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Unstable Equilibria in the Balance of Payments

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May I first of all express my sincere thanks for your invitation, by which I am very much honored. At the same time I want to thank the National Bureau, in the name of many econometricians, for the extremely important work it has performed.

I propose to focus attention on one special problem, the *stability of the equilibrium in the balance of payments.* It is meant to be an example of one type of research for which I want to ask your attention. After I have gone into some details of this special problem, I shall add some general remarks on this meeting's theme, Economic Research and the Development of Economic Science and Public Policy.

Much trouble arose from the disequilibria in the balances of payments of several countries after World War I. These difficulties are too well known to be described again. The Bretton-Woods regulations are an attempt to create the machinery to prevent similar difficulties in the future.

One possibility envisaged in the regulations is that if a country's balance of payments is in fundamental disequilibrium, that country will be permitted to change its exchange rate. Evidently the underlying theory is that by such a change equilibrium in the balance of payments will be restored. I propose to go into this problem somewhat more thoroughly.

Let us assume that there is an initial gap in the balance of payments, e.g., that a spontaneous and lasting decrease in exports occurs. This condition may be called a fundamental disequilibrium. It will generally be assumed that the country's exchange rate, by which I mean the price of its currency expressed in for-

eign currency, must be lowered. What will the consequences be?

The traditional view is that exports will be stimulated and that a brake will be put upon imports. According to this view, both tendencies operate to restore the broken equilibrium, which implies that the equilibrium in the balance of payments is a stable one. Most authors even assume that a rather small decrease in the exchange rate is sufficient to restore equilibrium; i.e., the exchange rate is considered a 'good regulator' of the equilibrium.

This traditional view, however, is true only subject to certain conditions:

a) The proposition is, strictly speaking, meant for quantities exported and imported, but not necessarily for the values of imports, since quantities and prices of imports are assumed to move in the opposite direction. Whether the import value will also be reduced depends upon the elasticity of the demand for import products. If the elasticity of the demand for import products happened to be below one, a decrease in volume would be accompanied by an increase in value.

b) The second condition that must be fulfilled if the traditional view is to be correct is that no other influences act on imports; that is, the traditional proposition is true only under a *ceteris paribus* clause. Unfortunately for the practical problem with which we are now concerned, this clause cannot be accepted. The increase in exports that is the immediate consequence of the considered change in exchange rates leads to an increase in national income, which in turn will have the effect of increasing imports. This is a second reason why the value of imports, instead of falling, may rise.

Thus upon closer examination, it appears quite possible that the increase in imports may equal the increase in exports, or even exceed it. In the latter case a reduction in the exchange rate would not lead to a restoration of equilibrium in the balance of payments, but take us even further away from equilibrium.

Even if the exchange rate does not behave so perversely, it may prove to be a bad regulator. The various possibilities as to the relative situation of the demand and supply curves for the country's currency may be such that both curves are negatively inclined. This would mean that, although the classical type of equilibrium is still attainable, very large changes in the exchange rate would be necessary in order to counteract a given shift in one of the curves.

The increase in exports will evidently depend upon the elasticity of the demand for export products exerted by foreign countries. The increase in imports will also, as we saw above, depend upon the elasticity of demand for import products, this demand being exerted by the country itself. Further, the increase in imports will depend upon the increase in national income. The latter may be determined by applying to the increase in exports an 'export multiplier'; from this increase in national income the increase in imports is determined by applying a 'marginal propensity to import'. A multiplier usually represents an indirect concept, depending, upon closer examination, on (a) what the components of total income are, and (b) how they are related to total income. In the case under consideration the components are exports and domestic sales, minus imports and depreciation. It would lead us somewhat too far afield to go into details. In an article, Unstable and Indifferent Equilibria in Economic Systems, published in the *Revue d l'Institut International de Statistique* (1941), I showed that the demand and supply curves will be parallel, if

$$\phi \equiv 1 - \varepsilon^1 - (1 - \pi)\,\varepsilon^e + \frac{1 - \pi}{1 - \pi'}\,\frac{\varepsilon' - v'}{1 - v'}\,\pi'^2 = O$$

and will have the normal relative situation, if

$$\phi < O.$$

In these formulas the various symbols have the following meanings:

ε^1, the elasticity of substitution for imports;

ε^e, the elasticity of substitution for exports;
π, the import quota;

$$\pi' = \frac{\pi}{1 - \pi_i}$$

where π_i is the marginal labor quota in national product;
v', the marginal propensity to spend;
ε', the elasticity of total spendings with respect to the price level.

Attention may be drawn to two special cases. First, there may be no money illusion; i.e., all subjects concerned base their decisions as to (real) spendings on the size of their real income alone. In this case $v' = \varepsilon'$ and $\phi = 1 - \varepsilon' - (1 - \pi)\,\varepsilon^e$. The second special case presents itself if money spendings are based only on total money income; i.e., the elasticity of real spendings with respect to prices equals one ($\varepsilon' = 1$). This case is, however, less acceptable from a theoretical point of view.

From the foregoing it is clear that the sizes of the substitution elasticities of imports and exports primarily determine whether the equilibrium in the balance of payments is unstable or not, and whether the rate of exchange is a good or bad regulator. Therefore, to get an idea of the conditions prevailing in individual cases, we must know something more about those elasticities. In the last few years several attempts have been made in this direction. Let us first consider what is known about the elasticity of imports. When studying by econometric methods the size of this elasticity, one meets two important technical problems: (a) How far shall we go in using macro-economic concepts? (b) Shall we assume that absolute quantities imported are determined by absolute import prices (and perhaps other factors), or shall we assume that relative quantities depend upon relative import prices?

Let me explain briefly what I have in mind:

a) A purely macro-economic setup is obtained if we try to explain an index of total import quantities, absolute or relative, by an index of import prices, absolute or relative.

Another method is also possible. One could try to explain the fluctuations in imports of each of several commodities by the fluctuations in their price levels, determine the elasticity of each individual commodity, then compute a weighted average of these elasticities. In a sense the latter method would test the results obtained by the first.

b) The simplest approach is of course to try to explain the fluctuations in absolute quantities imported by those in the absolute import prices. Since, however, almost any product imported competes with domestic products, it seems more appropriate to explain the proportion of imports to home production by the relative price level of imported goods to that of domestic products. This amounts to introducing a simple version of the concept of the elasticity of substitution.

After these preliminary technical remarks, let us survey briefly the results obtained by some recent investigations:

One most interesting attempt has been made by Randall Hinshaw who studied American imports between 1921 and 1941.[1] Using the macro-economic method for absolute quantities and prices, Mr. Hinshaw finds an elasticity of imports with respect to prices of only 0.4. Apart from the difficulty I have in understanding the use of absolute quantities and prices, I think one point may be questioned. From other studies I have gained the impression that total demand in relation to national income declined after 1933. This downward shift may be due to the influence of the New Deal on the attitude of business. Mr. Hinshaw, however, assumes that the same demand function prevails during the entire period studied.

When using Mr. Hinshaw's method on separate commodities in the case of Great Britain before 1914 I too found figures well below 1. I have made other attempts to determine the elasticity of imports. It seems to me necessary to use the method of relative quantities and prices. I applied the method both to total im-

1 American Prosperity and the British Balance of Payments Problem, *Review of Economic Statistics* XXVII (1945), p. 1.

ports and to imports of selected commodities into Sweden and the United Kingdom between World Wars I and II. For a number of import commodities there seemed to be no clear connection between relative imports and relative prices. For the commodities where a relation apparently existed, elasticities of between 1 and 2 were found. It is probable that these cases, by the very fact of the good correlation, are cases of rather high elasticities. The average elasticity, therefore, might be somewhat lower. Nevertheless, my figures turn out to be higher than those obtained by Mr. Hinshaw.

Applying the method to total imports of consumers' and investment goods into The Netherlands between 1923 and 1933, I found substitution elasticities of 0.4 and 0.6, respectively.[2]

Attempts to measure the elasticity of exports with respect to prices have been made by The Netherlands Central Statistical Office.[3] Here the macro-economic method was used for relative quantities, explained by relative prices. Some ten countries were investigated. Although their economic structures differ widely, all showed elasticities of about 2, which, by the way, is the figure assumed by Lord Keynes in his well-known article in the *Economic Journal*.[4] Values down to 1 were among the results.[5]

The investigations by The Netherlands Central Statistical Office have been tested by additional investigations on individual commodities. The elasticities for wheat are decidedly higher, which might be ascribed to the perfect organization of its market. The figures for cotton, however, again turned out to be about 2.

What are the provisional conclusions to be drawn from our statistical findings? The elasticity of imports may be, though not

[2] *An Econometric Approach to Business Cycle Problems* (Paris, 1937).

[3] The influence of prices on exports. De Nederlandsche Conjunctuur, Special Memoranda 1. The Hague, 1939 (J. B. D. Derksen and A. L. G. M. Rombouts; Dutch, with English summary): Verdere metingen van de vervangingselasticiteit (Maandschrift van het C.B.S., 1943). p. 151.

[4] The German Transfer Problem, *Economic Journal*, XXXIX. 153 (March 1929). p. 1.

[5] For fuller details may I refer to my paper, Some Measurements of Elasticities of Substitution, *Review of Economic Statistics, XXVIII* (Aug. 1946).

necessarily, below unity. The elasticity of exports is about 2 and in various cases even lower. The import quotas range from 0.3 for several small countries to almost 0 for very large countries. Taking 0.3 for the latter, 0.3 for the elasticity of imports, and 1 for the export elasticity,

$$\phi = 1 - 0.3 - 0.7 \times 1 = 0,$$

suggesting the possibility that the slope of the supply curve may be algebraically less than that of the demand curve. In other words, the instability of the equilibrium in the balance of payments may, in some countries, be a reality. It is more probable that the equilibrium is stable, however; but it is doubtful that the exchange rate is a good regulator of the balance of payments for all countries. There is a good chance that the slopes of the two curves are almost equal.

If the exchange rate is not a good regulator, how may equilibrium in the balance of payments be restored? Evidently the best cure for a disturbing shift in one of the curves would be a countershift in another. Under future conditions this may involve either the introduction of a quota system—as far as permitted by the International Trade Organization—or, as an important alternative, a reduction in the payments due on behalf of international debts. In various cases the latter may prove the best solution.

It may be interesting to dwell for a moment on a more theoretical implication of our findings. Assume that we have to do with a country for which the equilibrium in the balance of payments is unstable. A given shift in exports, or in the rate of exchange (if considered as an institutional datum), will lead to a rupture of the equilibrium in the balance of payments that cannot be restored. Does this mean that the equilibrium between production and consumption (generally speaking, equilibrium in the purely physical sphere) likewise becomes impossible? If the system of equations describing the dynamics of the economy considered is nondegenerate, as one would be inclined to assume at first sight, all variables will show the same type of movement

around the equilibrium, i.e., their equilibrium will be either stable for all, or unstable for all. As soon, however, as the system of equations is degenerate, it may happen that for some variables a stable equilibrium exists and for others an unstable. There is much to be said for the assumption that a good description of reality shows the latter feature, in the case of an unstable equilibrium in the balance of payments. In every day language: some disturbance in the balance of payments may start an endless inflationary development in prices which, as a first approximation, is compatible with the existence of equilibrium in the physical sphere.

So much on the special problem I chose as an example for a future program of research. May I now add some general remarks on such a program? My example was not altogether so special as it might seem. Two features are, I think, characteristic for the type of research that under present conditions is both useful and possible.

One is the question of the nature of economic regulators. In the reconstruction of the world economy we propose to rely on several automatic reactions able to preserve, for the system as a whole, its equilibrium. Are these regulators really reliable? That is what we have to investigate systematically. Many other examples could be given. Particularly in the field of employment policy will we have to look for these regulators.

Another feature of my example is the method of research followed. This method, now commonly known as the econometric method, is characterized by an interplay of economic theory and statistical analysis, both in as rigorous a form as possible. I understand that the National Bureau of Economic Research, which did such excellent work both in collecting and computing figures and in their analysis, is also interested in these new methods. I am convinced that in all these fields further work of high quality will be performed by it, to the benefit of society, national and international.