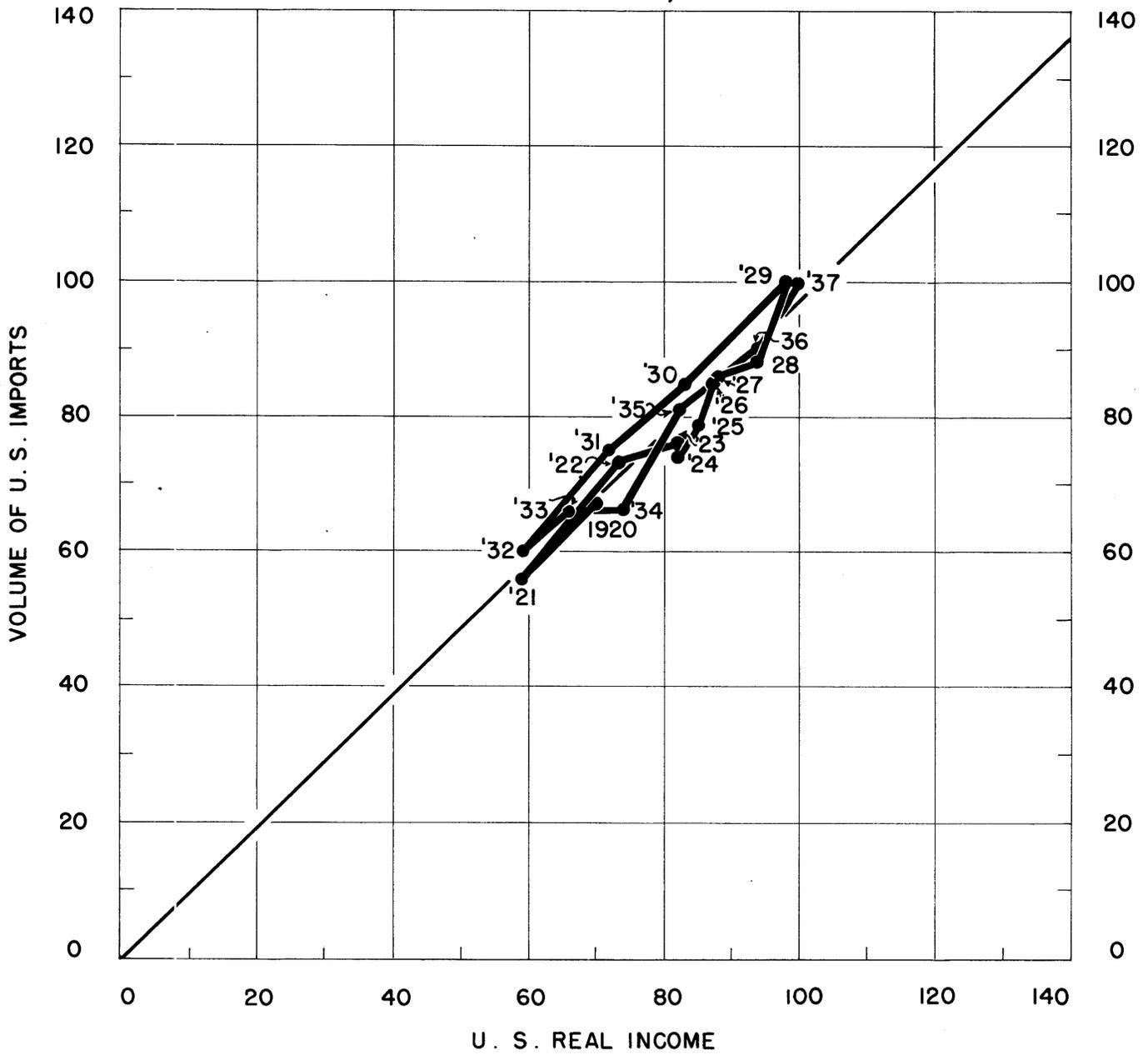
CHART I

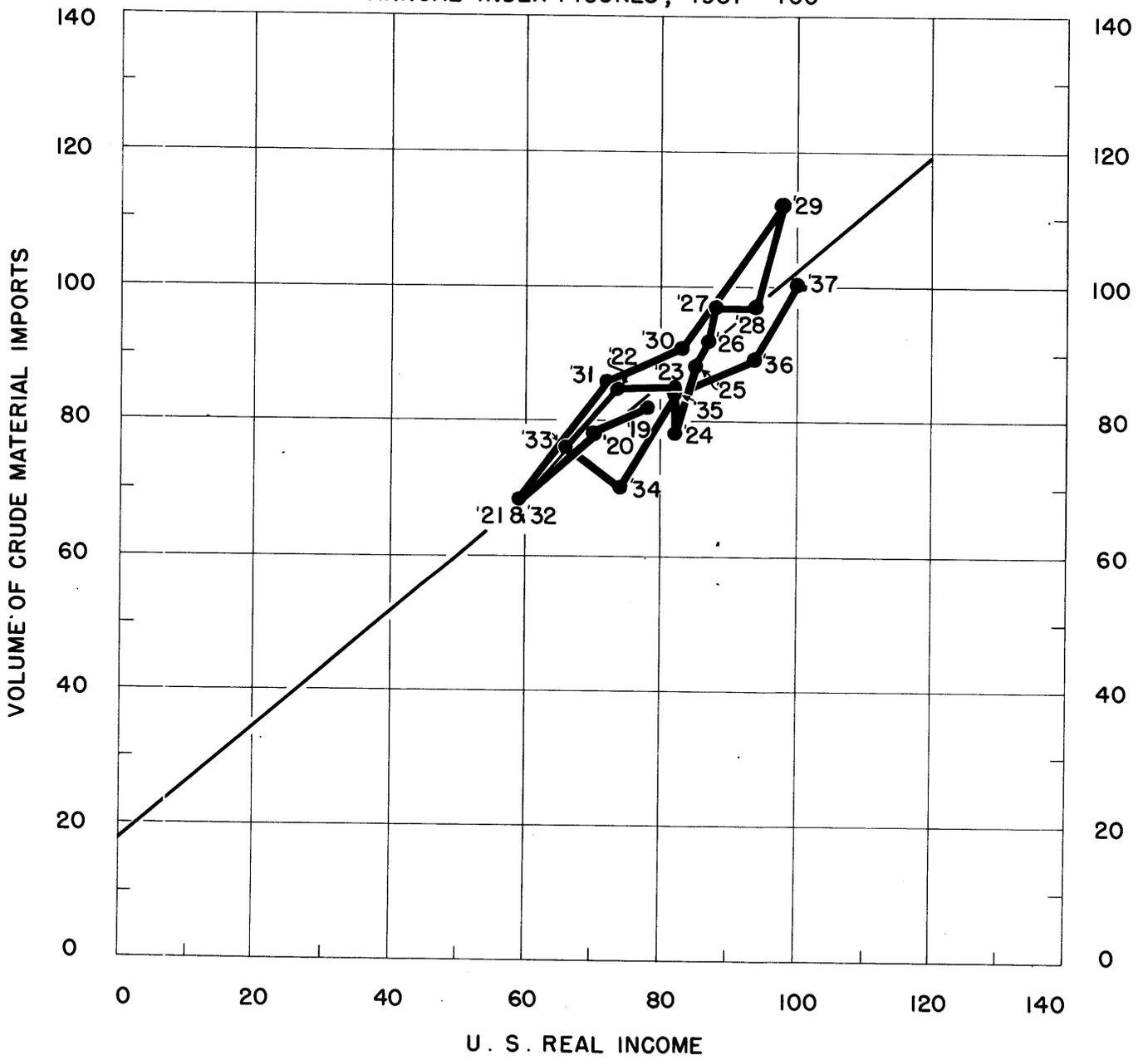ANNUAL INDEX FIGURES, 1937 = 100

CHART 2

ANNUAL INDEX FIGURES, 1937 = 100

VOLUME OF CRUDE MATERIAL IMPORTS

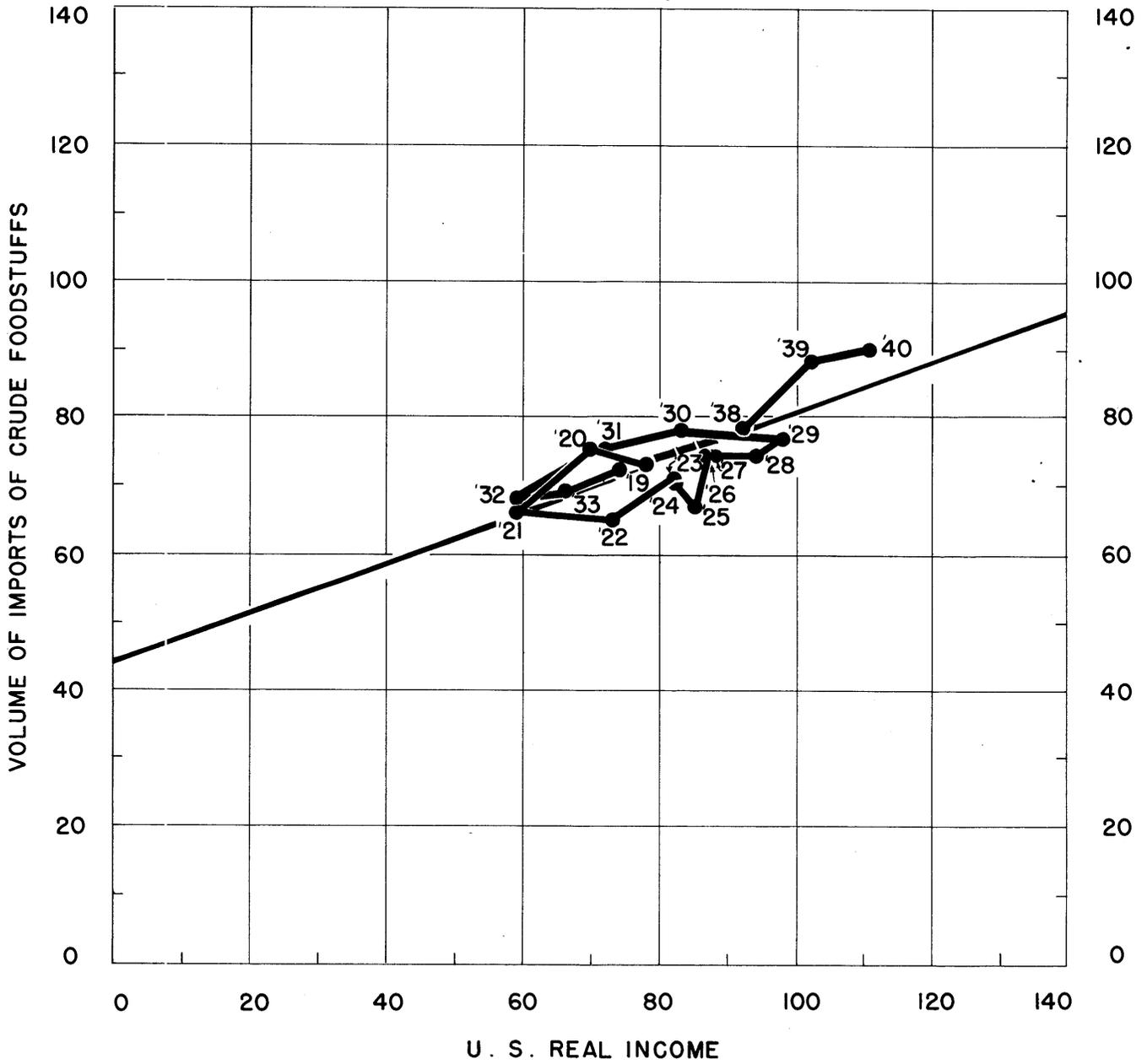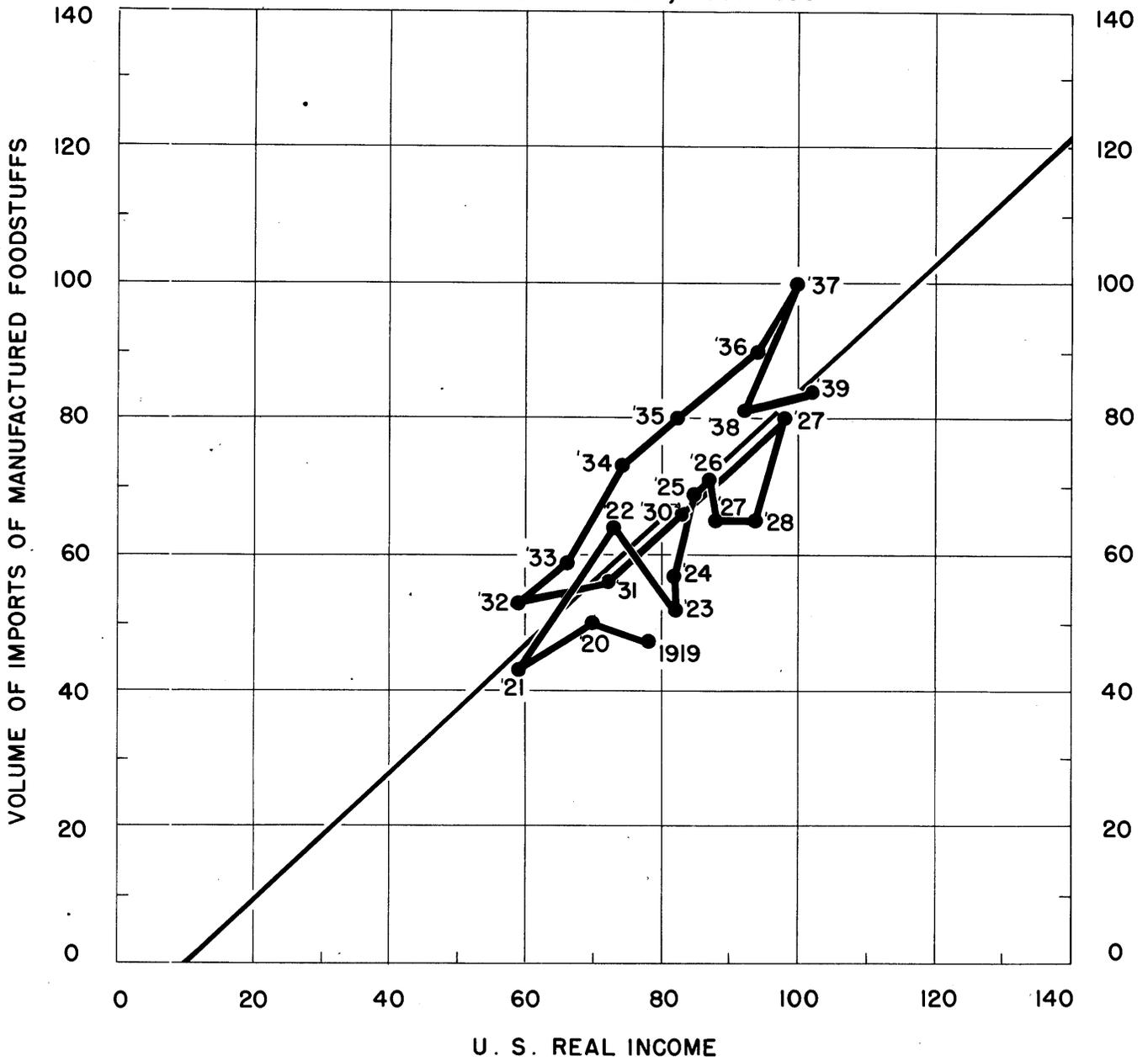U. S. REAL INCOME

CHART 3

ANNUAL INDEX FIGURES, 1937 = 100

# CHART 4

## ANNUAL INDEX FIGURES, 1937 = 100



Y-axis: VOLUME OF IMPORTS OF MANUFACTURED FOODSTUFFS

X-axis: U. S. REAL INCOME

# CHART 5
## ANNUAL INDEX FIGURES, 1937 = 100
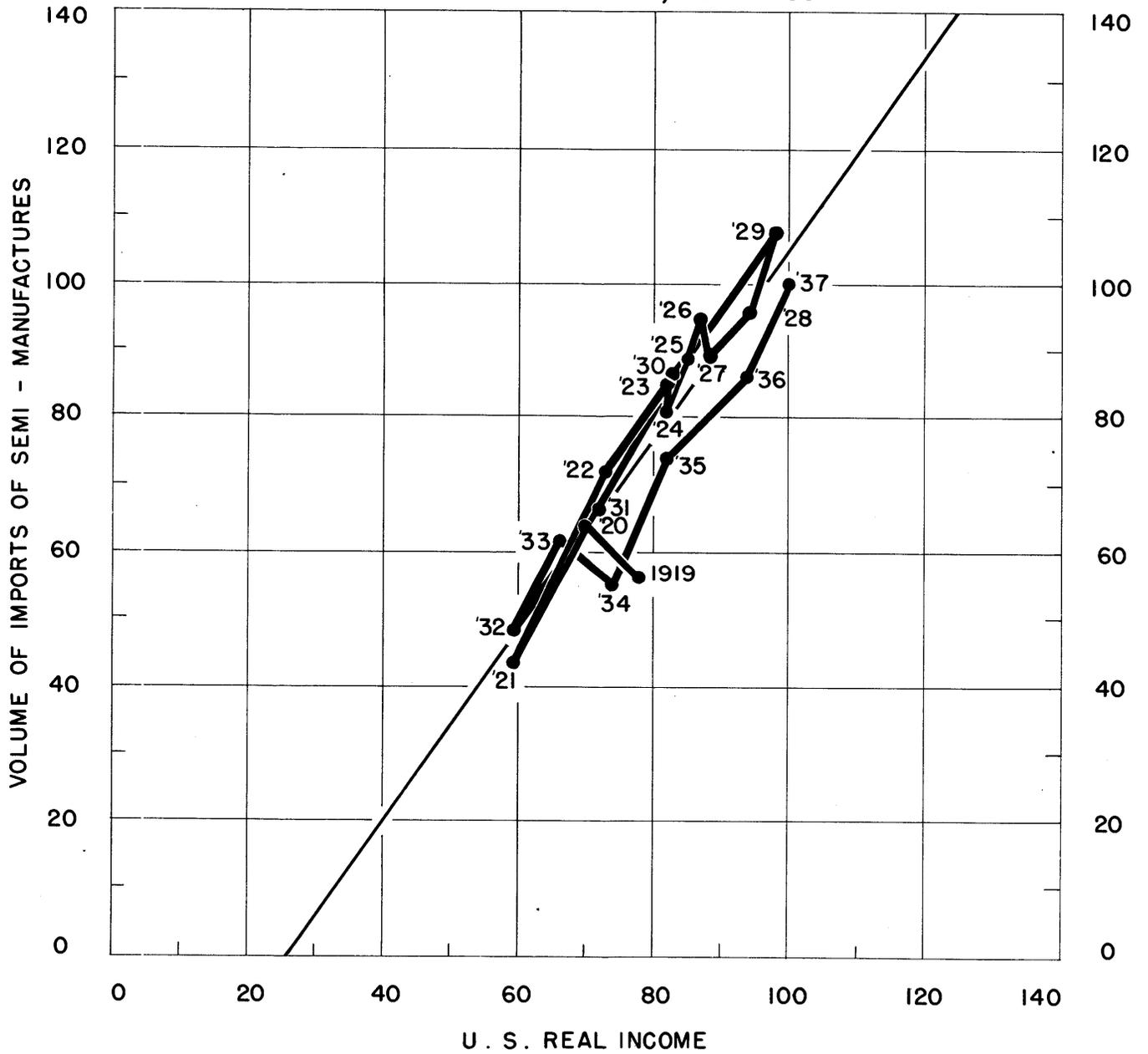


VOLUME OF IMPORTS OF SEMI – MANUFACTURES

U . S . REAL INCOME

CHART 6

ANNUAL INDEX FIGURES, 1937 = 100