

The Inappropriateness of Simple « Elasticity » Concepts in the Analysis of International Trade (*)

by

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Recent disturbances in international economic relations have once more focussed attention on the analysis of the effects of changes in exchange rates on the balance of international payments. The method of analysing them by constructing functions of demand and supply of foreign exchange in terms of its price seems to have been generally accepted without further questioning. In an effort to come to determinate conclusions which might serve as a guide for policy, simple models have been constructed. The question whether the conclusions derived from them, indeed the concepts used, can be applied to real life is usually neglected. Income effects, if they are analysed at all, are brought in as a subsequent « complication ». Occasionally the further assumption is made that the elasticity of supply of exports and imports underlying the function of the supply and demand of a currency is infinite. In all these manipulations the functions are considered to be smooth and continuous, independent of each other and reversible. Hence partial equilibrium analysis is applied to them without any qualms.

In this and a subsequent paper we shall contend that this approach to the problem is erroneous. In the analysis of international economic relations such concepts as « elasticities » (†) and « equilibrium » are inappropriate in the first place because the commonly used

component « elasticities » are *interdependent*. Furthermore, *given* supply and demand functions or *given* « elasticities » cannot be used as guides to policy because the shape and positions (if the fiction of a « function » is maintained) of the « functions » or the amount of the « elasticities » will depend upon: 1) changes in the market structure, 2) changes of the level of income, 3) changes of the level of employment, 4) changes in the distribution of income, 5) changes in the relevant prices themselves, 6) reactions in other countries. Some of these factors cannot be separated analytically from a proper examination of « elasticity » reactions; others, though analytically separable, are separated at the cost of lack of realism and therefore useless for predictions or policy recommendations. In other words, statements of the type « devaluation is indicated if the sum of the elasticities is... etc. » have as little meaning as statements, so fashionable in pre-Keynesian days, like « unemployment will decrease on wage-cuts if the elasticity of demand for labour is... etc. ». There is no given demand schedule irrespective of the measure proposed. The very discussion in anticipation of measures and those measures themselves will alter the « schedule ».

It is regrettable but inevitable that no single new method of analysis can be put into the place of the old approach. This limitation is imposed by the complexity of the problem which the customary method artificially, and mostly tacitly, assumes away. As far as policy is concerned, the argument of this paper suggests the following conclusions. 1) Exchange rate adjustments alone are unsuitable remedies where international maladjustments

(*) The contents of this and a subsequent article formed the basis of a paper given to the seminary of Prof. G. U. Papi, of the University of Rome, in April 1950.

(†) Elasticities appear in the following in inverted commas to remind us that we are concerned with irreversible reactions to price changes and not with movements on independently given demand and supply curves.

are large (2). 2) They are also unsuitable if they would have to be used repeatedly and fairly frequently. 3) It is false to argue that appreciation of a currency is always a remedy when deficits cannot be eliminated by depreciation because «elasticities» are too low. 4) Even when and where exchange rate alterations promise to be suitable remedies, they are likely to be insufficient unless accompanied by full employment (or even possibly over-full employment) policies in creditor countries; measures to counteract undesirable distributional effects, or effects on internal monetary equilibrium, and possibly measures against certain oligopolistic or monopolistic reactions. Many policy recommendations in the past seem to have disregarded the overwhelming importance of employment policy and the level of employment for international economic adjustments.

Not only the theoretical concepts and measures hitherto used in the analysis of foreign trade adjustments are of doubtful value. Even more serious objections can be raised against attempts to establish statistically the order of magnitude of these «elasticities». Quite apart from the shortcomings of the data and of the statistical methods used (3), not enough attention has been paid to certain logical flaws of the procedures adopted and the lack of realisation of their assumptions. Both the attempt to use time series and correlate data of different periods for the same country, and the method of comparing the relationship of data of the same period of different countries, involve sim-

(2) Sir HERBERT HENDERSON, *The Hoare Charter*, «American Economic Review», June, 1949.

(3) Cf. e.g. recent articles by OSGOOD, MACGILVER. These efforts to criticise the statistically calculated «elasticities» served as arguments for the rehabilitation of devaluation (i.e. the price mechanism) as a suitable remedy for disequilibrium. They were meant to dispel the doubts that had risen as a result of the low «elasticities» discovered by the statisticians. But these very useful criticisms of crude statistical methods pay little attention to the objections analysed in this paper, which cast doubt on the possibility of establishing any trustworthy and useful functional relationship of that kind at all. It seems that even if it is true that the «required elasticities» are smaller than was thought, and that the «actual elasticities» are larger than statisticians tell us, the definitions used by both the critics and the criticized are misleading. Forces which are ignored by their assumptions are likely to swamp the favourable effects of favourable elasticities. The attempted rehabilitation of devaluation must, to that extent, fail.

plifications or neglect of interrelationships, which reduce the value of the results obtained. Indeed, the price and income «elasticities» and propensities thus obtained really amount to nothing more than historical descriptions and can yield no inference to causal relationship. In the absence of knowledge of the functional connection between the path of adjustment and its end position no predictions can be made. Any formal equations (e.g. on «optimum tariffs» or the criteria for successful devaluation) purporting to provide a basis for accurate extrapolation, really do not give more than description derived from past data which are of small use for gauging future possibilities.

1. — The inappropriateness of partial equilibrium analysis.

The schedules of the demand and supply for foreign exchange, like the schedules of the demand and supply for labour or for savings and investment, are aggregates to which the technique of demand and supply curves, with its implicit assumption of other things remaining equal, must be applied with great caution, even in the case of simple models comparative statics (4). When it comes to analysing actual situations the comparative static approach breaks down. Not only will the change in one

(4) This objection on the plane of comparative static analysis is similar to Mr. SRAFFA's criticism: This point of view, (i.e. the particular equilibrium analysis) assumes that the conditions of production and the demand for a commodity can be considered, in respect to small variations, as being practically independent, both in regard to each other and in relation to the supply and demand of all other commodities. It is well known that such an assumption would not be legitimate merely because the independence may not be absolutely perfect, as, in fact, it never can be; and a slight degree of interdependence may be overlooked without disadvantage if it applies to quantities of the second order of smalls, as would be the case if the effect (for example, an increase of cost) of a variation in the industry which we propose to isolate were to manifest partially on the price of the products of other industries, and this latter effect were to influence the demand for the product of the first industry. But, of course, it is a very different matter, and the assumption becomes illegitimate, when a variation in the quantity produced by the industry under consideration sets up a force which acts directly, not merely upon its own costs, but also upon the costs of other industries; in such a case the conditions of the «particular equilibrium» which it was intended to isolate are upset, and it is no longer possible without contradiction, to neglect collateral effects. Cf., *Laws of Returns Under Competitive Conditions*, «The Economic Journal», 1926, p. 538-9.

of the variables result in a change of the same order of magnitude in the others, but dynamic effects will be set in motion which might swamp the original cause of the change.

Wherever foreign trade forms a more than negligible part of country's national income, partial equilibrium analysis is no longer applicable. It is no longer legitimate to draw up a demand curve for imports on the assumption that all other prices remain the same. The demand for imports will not be independent of the change of prices of home-produced goods. That is to say, the conventional demand curve based on the assumption that other things remain the same, is subject to shifts. These shifts themselves are not simple, as some models try to envisage, but the result of an intricate network of relationships. Thus if, for example, we devalue our currency, demand for imports will depend:

(a) upon the supply «elasticity» of home-produced goods which are substitutes for imports, which in turn is affected by;

(b) the home supply «elasticity» of and the foreign demand «elasticity» for our exports. For the supply «elasticity» of home substitutes for imports will be smaller, the greater the diversion of factors (and goods) used up in increasing exports. A substantial increase in exports leaves fewer factors available for substituting home goods for imports;

(c) the changes in income distribution accompanying the demand and supply changes which will alter the propensities to save, invest, and import (5).

Similarly, the «elasticity» of supply of imports is a function of the home «elasticity» of supply of exports and of the foreign «elasticity» of demand for our exports. If foreigners spend more on our exports after devaluation in terms of their own currency, goods and factors will be released abroad, which will make it more difficult for them to divert resources from their exports (our imports) to their home market, when the prices of their exports are reduced. A lower total expenditure on our exports, on the other hand, will make this diversion easier

and thus increase the elasticity of supply of their exports (i.e. our imports). Both home demand and supply «elasticities» depend upon the foreign demand and supply «elasticities» and, by the same reasoning the foreign «elasticities» depend upon of the home «elasticities». The «elasticities» are therefore interdependent.

To apply to this type of relationships the term «price elasticity» is therefore misleading. The reactions to price changes are lumped together into an elasticity concept as if they were similar to the reaction experienced in the case of a commodity the demand for which is an infinitely small fraction of total demand. In this latter case the repercussions can legitimately be neglected, whereas in our case, just as in the case of the general internal economic equilibrium, reactions are determined by shifts in other prices (6).

Assume two countries, A and B. A exports textiles and B exports wheat, but both produce some wheat and some textiles themselves. A depreciates its currency. Textile producers in A will now have an inducement to export more, for the price of textiles in B will have risen in terms of A's currency. How great will be the increase in A's textile exports for a given rise in their price in B? How great is the supply «elasticity» of A's exports? This will depend on a number of factors, but amongst them on A's demand «elasticity» for imported wheat. If its demand is «inelastic» factors will be released for the production of textile exports. If, on the other hand, its demand for wheat imports is «elastic», the increase in exports for any given rise in their price will be smaller. But A's demand «elasticity» for wheat imports is not given independently. It depends on a number of factors, amongst them on its supply «elasticity» of textile exports. The more textiles are exported for any given rise in their price (in B in terms of A's currency), the fewer factors are available to produce wheat at home, and, hence, the lower the demand «elasticity» for wheat imports. The answer to our original question, what determines the supply

(6) This explains the paradox that the formulae elaborated for the level «optimum» tariffs is based seemingly on foreign «elasticities» alone: they implicitly contain a large element of the home «elasticities», being co-determined by them.

(5) This particular aspect, however, will be treated in a subsequent section.

« elasticity » of A's exports, is that it is partly that supply « elasticity » of exports itself. The same can be shown to hold for any other of the « elasticities ».

This interdependence does not, of course, mean circularity. A determinate solution would result when the various « elasticities » are consistent with one another. But the important point is that a country's response to price changes is not simply a function of « tastes » and « technical conditions », but also a function of the changes in demand and supply abroad which will determine the availability of substitutes and factors to produce substitutes. It is well known that e. g. the supply « elasticity » of exports is partly a function of the demand « elasticity » for imports. If the latter is low a large amount of purchasing power will be absorbed by dearer imports, thus setting free domestic products for exports and/or factors capable of producing exports. But one must remember that the demand « elasticity » for imports depends, in turn, on the supply « elasticity » of exports. For demand will be more elastic, the smaller the increase in the supply of exports which absorbs factors that could be used for producing import substitutes. And the two home « elasticities » will depend upon the foreign « elasticities », because the latter codetermine the changes in exports and imports. Thus, a low foreign supply elasticity, for example, coupled with a low home demand « elasticity » will reduce the home supply « elasticity ». For if home demand « elasticity » is less than unity, the value of imports will rise by less, the smaller is the foreign supply « elasticity » and thus fewer goods and factors will be released for export purposes than would have been available, had the foreign supply elasticity been greater.

The treatment of the effects of exchange depreciation in terms of four independent given demand and supply « elasticities » oversimplifies and falsifies the problem. A change in any one of them will inevitably affect the others, usually after a time. The assumption of the constancy of « elasticities » in time, even if we ignore changes of income, employment and distribution, is therefore hardly justified. An autonomous change in any one will have inevitable repercussions upon all others.

Determinate and independent demand elasticities could be assumed if supply were infinitely elastic. Since this is impossible in conditions of full employment, it would involve the assumption of unemployment and excess capacity. But this case which is the most favourable to an analysis in terms of given demand « elasticities », is least suited to policy recommendation of exchange rate adjustments. Not only is demand likely to be highly « inelastic » without any relief from low supply « elasticities » (as would be the case under full employment) but deficits arising in conditions of unemployment are not necessarily signs of disequilibria which should be cured by exchange rate adjustments.

2. — *Asymmetrical reactions resulting from employment effects.*

Many authors assume in their analysis of foreign exchange problems both independent and smooth demand and supply function. In the last section it was argued that the functions are interdependent. In this section we shall consider certain reactions to changes in the value of the currency and consequential price changes which may lead to asymmetrical reactions of the type which is occasionally formalized in « kinked » curves. The view that functions tend to be smooth depends on coupling the assumption of full employment with that of high flexibility and absence of oligopoly. In actual fact imperfect flexibility and induced income variation will tend to produce different reactions to changes in the rate of exchange (different « elasticities ») according to the direction of the change for two reasons. First because of oligopolistic relationships between firms. Second because of oligopolistic relationships between countries. Both are largely a function of the level of employed capital and manpower capacity.

The supply of exports at full employment will probably be « inelastic » for a price rise and « elastic » for a fall because home demand can easily absorb exportable goods. It is, as it were, the suction from a fully employed and relatively riskless home market which results in this asymmetry: goods are more easily absorbed than released in response to price al-

terations. A low supply « elasticity » coupled with a low foreign demand « elasticity » will mitigate the fall in foreign exchange receipts, and coupled with a high foreign demand « elasticity » will reduce the increase in those receipts.

If, on the other hand, unemployment and excess capacity prevail, supply « elasticities » for price rises may be high, approaching infinity, especially in industrial and plantation economies and might be low for further price falls as the resistance of the trade unions against wage cuts is undermined, and bankruptcy forces (and enables) recapitalisation, even if the exchange rate of the country is held rigid in face of the depression. This however is not the full story.

The limitation of international reserves, and the necessity to remain competitive would, in a world without commercial restrictions and without currency control have the same effects upon the policies of countries as excess capacity in oligopolistic conditions has on the policies of firms. It would make demand inelastic for downward and elastic for upward price movements. For a country which cannot afford to have its reserves further depleted would be forced to follow a devaluation or deflation abroad with much greater force than it would be inclined to follow an appreciation or inflation abroad. In other words, price cuts will be accompanied by price cuts of rival products but price rises will not. This effect will reinforce the asymmetry brought about by entrepreneurial reactions.

The absence of a firm full employment policy will, beyond a certain point, have the same effect in a « rich » country as the insufficiency of reserves in poor areas: the « creditor » country will resist attempts by others to wipe out the deficit as the reduction of the favourable balance would create unemployment. On the other hand — e. g. Germany early in 1950 — they would gladly supply more exports and/or take fewer imports. Thus both small reserves and the absence of full employment policies induces oligopolistic asymmetry of reaction.

A similar asymmetry will prevail on the demand side. In conditions of over-full employment the demand for imports becomes

relatively « inelastic » for foreign price rises (cf. the sale of Belgian steel to the U.S. at rising prices) and « elastic » for foreign price cuts. Price rises will not be as strong a deterrent, as price reductions are a stimulus to imports. This tendency will be reinforced if home producers of import substitutes — who are likely to be working at or above capacity — follow the price rises of imports but are unwilling to match price reductions. They follow rises because they can thus easily increase their profits; they refuse to follow reductions because they do not object to having the pressure of excess demand reduced by foreign supplies.

Conversely in conditions of heavy unemployment and excess capacity, demand probably becomes « inelastic » for price cuts because domestic competitors try to match these cuts, refusing to allow their excess capacity to be increased further; and it will be highly « elastic » to price rises because domestic supplies can be substituted without a rise in their prices. The downward « inelasticity » will be reinforced if losses have been suffered and financial reserves exhausted, while certain fixed costs have to be met. The inducement to cut prices and not to allow overheads to swell further will then be strong.

This means devaluation as a remedy will be handicapped in boom conditions, when demand abroad might be expected to be « elastic », by the low supply « elasticities » of the devaluing country. Hence a large devaluation would be required in order to be effective and the objections to such a large devaluation arise out of its effects on real income and the home inflationary situation. Low supply « elasticities » which may be the result of technical limitations or, in the case of manufactured products, of monopolistic pricing policies which have the same effect as rapidly rising costs, will affect the terms of trade less unfavourably than higher supply « elasticities ». The low demand « elasticity » for imports will not, on the other hand, be eased by a low foreign supply « elasticity ».

In a depression, the hopes which might be aroused by high supply « elasticities » are dashed by low foreign demand « elasticities ». It appears therefore that the rehabilitations of

devaluation as a suitable remedy which are based on the fact that low supply « elasticities » relieve difficulties created by low demand « elasticities » must be related to employment and capacity levels. The situation then no longer looks so hopeful.

There is also another type of asymmetry, besides the price and output policies of firms in imperfectly competitive markets which is caused by the policies of countries. Unless there is rigid adherence to an international code of rules, any attempt to shortcut piecemeal adjustments by measures affecting the whole economy indiscriminately, e.g. tariffs, restrictions or devaluation, will be matched by competing countries (7). Whole countries will behave analogously to oligopolistically competing firms and their reactions cannot be neglected. Reactions to the generation of import surpluses will be for a number of reasons more rapid and more drastic than attempted cure of export surpluses, especially if the reserve position of the « creditor » countries is not comfortable. Even if it were the employment effect might force retaliation (e.g. U.S. measures against the import of gloves, hats, watches, etc.).

One of the conclusions is that the maintenance of full employment, or perhaps even what is now termed « over-full » employment in surplus countries is a necessary (though not a sufficient) condition of success if any attempt to adjust international disequilibria through the price mechanism, i.e. by devaluation or appreciation as contrasted with direct controls. Low supply elasticities might be overcome in time by the depreciating country through fiscal policy. Retaliatory actions to price reductions either on the part of private firms or of whole countries are less probable if the creditors are in any case fully employed. If unemployment prevails in the surplus country, exchange rate adjustment will be unsuitable. International institutional safeguards against unemployment are therefore of the utmost importance if a restoration of the international price mechanism

(7) The habit of talking about « elasticities » without specifying the present and expected level of employment in all countries under consideration is highly misleading. The pure « elasticities » of demand and supply of exports and imports are largely determined by the level of employment.

is to be attempted without results fatal to weaker countries (8).

3. — *Asymmetrical reactions resulting from variables other than price.*

Whenever competition is monopolistic or oligopolistic and when changes in income are significant the simplifying assumption that price is the chief variable is unsound. Frequently it is argued that although depreciation may make matters worse in the short run because demand will be inelastic, it is likely to improve the balance in the long run when « elasticities » will be higher. We shall argue below that in the « long-run » multiplier and investment effects will have had time to work themselves out with the result that any price effects will be swamped. Let us disregard these effects for the time being and accept the assumption that other things remain the same as far as income and employment is concerned. The argument then rests on the assumption that a readjustment of the productive structure and/or of the overcoming of market imperfections will take time. But this ignores the fact that the interests to be displaced need also time to organise their defence and that imperfections and low « elas-

(8) Thus the experts' report submitted to U.N.O. on « National and International Measures for Full Employment » is warmly welcomed as it puts forward schemes to deal not only with this problem but also of the closely related problem of unequal technical progress. The effect of the 1949 devaluation supports rather than weakens our conclusion. The effects of devaluation were swamped by the U.S. revival. The price of the main U.S. imports from the devaluation area rose in terms of dollars. At the same time the fall of U.S. export prices was checked and U.S. delivery dates lengthened: the favourable effect of devaluation on the competitive position of the devaluing countries was not cancelled by further deflation in the U.S. Thus the superficial impression that the striking reduction in U.S. exports was due to a high demand « elasticities » is largely misleading. The employment factor played the most important role. Moreover the price and wage increases in the rest of the world have only been delayed and are certain to come. In other countries the rise in the dollar price of exports helped to maintain stability, i.e. the situation was saved in spite of rather than because of devaluation. The reduction of dollar exports was decided upon and actually began prior to devaluation and there has been some recovery in the volume of U.S. exports from the low point. As the reduction in U.S. exports occurred when home demand in the U.S. was rising the competitive effort by U.S. business to retain foreign markets slackened. Any reversal of the trend in the U.S. would lead to renewed acute dollar crisis. Recent experience thus confirms completely the supreme importance of business activity in the dominant country, the U.S., on international economic readjustment.

ticities » can also be built up by sellers in time. An attack on, say, the American market will have to meet a counter-attack as soon as it promises to be successful. The whole concept of a long-run demand schedule in conditions of uncertainty and oligopoly is of dubious value. If advertising is successful in capturing a market it is likely to be no less successful when resistance or the struggle for recapture are organised.

In order to analyse the relationship between price changes and quantities demanded a number of variables besides shifts in demand due to advertising are relevant which are frequently ignored. Thus, demand is not only a function of price but also of a change of price. Price changes shake customers out of their rut and make them experiment. Strictly speaking, demand curves do not apply, for the amount demanded will depend upon the size and the speed of the preceding change in price. Steps on such a « curve » are not reversible and not only point elasticities but also arc elasticities become meaningless. The « equilibrium » price, if any, is codetermined by the path by which it is reached.

Price is not the only important variable determining demand: the speed of delivery, available stock, discounts and terms of payment are others. The existence of unemployment usually bestows advantages upon a country with respect to delivery dates and the availability stocks of manufactured goods. It is a moot point whether and how much unemployment would spell greater all-round internal flexibility, but there is no doubt that excess capacity, plentiful stocks and a reservoir of labour will make for speedier deliveries of orders in existing, and for capacity to undertake work in new, lines of production. The real cost of this type of competitive advantage is partly borne by the unemployed, and not expressed in lower costs and prices. In order to become more competitive, greater efficiency and price reduction might be of little use in comparison with the creation of unemployment and excess capacity (however directional).

The advantages of free discounts and easy terms of payments are largely a function of the size of the firm. Large monopolistic concerns with more information about their customers

have advantages in foregoing liquidity and shouldering risks which small firms, though possibly more efficient and offering lower prices, cannot emulate. Similar advantages accrue to countries with organised capital markets.

There are numerous other important factors amongst which only investment outlay on initial advertising can be mentioned here, where again the large firm has an advantage. Thus monopoly and unemployment bestow advantages in factors determining demand which are often of greater significance than price variations. An analysis which pays only attention to price and quantity variations neglects these other variables which play a more important part than the oligopolistic armoury than price competition.

4. — *Small v. large depreciation.*

Sometimes it is argued that if a small depreciation is not effective, a large one must be, for demand must, at some price, become elastic. To this, there are two replies; first, it is now well recognized that price adjustments often fail to do their work where the changes are very large. A large depreciation may merely give rise to an additional bout of inflation and aggravate the foreign exchange difficulties (9).

Thus the country may not succeed in curtailing imports and pushing exports. If it does succeed, on the other hand, by applying deflationary measures, the reduction of imports and the foregoing of exportable goods will necessitate a reduction in the standard of living. Now the same results in the correction of the foreign balance can be achieved with a smaller reduction in the standard of living if import reductions are selective and not indiscriminate. The change in the composition of imports can be more suitably geared to domestic social policies than if the work is left to the price mechanism (10).

(9) It is curious that Professor Smithies e.g. should argue that it is a point in favour of devaluation that import controls will be more easily administered after devaluation without pointing out that the burden is merely shifted and domestic anti-inflationary controls are put under additional strain. (A. SMITHIES, « Review of Economics and Statistics », 1950, and « Quarterly Journal of Economics », 1950).

(10) Sir HUBERT HENDERSON, *The Havana Charter, loc. cit.*

We conclude that depreciation may not be able to bring about the desired adjustment or, if it does succeed, it will be at a cost which may well be too high. Infinitesimally small changes in the exchange rate, to which the analytical and policy objections apply with less force, are likely to be ineffective. Large changes, on the other hand, cannot be analysed in terms of constant «elasticities». The fact that a large depreciation will make demand more «elastic» does not strengthen the case for devaluation if income and employment effects swamp the price effects or if the reduction in real income is unnecessarily and undesirably severe.

5. — Depreciation v. appreciation.

The argument that appreciation would improve the balance where depreciation fails because of low «elasticities» rests on very special assumptions. In order to refute it, it is not necessary to assume kinks in the curves although the existence of certain kinks will strengthen the conclusions which can also be derived from smooth curves. It is quite sufficient to assume that elasticities change in a certain way with the movement in the exchange rate in order to show that it is not true that some change in foreign exchange rates will always bring about a restoration of equilibrium. Quite apart from dynamic complications to which we have referred and which we shall discuss again, it is perfectly possible that even in the case of smooth demand and supply functions both appreciation and depreciation will worsen the balance. We ignore here the problem that the curves representing demand and supply of foreign exchange beg the whole question of the four «elasticities» because each of them lumps together two, e.g. the demand for foreign currency expresses both the demand «elasticity» for imports and their supply «elasticity».

In fig. (i) the demand for foreign exchange is represented by D and the supply of foreign exchange by S. The rate of £ per \$ is plotted on the Y axis so that an upwards movement represents depreciation and the total receipts or expenditure in terms of \$ are plotted on the X

axis. If we start from a position of disequilibrium (D exceeding S) with an exchange rate of OR, both a depreciation to OR' and an appreciation to OR'' will worsen the deficit. The shape of the curves is a perfectly possible one, at least over a range. The only limitation of their shape is that the D curve must slope down to the right (dollar expenditure on imports with certain negligible exceptions must decrease after depreciation) and the S curve which may slope to the right or to the left cannot slope to the left in such a way as to decrease the area of the rectangle OMEQ (fig. ii). This rectangle is the £ outlay on exports which cannot (with certain negligible exceptions) decrease. Hence at some point the S curve will cut the D curve from below and this will be a point of stable equilibrium E.

But this may well be one of these cases where the invisible hand does its work by strangulation.

The difficulties of adjustment are aggravated if the curves at the ruling rate are kinked. (Fig. iii). We have argued that the change of the exchange rate itself will tend to make for such a kink so that whatever the exchange rate happens to be, in some conditions any alteration of it will lead to an increase in the deficit.

The position may be similarly represented in terms of £. The supply of dollars in terms of pounds constitutes the demand for pounds in terms of dollars. We trace the \$ per £ rate on the Y axis and the total £ receipts and outlays on the X axis. Fig. (iv) shows the case where depreciation to R' (which is now a downward movement on the Y axis) and appreciation to OR'' both deteriorate the balance; Fig. (v) shows the «inevitable equilibrium» exchange rate which results from the fact that the total sterling expenditure must decrease at some point; hence the D curve must cut the S curve from above and this will be a point of stable «equilibrium» E. Fig. (vi) shows kinked demand and supply curves, the kink depending on the actual exchange rate which has come to be established. Although the D curve can slope to the right or to the left, its slope to the right upon devaluation can in the worst case be a rectangular hyperbola for the demand for dollars, expressed by the re-

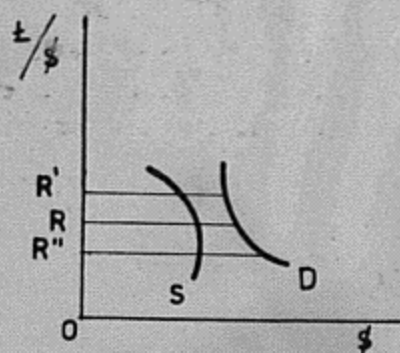


Fig. (i)

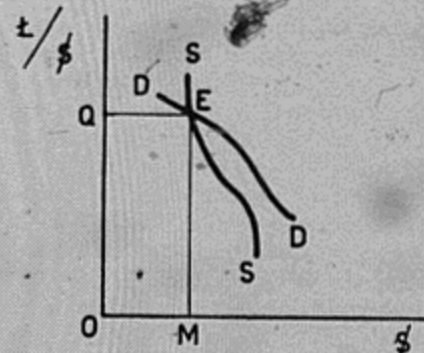


Fig. (ii)

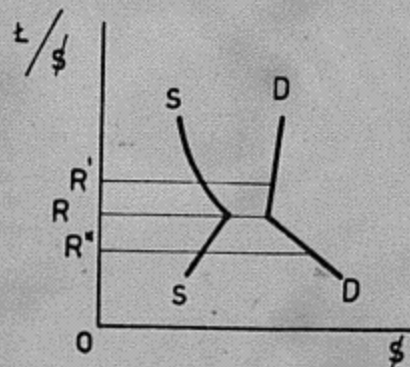


Fig. (iii)

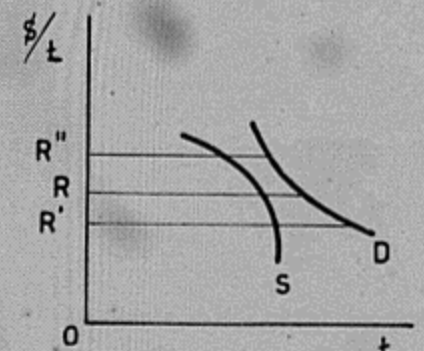


Fig. (iv)

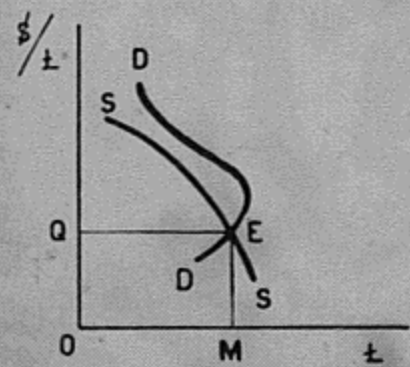


Fig. (v)

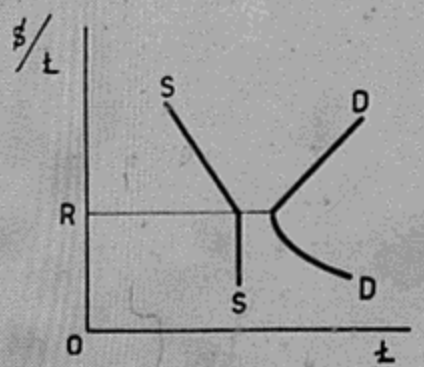


Fig. (vi)

tangle under the D curve, can at worst be constant.

Similar kinks in the schedules may also be the result of the fact that international competition is oligopolistic not merely in the sense of entrepreneurial reactions in the markets of most manufactured goods but also in the sense, described at greater length elsewhere (11) that the reactions of the competing national economies policy changes in (powerful) economies are of an oligopolistic character. In their policy decisions they take note of the policy of the countries with which they compete (12). To give an ex-

(11) e.g. T. BALOGH, *The International Implications of Full Employment*, in «The Economics of Full Employment», Oxford, University Institute of Statistics, 1944.

(12) This reduces the analytical value of efforts to circumvent the obvious and acknowledged difficulties of the time correlation analysis of elasticities by an analysis of simultaneously existing relations between the price and the quantity of foreign transactions of different countries. The fact that lower prices were associated with higher export figures does not permit us to conclude that, had the countries suffering from higher prices reduced their prices, their exports would have risen in the proportion indicated by the relation of prices and exports between high and low cost countries. This difficulty is far more basic and ineradicable than the obvious sta-

ample, devaluation or deflation in a powerful country which has the impact effect of making *all* entrepreneurs in that country *more competitive* abroad, has usually been automatically followed by the competing economies as they would otherwise have been denuded of liquid reserves. Appreciation, on the other hand, need not be followed by appreciation or inflation abroad. Indeed unless the rest of the world is already fully stretched the appreciation will lead to a loss of trade (13). Hence a country contemplating a change in its exchange rate is in an analogous position to the oligopolistic entrepreneur whose behaviour has been represented by a kinked demand curve. The reactions need not be certain. The mere risk may be a sufficient reason to refrain from experiments if the country's international liquidity position is precarious.

tistical difficulty of measuring relative prices in a world where even certain raw materials e.g. coal, were sold in highly imperfect markets.

(13) Under certain circumstances e.g. when the appreciating (or inflating) country is the main supplier of essential commodities its customers might gain if they followed suit (e.g. the U.S. in 1946-47).