Some Remarks on the Problem of Dollar Scarcity

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SOME REMARKS ON THE PROBLEM OF DOLLAR SCARCITY*

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1. THE BASIC PROBLEM OF DOLLAR SCARCITY

At the prevailing exchange rates and price levels it appears that, considering the current items of the balance of payments of the United States, demand for dollars surpasses their supply. Or in other terms: American exports to the rest of the world (taking goods and services together) surpass imports from the other countries. For the moment, one of the chief reasons is the heavy reconstruction demand in many countries, particularly European, together with the low level of productivity in these areas. Many experts expect, however, that the disequilibrium will remain to some extent after the reconstruction period. The possibility of a permanent disequilibrium will hamper, they fear, even the action needed to solve the temporary difficulties. Granting credits for reconstruction to war-hit countries is not attractive unless in the long run an equilibrium will develop. It seems worth while, therefore, to investigate in some more detail the possibilities of restoring the equilibrium in the current items of the American balance of payments.

The problem of dollar scarcity would be nonexistent if a permanent flow of capital from the United States would be accepted as a normal

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element in the world economy. Such a flow may be accepted as far as it is directed to underdeveloped countries; most European countries would not, however, after the reconstruction period, want to continue capital imports from the United States. Of course it may, nevertheless, upon closer examination, prove to be the best solution. To begin with, we shall investigate the possibilities of restoring equilibrium in the purely current items.

A priori, there are many aspects of the problem. American imports may be increased by new technical developments in the other countries, or by better sales promotion; exports may be curtailed by higher American home consumption or by deliberate cutting of imports by the receiving countries; developments in natural resources may exert an influence, etc. In this paper I want to focus upon the orthodox economic method available, *viz.*, a change in the terms of trade, or to say it in other words: a reduction in costs of production (by a change either in living conditions or in productivity) in non-American countries. The other aspects, important though they are, will be neglected.

Our analysis will consist of two parts: a theoretical analysis of the mechanism at hand (section 2) and an attempt to measure some of the most relevant coefficients and to draw some provisional conclusions (section 3). A few remarks on the nature of the disturbing forces may precede. In a general way it may be said that imports into the United States are expected to be, even in more normal times, "too low," exports to be "too high," particularly imports from and exports to the European countries. To some extent, American trade policy may be the reason; much will depend on the outcome of the new multilateral negotiations. Apart from that, there is the prospect of a changed relation between Western Europe and the Far East. Formerly, the Far East supplied some necessary raw materials to the United States, whereas Western Europe supplied capital goods to the Far East. There is a tendency now for the United States to make over that capital-goods supply and, at the same time, to demand less of Far East raw materials (*e.g.*, rubber). It is evident that all this points to a decline in the competitive position of Europe, either by economic or noneconomic developments. And the only purely economic response would seem to be in a reduction of European supply prices.

2. Theoretical Analysis of Equilibrium in Balance of Payments

We want to understand the essential features of the problem. For that purpose a model will be used satisfying the minimum requirements that must be posed.

First of all, there must be the question of two territories. We call them the United States and the Rest of the World. United States

variables will be indicated without a prime, Rest of the World variables with a prime.

Our primary interest concerns the balance of payments between these two territories. We assume it to consist of the current items only, since

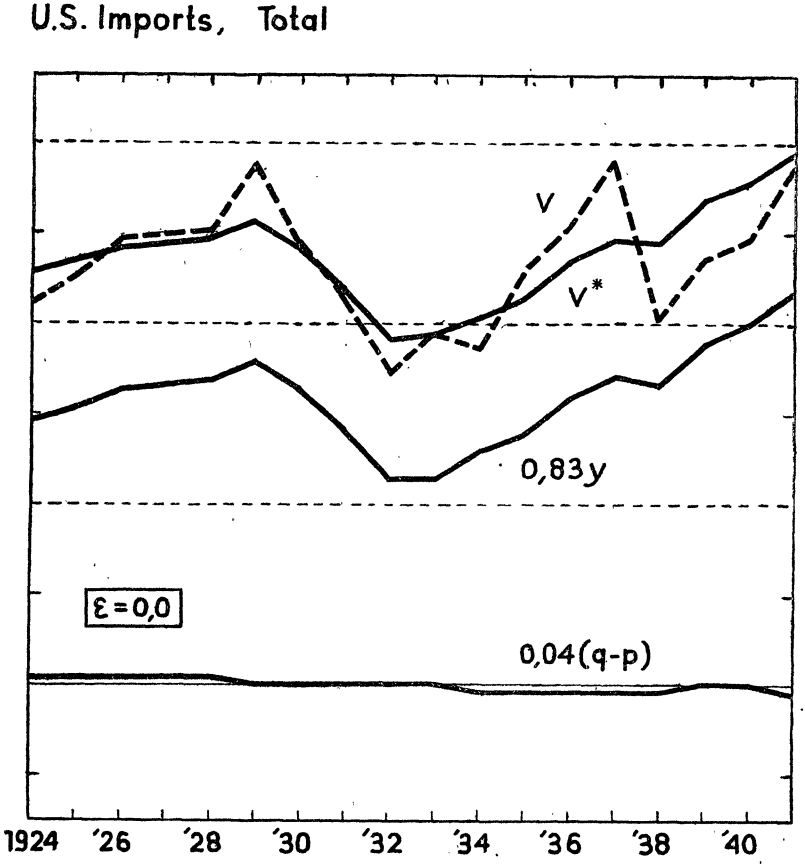

Figure 1

we are interested in the possibility of equilibrium in these items. Including goods and services when speaking of imports and exports, we may simply say that equilibrium in the balance of payments is identical to the equality of the value of imports and exports of the United States. The value of imports will be indicated by V, their volume by v and their price level by q. Exports of the United States are imports into the other territory; their value, volume, and price level (in foreign currency) are written as V', v', and q', respectively. All these symbols are assumed to refer to deviations from some initial equilibrium the figures for which

are indicated by barred values: $\bar{V}, \bar{v}, \bar{q}, \bar{V}', \bar{v}', \bar{q}',$. The disturbance of equilibrium may be due to some consequences of the war to be specified and localized later. Writing k for the exchange rate of the dollar in terms of foreign currency, the equilibrium condition for the balance of payments runs:

$$\bar{V}'+V' = (\bar{V}+V)(\bar{k}+k). \tag{1}$$

As a first approximation, only linear terms in the deviations will be considered. Since $\bar{V}' = \bar{V}\bar{k}$, equation (1) reduces to:

$$V = \bar{V}k+\bar{k}V. \tag{2}$$

By definition,

$$\bar{V}'+V' = (\bar{v}'+v')(\bar{q}'+q') \text{ or}$$
$$V' = \bar{v}'q'+\bar{q}'v', \tag{3}$$

and similarly:

$$V = \bar{v}q+\bar{q}v. \tag{4}$$

Choosing our units such as to make $\bar{q} = \bar{q}' = \bar{k} = 1$, we shall have $\bar{V}' = \bar{V} = \bar{v}' = \bar{v}$ and hence (2) turns into:

$$\bar{v}q'+v' = \bar{v}k+\bar{v}q+v. \tag{5}$$

Since our problem is essentially one of relative price levels, we shall have to introduce, apart from import price levels q and q' for each of the territories (measured in their own currency), home price levels p and p'. In order to simplify as much as possible, it will be assumed that export price levels are identical with home price levels. (It would not be difficult to substitute more complicated hypotheses for this simplest set-up.) It follows that p measures, in dollars, the same thing as q' in foreign currency; consequently,

$$\bar{q}'+q' = (\bar{k}+k)(\bar{p}+p)$$

or

$$q' = k+p. \tag{6}$$

Similarly,

$$p' = k+q. \tag{7}$$

So far, only purely *technical* relations (including definitions) have been introduced. We now turn to the economics of the problem. This

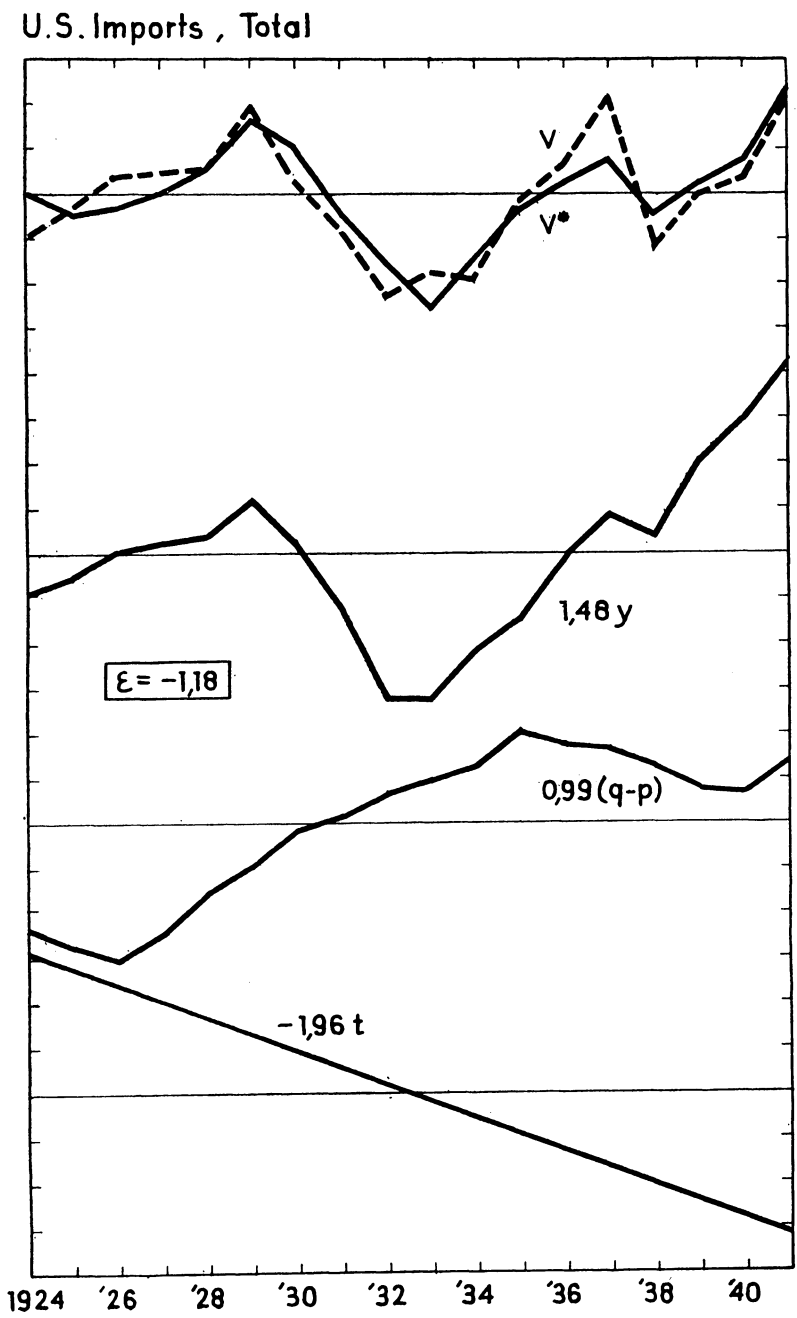
U.S. Imports, Total
V
V*
1,48 y
ε = −1,18
0,99 (q-p)
−1,96 t
1924
'26
'28
'30
'32
'34
'36
'38
'40

Figure 2

comes to considering the *demand* and *supply* functions for each of the flows v and v'.

As to demand, our hypothesis will be that demand for imports depends on:

(i) total volume of production u, which may be written as the sum of production for the home market x and production for exports v';

(ii) import price level $\bar{q} + q$; and

(iii) home price level $\bar{p} + p$.

We shall even specialize somewhat more by assuming, in addition, that the two latter variables act only through their ratio; in linear approximation $q-p$. Denoting the elasticity of imports by ε, and the marginal import quota by π, we have, for the United States:

$$v = \pi(v'+x)-\bar{v}\varepsilon(q-p). \tag{8}$$

For the Rest of the World, similar hypotheses will be made. In addition, however, it will be assumed that there is an extra demand for imports s, which is the chief cause of the disequilibrium with existing exchange rates and prices and which may be due, say, to a loss of competitive power by capital destruction. Hence we have:

$$v' = \pi'(v+x')-\bar{v}\varepsilon'(q'-p')+s. \tag{9}$$

A complete solution of our problem will only be possible, therefore, if we are informed on the determinants of x and x' also. There are two possible approaches here, which may be called for shortness the "Walrasian" and the "Keynesian." The Walrasian solution should be taken under conditions of stable and high employment; the Keynesian under conditions of depression. According to the first, the volume of total production is determined by productive capacity c; assuming $\bar{u}$ to be equal to c, we have $u = 0$, and the first term in (8) and (9), right-hand side, vanishes altogether. According to the Keynesian solution, there will be a relation between total real expenditures x and total real income y:

$$x = \xi y. \tag{10}$$

Since it may be shown by a somewhat extensive calculation that

$$y = x, \tag{11}$$

the consequence is that $x = y = 0$ and hence, in this case (8) and (9) reduce to:

$$v = \pi v'-\bar{v}\varepsilon(q-p), \tag{8'}$$

$$v' = \pi' v-v\varepsilon'(q'-p')+s. \tag{9'}$$

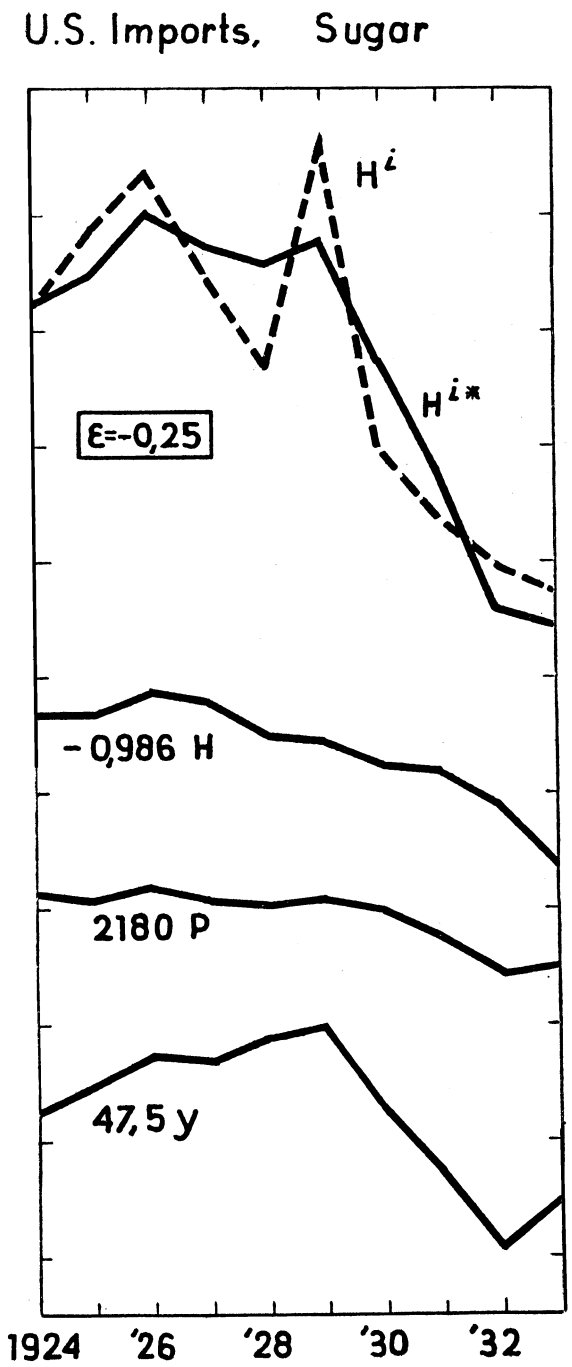

Figure 3

The *supply* equations will be given the form of price-fixation equations. Indicating by l the price of home productive effort (*e.g.*, labor) and by π_1 the marginal quota of such effort in a unit of home-produced goods, we have:

$$p = \pi q + \pi_1 l, \tag{12}$$

and correspondingly:

$$p' = \pi' q' + \pi_1' l'. \tag{13}$$

The price l may be linked up with p by:

$$l = \lambda p + l_0, \tag{14}$$

and similarly,

$$l' = \lambda' p' + l_0'. \tag{15}$$

Here the terms l_0 and l_0', represent some autonomous change in the price of productive effort (*e.g.*, wage rates) that may be used as a deliberate instrument of economic policy. We may call them the "indices of autonomous price policy."

The system of equations now established will be sufficient to solve our problem.

It seems instructive to do this in the following way. We may first express *all the items of the balance-of-payments equation* (except the disturbance term) *as functions of* $q-p$ and, as a next step, express $q-p$ as a function of k and the indices of autonomous price policy l' and l_0'. In both the "Walrasian" and the "Keynesian" approach it appears possible to transform the balance-of-payments equation (5) into an equation of the following type:

$$\gamma(q-p) = s/\bar{v}. \tag{16}$$

For the "Walrasian" approach:

$$\gamma_w = 1-\varepsilon-\varepsilon'; \tag{17$_w$}$$

whereas for the "Keynesian" approach:

$$\gamma_k = \frac{(1-\pi\pi')-(1-\pi')\varepsilon'-(1-\pi)\varepsilon}{1-\pi}. \tag{17$_k$}$$

From equations (6), (7), and (12)—(15) we deduce:

$$q-p = \alpha k + \beta \tag{18}$$

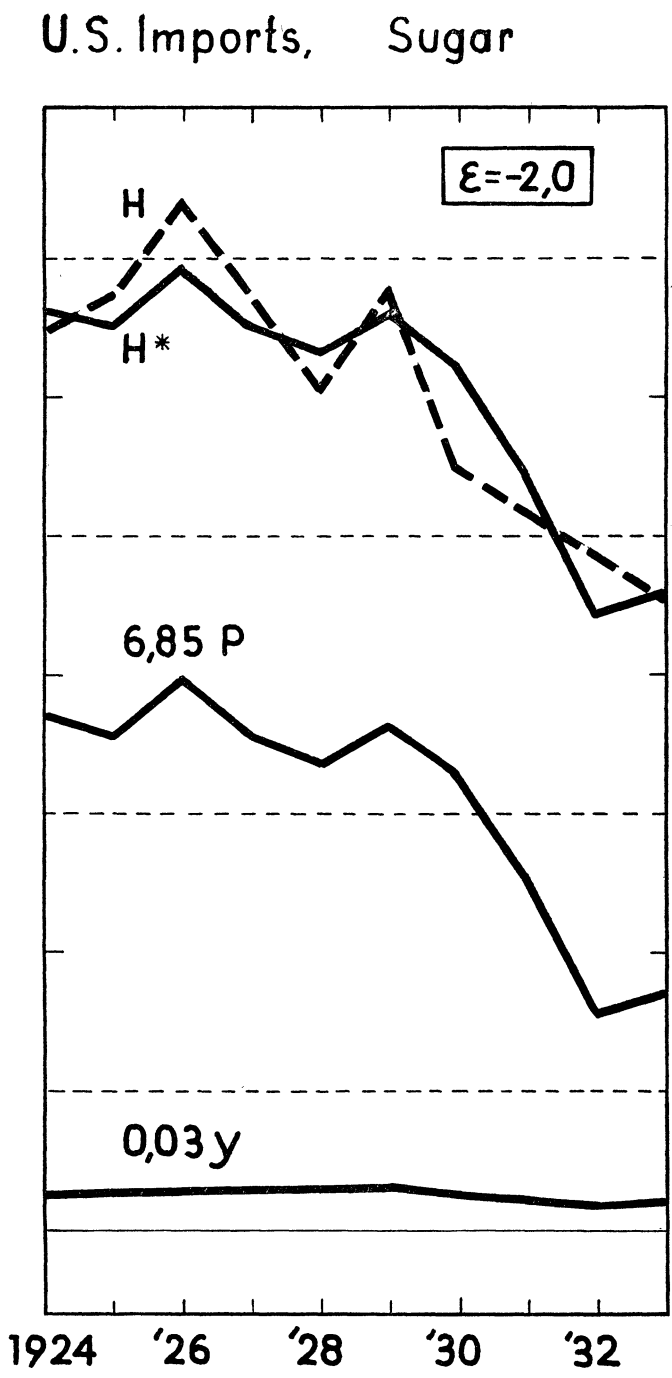

Figure 4

in which $\alpha = \frac{\pi\pi' + \mu\mu' - \pi'\mu - \pi\mu'}{\pi\pi' - \mu\mu'}$, $\mu = 1-\pi_1\lambda$, $\mu' = 1-\pi_1'\lambda'$;

$$\beta = \frac{(\mu'-\pi')\pi_1 l_0 - (\mu-\pi)\pi_1' l_0'}{\pi\pi' - \mu\mu'}. \tag{20}$$

These rather complicated expressions reduce to simpler ones if the two territories are assumed to be identical in structure; an assumption that may have didactic value, when we are studying these problems.

We are now able to draw some interesting *conclusions* about the possibilities of restoring equilibrium in the balance of payments. From (16) we see that this may be done by an adaptation of the "terms of trade," $q-p$; the equilibrium being obtained for:

$$q-p = \frac{s}{\gamma\bar{v}}. \tag{21}$$

Some very rough estimates of the figures involved will be considered in section 3.

Such a policy will, however, not succeed if γ *happens to be equal to zero*; and it will be difficult to perform if γ is a small figure. According to (17_w) and (17_k) it depends on the elasticities ε and ε' whether or not this special case will present itself. The "Walrasian" case has been discussed repeatedly in the literature.[1] The critical values for ε and ε' are rather low. The "Keynesian" case has so far not been put forward.[2] Here the critical values are somewhat higher. Taking, *e.g.*, $\pi = \pi' = 0.1$, we have:

$$\varepsilon + \varepsilon' = 1.1. \tag{22}$$

How, now, can we obtain the desired adaptation in the terms of trade? This question is answered by equation (18).

There are two ways:

(i) a change in the nominal rate of exchange k; or

(ii) a change in autonomous price policy in either of the territories.

Equations (19) and (20) tell us to what extent k or l_0 and l_0' must be changed in order to obtain the desired change in the terms of trade. *Here again there is a condition to be fulfilled in order to let the mechanism work*: if $\alpha = 0$, no change in k, however large, will help; if $\beta = 0$,

[1] *Cf.* Alfred Marshall, *Money, Credit and Commerce*, Appendix J, 1923.

[2] I suggested a somewhat different approach in the *Revue de l'Institut International de Statistique*, Vol. 9 (1941), p. 36, where, however, the economy of the second territory was not considered completely.

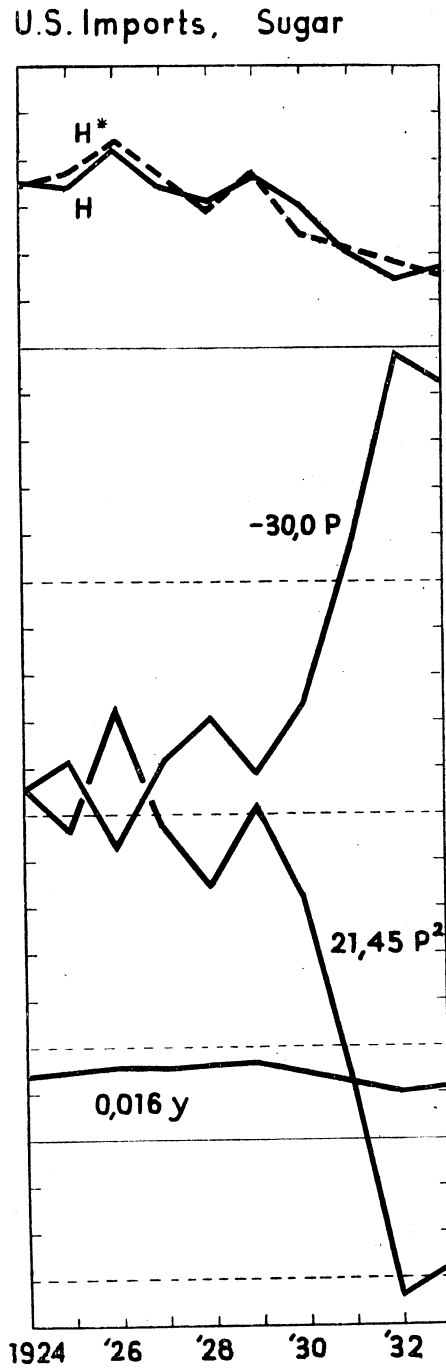

Figure 5

autonomous price policy will be impossible. A closer examination of α teaches us that $\alpha = 0$ either for:

(23) (*a*) $\pi = \mu$ but $\pi' \neq \mu'$,

(24) (*b*) $\pi' = \mu'$ but $\pi \neq \mu$.

The case where both $\pi = \mu$ and $\pi' = \mu'$ presents complications which we will not now discuss. Case (a) comes to the assumption that

(25) $$\pi + \pi_1\lambda = 1.$$

This may materialize in various ways. First, it may be that, in addition, $\lambda = 1$; an example is to be found in labor contracts prescribing proportionality between wage rates and cost of living. In this situation there will be proportionality between all prices: p, q, and l. This is commonly supposed to hold true for long-term reactions. For static systems this is the generally accepted feature, narrowly related to the statement that, in principle, only price ratios are relevant and not the absolute level of prices. In a sense, case (a) is therefore also typically "Walrasian." Under these conditions, changes in nominal exchange rates will not be helpful to restore equilibriun, since in the long run all prices will show proportional changes and the terms of trade will not change.

It may, however, even be that (25) is true, without $\lambda = 1$. Marginal quota for imports and internal factor cost may add up to more than one whereas the response of l to changes in p may be less than proportional, to quote the most probable example. In this situation too, manipulation of exchange rates would not lead to changes in the terms of trade.

From (20) it will be seen that for $\mu = \pi$, but $\mu' \neq \pi'$, autonomous price policy will be possible for the United States; if $\mu' = \pi$, but $\mu \neq \pi$, it will be possible for the Rest of the World.

Summarizing, we may state that there are *two possible reasons why a manipulation of nominal exchange rates may be unsuccessful* in restoring a disequilibrium in the balance of payments, *viz.*,

(i) if $\mu = \pi$ no change in terms of trade will result and even if this should be the case where $\mu \neq \pi$,

(ii) no change in the gap in the balance of payments may occur if the elasticities ε and ε' add up to about 1 or 1.1.

If situation (i) present itself, other types of price policy, exemplified by what we called *autonomous price policy*, must be tried. If case (ii) is present, even these policies will not help; the only way of restoring

equilibrium in the balance of payments will then be the *manipulation of capital items*, *i.e.*, cancelling of debts or granting of new credits, in whatever form.

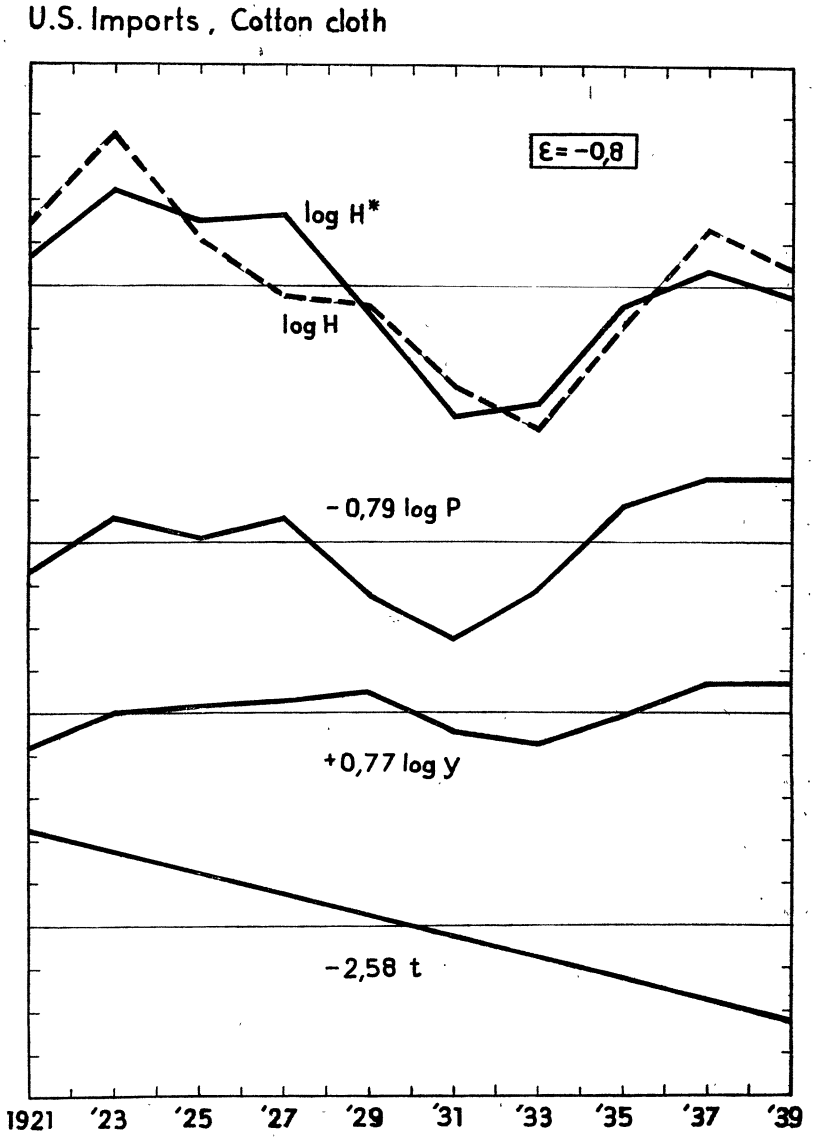

Figure 6

It goes without saying that our very simple model may be made more complicated in various ways. These complications will be imperative

as soon as a good approximation to reality is required for purposes of practical policy. It is to be expected, however, that these more complicated models show even more singular situations than this simple one and this makes the study of the simple model so useful. More complicated assumptions will be necessary anyhow if dynamic models are required. The introduction of certain lags may be the first step. For the above-stated singular values of π and ε, the corresponding dynamic systems will show explosive movements.

In the static models, the introduction of more complicated demand functions may be necessary, *e.g.*, with different coefficients for the competing price levels. Although this would be a departure from pure statics it might be useful as a first approximation to "middle-long-run" problems.

3. Statistical Determination of Elasticities for the United States

From the foregoing theoretical analysis it will be clear that it is particularly interesting to gain an insight into the probable values of ε and ε' *i.e.*, the elasticities of American imports and Rest of the World imports as defined in section 2. *A priori* views as recently expressed are contradictory. In a general way most economists would assume that the elasticities are not as low as in the "special case," in which the dollar problem cannot be solved by changes in the terms of trade. For the particular case of the United States (*i.e.*, ε) some would, however, admit the possibility.[3] Many business men and politicians are of the opinion ε is very low indeed. They point to the high degree of "autarky" of the United States as to raw materials and to the virtual impossibility for European producers to compete in the field of manufacturing. In addition, one could point to the large demand for home-produced services in the United States which is an immediate consequence of the high standard of life. There is probably some exaggeration in this pessimism. As to the competitive power of the United States it is interesting to quote the investigation made by the International Labor Office, at the request of Henry Ford, in 1930. To my knowledge it is the most exact attempt to compare price levels of strictly comparable goods in the United States and elsewhere. The differences were not large; in many cases, non-American prices were lower.

A first attempt to measure the elasticity of American imports was made by Hinshaw,[4] who found a figure of 0.48. As variables he

[3] *Cf.* O. H. Korican, "Aims of our Foreign Investment Policy," *Harvard Business Review*, Vol. 24.

[4] R. Hinshaw, "American Prosperity and the British Balance of Payments Problem," *The Review of Economic Statistics*, Vol. 27 (1945), p. 1.

used, however, only American national income and the price level of American imports; not, therefore, any competitive price index. I have tried out several methods to give an explanation, by correlation analysis, of the fluctuations in American imports, using as explanatory

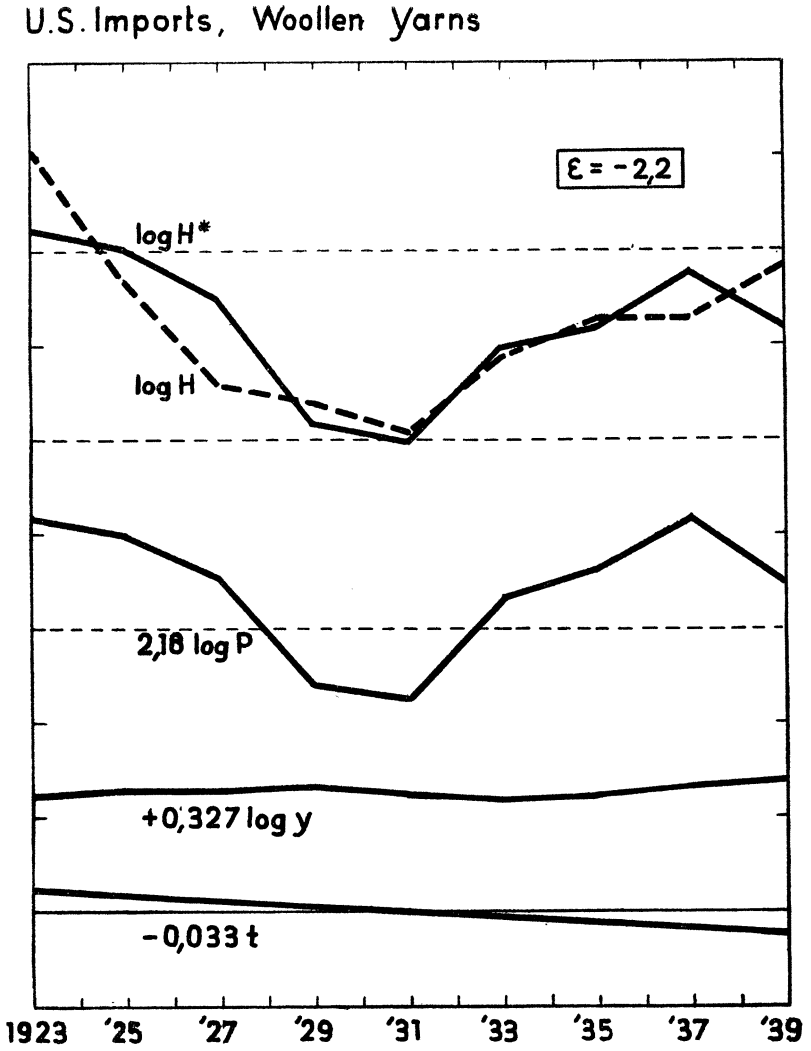

Figure 7

variables national income at 1929 prices, an index of import prices (taken from Hinshaw; duties included), and a wholesale price-index, reweighted according to the composition of imports (using broad subdivisions only).

From 1924 to 1941 the import quota shows only irregular fluctuations, whereas the ratio between import and home prices fell considerably. There is no correlation between these two ratios; which would point to a low elasticity, but does not permit of any numerical estimate. Fairly good correlations are obtained if a regression equation with free coefficients is tried:

$$v = \alpha u + \beta q + \gamma p,$$

but a bunch map shows large margins of uncertainty although always the signs are correct. The most probable results point to elasticities at least as low as those found by Hinshaw.

In order to get more accurate estimates separate commodities were considered. The general idea was to use a different procedure for goods immediately competing with American products (sugar, cheese, herring, woollen and cotton manufactures) and for goods not immediately doing so (rubber, tin, bulbs). For the first group it will be possible to take account, in the explanations, of competing prices in the strict sense. For the second group this is impossible; here only the general home price level may be assumed to present "competing prices" but in a wider sense. Similarly, for the first group the volume of production may either be total production of all goods (or real national income) as a general index of activity or the volume of home production of the special good considered, whereas for the second group only the general index can be used.

Some results obtained for commodities of the first group are given in Table 1. The corresponding graphs are represented in Figures 1–10.[5] There are a number of fairly high elasticities of substitution among them.

For the second group a few results are available from other authors, which have been assembled in Table 2.

[5] In all the graphs the dotted line represents the actual value of the variable to be explained, whereas the full line indicated with an asterisk indicates the explanation obtained by the inclusion of the explanatory variables whose symbols are indicated in the graph. The contribution of each separate explanatory variable is indicated by the full curves shown in addition.

The meaning of the symbols as far as these are identical with the variables used in the text may be taken from the text. The other symbols have the following meaning:

H = ratio between quantities imported or exported and corresponding production in importing country;

P = ratio between import price and home price;

ε = elasticity of substitution corresponding with formulae in text;

t = time;

t' = estimated influence of quota systems in non-American countries.

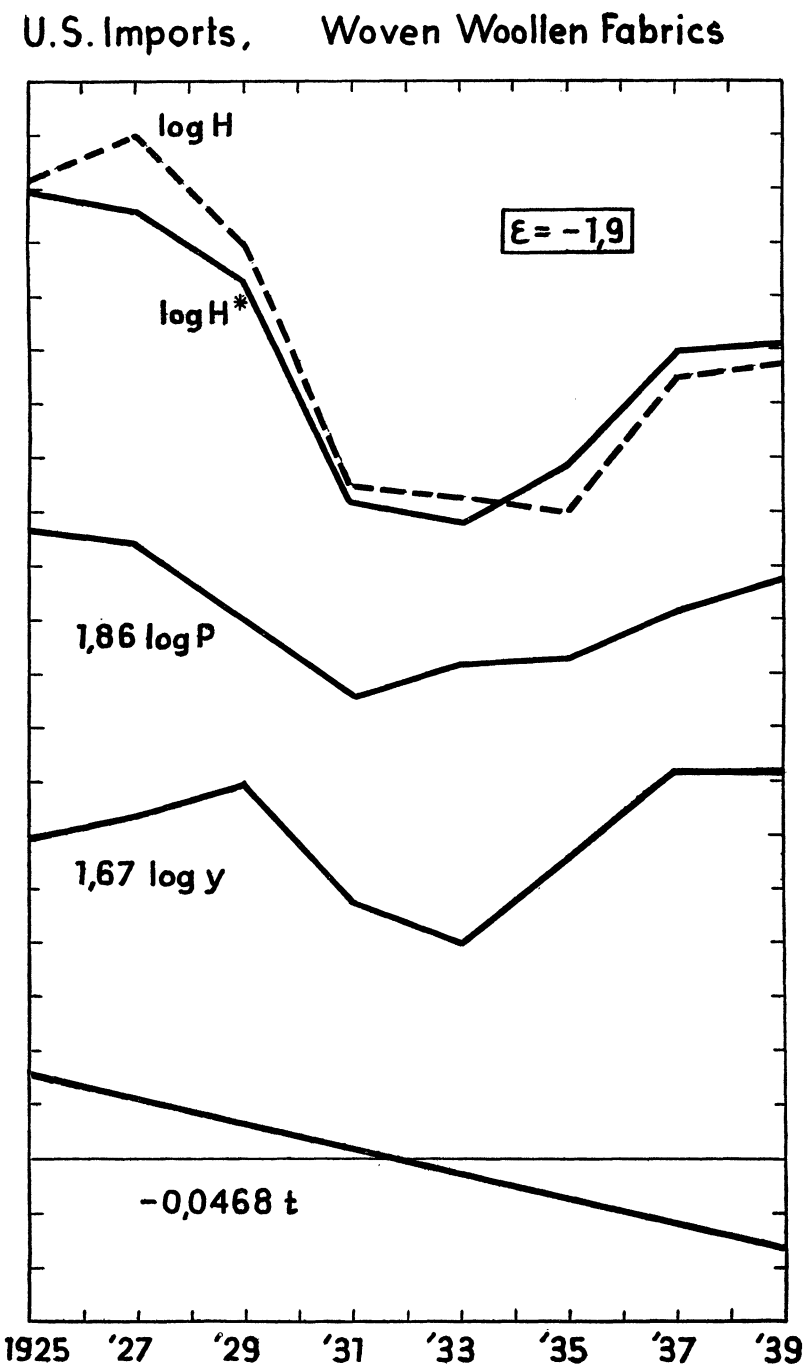
U.S. Imports, Woven Woollen Fabrics
log H
ε = -1,9
log H*
1,86 log P
1,67 log y
-0,0468 t
1925
'27
'29
'31
'33
'35
'37
'39

Figure 8

TABLE 1

Substitution Elasticities of Demand, American Imports

Commodity	Period	Explanatory variables: Index of production	Explanatory variables: Competing price	Elasticity
Cheese	1921–1933	1. real national income; home prod. cheese[2]	home price cheese[3]	0.0
		2. home prod. cheese[2]	do.[3]	1.0
Herring from Holland*	1929–1939	1. national income	price of all imp. herring	1.1
		2. all imp. herring[2]	do.[3]	0.8
Sugar	1924–1933[4]	real national income; home production[2]	home price sugar[3]	2.0
Cocoa*	1929–1939	national income[2]	price cocoa beans	2.3
Cotton cloth	1923–1939[5]	real national income; home production[2]	home price of cotton woven goods over 12 inches[3,6]	0.8
Woollen yarns	1923–1939[5]	real national income; home production[2]	home price of woollen yarns[3,6]	2.2
Woollen woven fabrics	1923–1939[5]	real national income; home production[2]	home price of woollen woven fabrics[3,6]	1.9

[1] Apart from price of commodity considered.
[2] With *a priori* elasticity = 1.
[3] With *a priori* elasticity equal to that of price of commodity considered (but with opposite sign).
[4] Since 1934 market regulation.
[5] Odd years only, being the only years for which census data are available.
[6] In addition, a linear trend was introduced.
* Taken from unpublished calculations by G. P. Kamermans.

TABLE 2

Elasticity of Demand, American Imports

Commodity	Period	Explanatory variables[1]	Author and publication	Elasticity
Bulbs[2]	1923–1936	National income	J.B.D. Derksen and A.L.G. M. Rombouts, "The Influence of Prices on Exports, *De Ned. Conj., Special Memoir. Nr.* 1, pp. 33–34	0.6
Rubber	1921–1934	Automobile production; Total number of motor cars	J.B.D. Derksen, "De Vraag naar Rubber," *De Nederl. Conjunctuur*, August, 1936, p. 19	0
Tin	1923–1936	Automobile production; Tin-plate production	M.J. Schut, *Tinrestrictie en Tinprijs*, Haarlem, 1940, pp. 26–27	0.3

[1] Apart from price of commodity considered.
[2] Average for hyacinths and other bulbs.

The elasticities found here are lower. They are not, however, substitution elasticities. Nevertheless it may be that they are the relevant

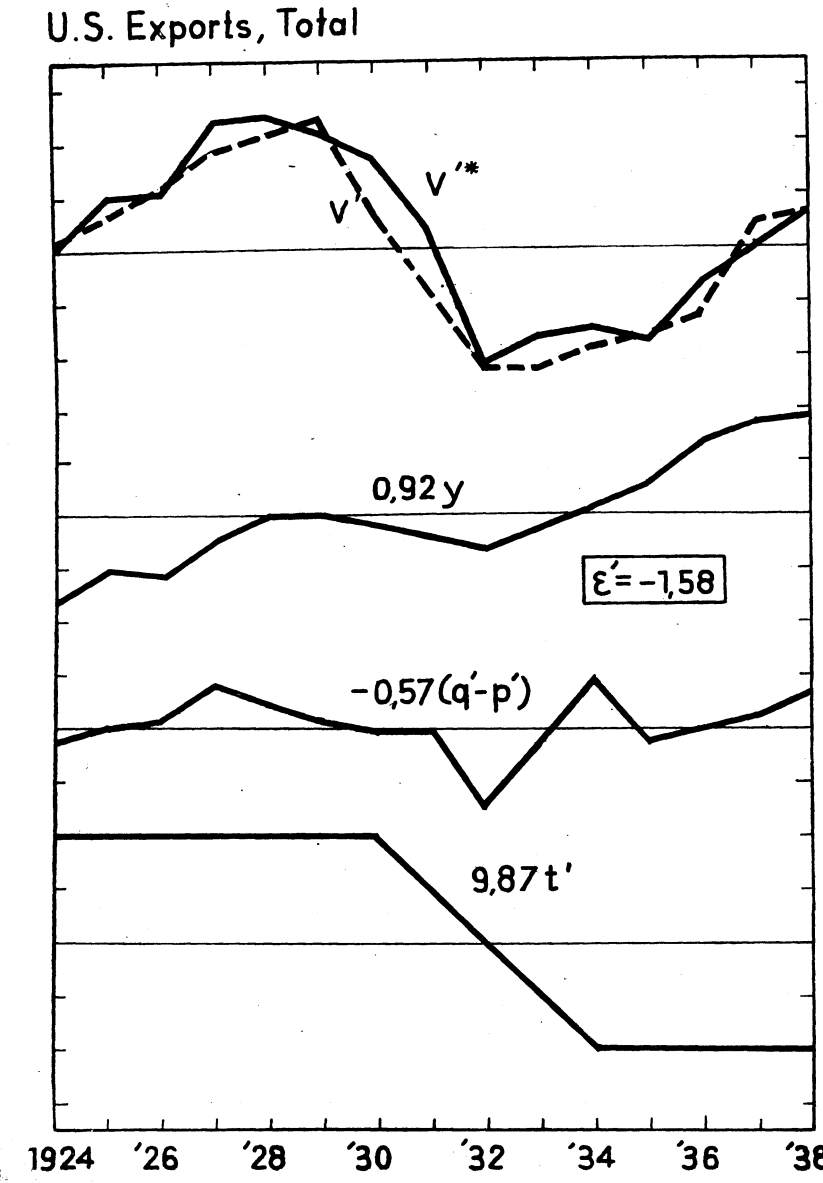

Figure 9

elasticities for our problem. This depends on whether the demand for these goods depends only on their own prices or whether the general

internal price level in the United States exerts an influence too. In the last case the elasticity with respect to their own price found in the quoted analyses may be the combined effect of the two influences and the net effect of their own price may be larger than suggested by the elasticities indicated. There seems to be some reason, however, to assume that in the cases now considered the difference is not so large.

In order to get an impression of the average elasticity corresponding with the figures shown in Tables 1 and 2, the individual elasticities have been weighted and averaged. As weights, the value of imports in 1929 have been used; the amplitude of price fluctuations has been assumed to be equal for all in the case in which we are particularly interested, *viz.*, a general change in the terms of trade. The average elasticity thus found amounts to 0.9.

The elasticity E' of "Rest of the World Imports" or of American exports was estimated in the following way: An attempt was made to explain the fluctuations in the volume of American exports v' by a combination of the variables:

y' = real income of the "Rest of the World,"

z = ratio of export price index of the United States (in gold) to export price level of "Rest of the World,"

t = a very rough index of "trade barriers," assumed to be zero from 1924-1930, increasing regularly from 1930 to 1934 and remaining constant after 1934.

Both y' and z were estimated in two different ways, which turned out to yield very similar results. The influence of t appeared to be large; in view of the rough character of this series this means that our results are very uncertain. The values found for ε' are —1.8 and —1.3 respectively. These values may be tested also by estimates for some individual commodities, *viz.*, wheat, cotton, and motor cars.

For wheat, some estimates bearing on the substitution of various kinds of wheat for each other were published recently.[6] Only one figure is given for exports of American wheat; here a substitution elasticity of —5.3 to —11.3 with respect to Canadian wheat is found. From the other figures it is clear, however, that the elasticity is highest for countries showing the same season; hence it is probable that the elasticity of substitution between American wheat and all other wheat is lower than the one between American and Canadian wheat. A fair average may be the median of all the figures presented, which is —5.6; still a very high one.

[6] J. Tinbergen, "Some Measurements of Elasticities of Substitutions," *The Review of Economic Statistics*, Vol. 28, (1946), p. 109, particularly p. 112.

For cotton, figures are to be found in the same publication; a figure of —2.9 is the most representative.

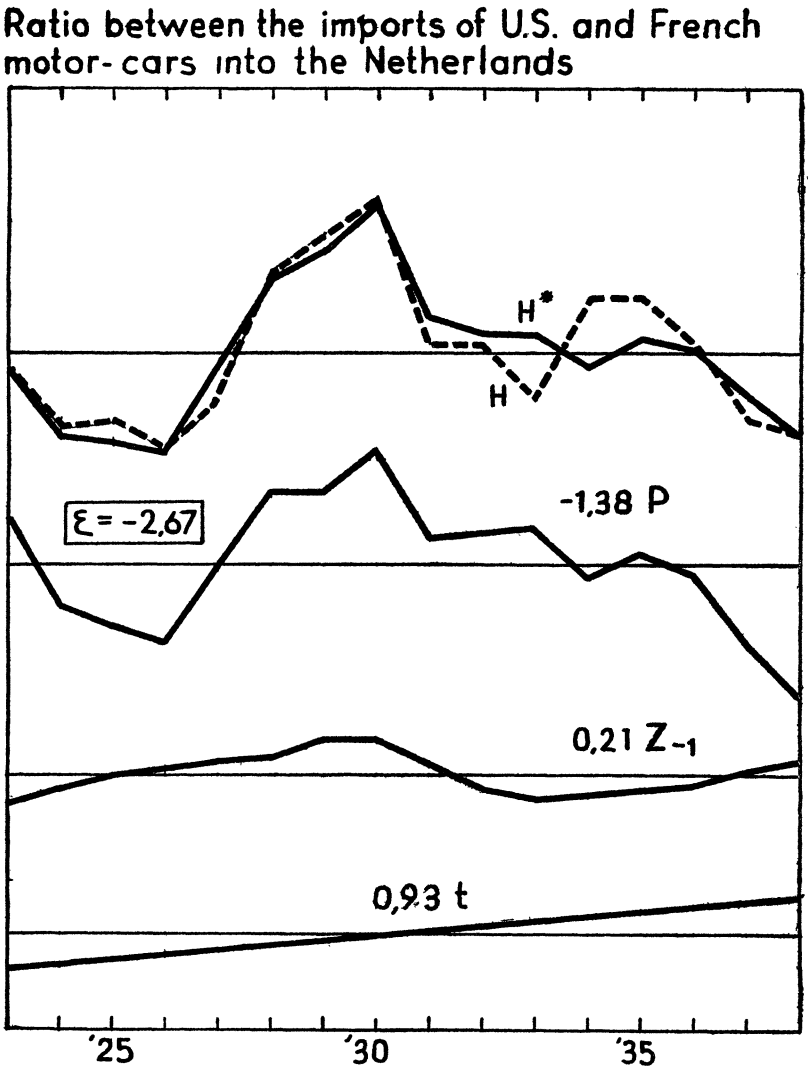

Figure 10

Finally, some figures are available for the substitution elasticity between American and other motor cars; they are between —2 and —2.5.

Clearly it will be necessary to refine and amplify the analyses just reviewed. As a provisional impression we may state that ε' cannot be far from -2.

It follows that $\gamma = 1-\varepsilon-\varepsilon'$ will be in the neighborhood of -2.

4. Interpretation and Estimation of the Shifts

For $s = 0$, all variables (measured as deviations from the "equilibrium values") are equal to zero, *i.e.*, the system shows the equilibrium that would have occurred if the "shift" s in the demand for American products had not existed. Apart from this situation I, two other situations are considered. It is assumed that the present state of affairs, if reconstruction demand is disregarded, is characterized by (i) the existence of the shift s whereas (ii) the price levels p, q, l, p', q' l', and k are not yet "adapted," *i.e.*, have their previous values, *i.e.*, zero. This implies that in equations (14) and (15) l_0 and l_0' are equal to zero too. The corresponding set of values may be called "situation II". Finally, a third situation III is considered, and, one might say, aimed at, *viz.*, the situation in which the values of all prices are such as to offset the consequences of s on the balance of payments. As already indicated, this may be obtained either by introducing values of l_0 and l_0' different from zero, or by changing the value of k (previously assumed to be zero) or by both methods.

The question of finding the desired values for the prices may be answered in two stages, the first being to indicate $q-p$ (and $q'-p'$) and the second being to indicate by what values of l_0, l_0', or k these values may be obtained. In the present paper this second stage was already discussed from the theoretical viewpoint in section 2, but will not be considered from the statistical side. Only the first stage will be considered.

In order to do so, it is necessary to estimate the value of s, or rather of $s/\bar{v}$, *i.e.*, the ratio between the shift in demand for American products and the equilibrium value of imports and exports. This again requires the interpretation of s. At closer examination this interpretation is a different one for the Walrasian and the Keynesian model. In the first case, where total volumes of production $x+v'$ and $x'+v$ cannot be changed, we have, in situation II, since also $p = q = p' = q' = 0$, $v = 0$ and $v' = s$. This means that s equals the *export surplus*.

In the Keynesian model things are not as simple as this. It appears that s is a multiple of the export surplus, or, to say it the other way round, that the export surplus is a fraction of s only. The Keynesian model comes down to the following representation of what happens: the original shift s leads to an export surplus of the United States, which in its turn increases the volume of production inside and decreases

production outside the States. In response, imports into U.S. are increased and imports into the Rest of the World decreased, which again affects production in both areas.

The final result is an export surplus generally smaller than s together with an upward shift in American production and a downward shift in non-American production, both considerably larger than the export surplus. Under conditions of full employment this cannot work; as soon as this state of affairs is approached, the Walrasian model will have to be substituted for the Keynesian.

The magnitudes of the shifts in production, exports and imports depends, in the Keynesian model, on the values of ξ and ξ' which are not exactly known. They may be quite near the values $+1$. The more these values are approached, the larger the shifts in production become and the less probable it becomes that the Keynesian model can portray the situation. Our calculations will therefore be based on the Walrasian model. This choice may also be justified in quite another way, *viz.*, by introducing the assumption that the governments and international agencies concerned will be able to maintain full employment.

On the hypothesis that s represents the export surplus after correction for the present temporary extra demand for reconstruction purposes it is still difficult to indicate its magnitude. We assume it is half that of $\bar{v}$, or that $s/\bar{v} = 0.5$. Closer examination would, of course, be very useful.

For any given value of $s/\bar{v}$ formula (21) teaches us what value of $q-p$ will be necessary in order to re-establish the equilibrium in the balance of payments. The result is, with our esitimate:

$$q-p = -0.25,$$

meaning that a lowering of the terms of trade of some 20 to 30 percent would be necessary.

The corresponding reduction in real incomes in the non-American countries will depend on the other coefficients, but as a first approximation will be $\pi\,(q-p)/(1-\pi)$, *i.e.*, about 1/9 of 0.25 or 0.03.

If the Keynesian model should be applicable, however, larger figures would be found.

It is too early yet to discuss the practical implications involved. The first thing to be done is to improve measurements of the coefficients and ε' and the ξ's. The provisional impression is, however, that a solution of the problem of dollar scarcity along the lines of price adaptation is not hopeless beforehand.

Résumé*

1. *Problème fondamental de la pénurie de dollars*: la demande de dollars dépasse l'offre:

(i) au cours de la période de reconstruction européenne;

(ii) au cours des années ultérieures. Ne constitue peut-être pas un problème si l'exportation permanente de capital est acceptée par le public; situation modifiée en Europe occidentale; rapport avec l'Extrême Orient.

2. *Analyse théorique de l'équilibre de la balance des paiements.* La demande et l'offre dépendent des transactions courantes et des transports de capitaux.

Transactions courantes: principalement importations et exportations. Dépendent du revenu réel, des niveaux "réels" de prix et des entraves (artificielles) au commerce (droits de douane et contingentements).

Selon la théorie traditionnelle, l'équilibre des transactions courantes peut-être restauré par une adaptation appropriée des termes d'échange, c'est-à-dire, des niveaux de prix et (ou) des cours de change.

Un examen plus poussé révèle, cependant, que cette méthode ne réussit pas toujours. L'équilibre peut-être presque indifférent (indéterminé). Il est utile de distinguer entre les changements des cours de change nominaux et réels, et entre quatre cas pouvant être combinés comme suit: a) plein emploi ou capacité inutilisée (en un certain sens: cas Walrasien et Keynesien);

b) élasticités "normales" des importations et exportations ou élasticités "spéciales."

3. *Détermination statistique des élasticités pour les Etats-Unis.* Les opinions a-priori sont contradictoires. La plupart des économistes pensent que les élasticités ne sont si basses comme l'on suppose dans le cas spécial; beaucoup de politiciens et d'hommes d'affaires pensent qu'elles le sont. L'élasticité faible des importations aux Etats-Unis pourrait être expliquée par les vastes ressources naturelles des Etats-Unis, la production en séries et le niveau de vie élevé (impliquant demande considérable de services d'origine intérieure).

Données sur les prix relatifs aux Etats-Unis et à l'étranger.

* A full French translation of this paper appeared in *Revue d'Economie Politique*, 1948, pp. 36 ff., under the title, "Observations sur le problème de la raréte du dollar."

Tentatives d'estimation de l'élasticité de la demande. L'essai de Hinshaw. Niveaux de prix à utiliser.

Multicollinearité. Essais sur marchandises isolées: sucre, automobiles, articles de laine, fromage.

Mr. Tinbergen's paper was discussed by Messrs. Jacques Rueff, J J. Polak, Kantilal L. Dalal, and the speaker.

[Footnotes]

[2] **Unstable and Indifferent Equilibria in Economic Systems**

J. Tinbergen

Revue de l'Institut International de Statistique / Review of the International Statistical Institute, Vol. 9, No. 1/2. (1941), pp. 36-50.

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[4] **American Prosperity and the British Balance-of-Payments Problem**

Randall Hinshaw

The Review of Economic Statistics, Vol. 27, No. 1. (Feb., 1945), pp. 1-9.

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http://links.jstor.org/sici?sici=0034-6535%28194502%2927%3A1%3C1%3AAPATBB%3E2.0.CO%3B2-G

[6] **Some Measurements of Elasticities of Substitution**

J. Tinbergen

The Review of Economic Statistics, Vol. 28, No. 3. (Aug., 1946), pp. 109-116.

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