

American Economic Association

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Source: *The American Economic Review*, Vol. 51, No. 4 (Sep., 1961), pp. 657-665

Published by: [American Economic Association](#)

Stable URL: <http://www.jstor.org/stable/1812792>

Accessed: 21/03/2011 11:35

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10. *United States v. E. I. duPont de Nemours and Co.*, 351 U.S. 377 (1956).
11. *United States v. E. I. duPont de Nemours and Co.*, 353 U.S. 586 (1957).
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A Theory of Optimum Currency Areas

It is patently obvious that periodic balance-of-payments crises will remain an integral feature of the international economic system as long as fixed exchange rates and rigid wage and price levels prevent the terms of trade from fulfilling a natural role in the adjustment process. It is, however, far easier to pose the problem and to criticize the alternatives than it is to offer constructive and feasible suggestions for the elimination of what has become an international disequilibrium system.¹ The present paper, unfortunately, illustrates that proposition by cautioning against the practicability, in certain cases, of the most plausible alternative: a system of national currencies connected by flexible exchange rates.

A system of flexible exchange rates is usually presented, by its proponents,² as a device whereby depreciation can take the place of unemployment when the external balance is in deficit, and appreciation can replace inflation when it is in surplus. But the question then arises whether all existing national currencies should be flexible. Should the Ghanaian pound be freed to fluctuate against all currencies or ought the present sterling-area currencies remain pegged to the pound sterling? Or, supposing that the Common Market countries proceed with their plans for economic union, should these countries allow each national currency to fluctuate, or would a single currency area be preferable?

The problem can be posed in a general and more revealing way by defining a currency area as a domain within which exchange rates are fixed and asking: What is the appropriate domain of a currency area? It might seem at first that the question is purely academic since it hardly appears within the realm of political feasibility that national currencies would ever be abandoned in favor of any other arrangement. To this, three answers can be given: (1) Certain parts of the world are undergoing processes of economic integration and disintegration, new experiments are being made, and a conception of what constitutes an optimum currency area can clarify the meaning of these experiments. (2) Those countries, like Canada, which have experimented with flexible exchange rates are likely to face particular problems which the theory of *optimum* currency areas can elucidate if the national currency area does not coincide with the optimum currency area. (3) The idea can be used to illustrate certain functions of currencies which have been inadequately treated in the economic literature and which are sometimes neglected in the consideration of problems of economic policy.

¹ I have analyzed this system in some detail in [7].

² See, for example [1] [3] [5].

I. Currency Areas and Common Currencies

A single currency implies a single central bank (with note-issuing powers) and therefore a potentially elastic supply of interregional means of payments. But in a currency area comprising more than one currency the supply of international means of payment is conditional upon the cooperation of many central banks; no central bank can expand its own liabilities much faster than other central banks without losing reserves and impairing convertibility.³ This means that there will be a major difference between adjustment within a currency area which has a single currency and a currency area involving more than one currency; in other words there will be a difference between interregional adjustment and international adjustment even though exchange rates, in the latter case, are fixed.

To illustrate this difference consider a simple model of two entities (regions or countries), initially in full employment and balance-of-payments equilibrium, and see what happens when this equilibrium is disturbed by a shift of demand from the goods of entity B to the goods of entity A. Assume that money wages and prices cannot be reduced in the short run without causing unemployment, and that monetary authorities act to prevent inflation.

Suppose first that the entities are countries with national currencies. The shift of demand from B to A causes unemployment in B and inflationary pressure in A.⁴ To the extent that prices are allowed to rise in A the change in the terms of trade will relieve B of some of the burden of adjustment. But if A tightens credit restrictions to prevent prices from rising all the burden of adjustment is thrust onto country B; what is needed is a reduction in B's real income and if this cannot be effected by a change in the terms of trade—because B cannot lower, and A will not raise, prices—it must be accomplished by a decline in B's output and employment. The policy of surplus countries in restraining prices therefore imparts a recessive tendency to the world economy on fixed exchange rates or (more generally) to a currency area with many separate currencies.⁵

Contrast this situation with that where the entities are regions within a closed economy lubricated by a common currency; and suppose now that the national government pursues a full-employment policy. The shift of demand from B to A causes unemployment in region B and inflationary pressure in region A, and a surplus in A's balance of payments.⁶ To correct the unemployment in B the monetary authorities increase the money supply. The monetary expansion, however, aggravates inflationary pressure in region A: indeed, the

³ More exactly, the rates at which central banks can expand monetary liabilities depend on income elasticities of demand and output elasticities of supply.

⁴ For present purposes inflation is defined as a rise in the prices of home-produced goods.

⁵ The tendency of surplus countries to control (what is, from a national point of view) inflation can be amply documented from United States and French policy in the 1920's and West Germany policy today. But it is unfortunate that a simple change in world relative prices is interpreted, in the surplus countries, as inflation.

⁶ Instructive examples of balance-of-payments problems between different regions of the United States can be found in [2, Ch. 14] For purposes of this paper regions are defined as areas within which there is factor mobility, but between which there is factor immobility.

principal way in which the monetary policy is effective in correcting full employment in the deficit region is by raising prices in the surplus region, turning the terms of trade against B. Full employment thus imparts an inflationary bias to the multiregional economy or (more generally) to a currency area with common currency.

In a currency area comprising different countries with national currencies the pace of employment in deficit countries is set by the willingness of surplus countries to inflate. But in a currency area comprising many regions and a single currency, the pace of inflation is set by the willingness of central authorities to allow unemployment in deficit regions.

The two systems could be brought closer together by an institutional change: unemployment could be avoided in the world economy if central banks agreed that the burden of international adjustment should fall on surplus countries, which would then inflate until unemployment in deficit countries is eliminated; or a world central bank could be established with power to create an international means of payment. But a currency area of either type cannot prevent both unemployment and inflation among its members. The fault lies not with the type of currency area, but with the domain of the currency area. The optimum currency area is not the world.

II. *National Currencies and Flexible Exchange Rates*

The existence of more than one currency area in the world implies (by definition) variable exchange rates. In the international trade example, if demand shifts from the products of country B to the products of country A, a depreciation by country B or an appreciation by country A would correct the external imbalance and also relieve unemployment in country B and restrain inflation in country A. This is the most favorable case for flexible rates based on national currencies.

Other examples, however, might be equally relevant. Suppose that the world consists of two countries, Canada and the United States, each of which has separate currencies. Also assume that the continent is divided into two regions which do not correspond to national boundaries—the East, which produces goods like cars, and the West, which produces goods like lumber products. To test the flexible-exchange-rate-argument in this example assume that the United States dollar fluctuates relative to the Canadian dollar, and that an increase in productivity (say) in the automobile industry causes an excess demand for lumber products and an excess supply of cars.

The immediate impact of the shift in demand is to cause unemployment in the East and inflationary pressure in the West, and a flow of bank reserves from the East to the West because of the former's regional balance-of-payments deficit. To relieve the unemployment in the East the central banks in both countries would have to expand the national money supplies, or to prevent inflation in the West, contract the national money supplies. (Meanwhile the Canada-United States exchange rate would move to preserve equilibrium in the national balances.) Thus, unemployment can be prevented in both countries, but only at the expense of inflation; or, inflation can be re-

strained in both countries but at the expense of unemployment; or, finally, the burden of adjustment can be shared between East and West with some unemployment in the East and some inflation in the West. But both unemployment and inflation cannot be escaped. The flexible exchange rate system does not serve to correct the balance-of-payments situation between the two regions (which is the essential problem) although it will do so between the two countries; it is therefore not necessarily preferable to a common currency or national currencies connected by fixed exchange rates.

III. *Regional Currency Areas and Flexible Exchange Rates*

The preceding example does not destroy the argument for flexible exchange rates, but it might severely impair the relevance of the argument if it is applied to national currencies. The logic of the argument can in fact be rescued if national currencies are abandoned in favor of regional currencies.

To see this suppose that the "world" reorganizes currencies so that Eastern and Western dollars replace Canadian and United States dollars. Now if the exchange rate between the East and the West were pegged, a dilemma would arise similar to that discussed in the first section. But if the East-West exchange rate were flexible, then an excess demand for lumber products need cause neither inflation nor unemployment in either region. The Western dollar appreciates relative to the Eastern dollar thus assuring balance-of-payments equilibrium, while the Eastern and Western central banks adopt monetary policies to ensure constancy of effective demand in terms of the regional currencies, and therefore stable prices and employment.

The same argument could be approached from another direction. A system of flexible exchange rates was originally propounded as an alternative to the gold-standard mechanism which many economists blamed for the world-wide spread of depression after 1929. But if the arguments against the gold standard were correct, then why should a similar argument not apply against a common currency system in a multiregional country? Under the gold standard depression in one country would be transmitted, through the foreign-trade multiplier, to foreign countries. Similarly, under a common currency, depression in one region would be transmitted to other regions for precisely the same reasons. If the gold standard imposed a harsh discipline on the national economy and induced the transmission of economic fluctuations, then a common currency would be guilty of the same charges; interregional balance-of-payments problems are invisible, so to speak, precisely because there is no escape from the self-adjusting effects of interregional money flows. (It is true, of course, that interregional liquidity can always be supplied by the national central bank, whereas the gold standard and even the gold-exchange standard were hampered, on occasion, by periodic scarcities of internationally liquid assets; but the basic argument against the gold standard was essentially distinct from the liquidity problem.)

Today, if the case for flexible exchange rates is a strong one, it is, in logic, a case for flexible exchange rates based on *regional* currencies, not on national currencies. The optimum currency area is the region.

IV. *A Practical Application*

The theory of international trade was developed on the Ricardian assumption that factors of production are mobile internally but immobile internationally. Williams, Ohlin, Iversen and others, however, protested that this assumption was invalid and showed how its relaxation would affect the real theory of trade. I have tried to show that its relaxation has important consequences also for the monetary theory of trade and especially the theory of flexible exchange rates. The argument for flexible exchange rates based on national currencies is only as valid as the Ricardian assumption about factor mobility. If factor mobility is high internally and low internationally a system of flexible exchange rates based on national currencies might work effectively enough. But if regions cut across national boundaries or if countries are multiregional then the argument for flexible exchange rates is only valid if currencies are reorganized on a regional basis.

In the real world, of course, currencies are mainly an expression of national sovereignty, so that actual currency reorganization would be feasible only if it were accompanied by profound political changes. The concept of an optimum currency area therefore has direct practical applicability only in areas where political organization is in a state of flux, such as in ex-colonial areas and in Western Europe.

In Western Europe the creation of the Common Market is regarded by many as an important step toward eventual political union, and the subject of a common currency for the six countries has been much discussed. One can cite the well-known position of J. E. Meade [4, pp. 385-86], who argues that the conditions for a common currency in Western Europe do not exist, and that, especially because of the lack of labor mobility, a system of flexible exchange rates would be more effective in promoting balance-of-payments equilibrium and internal stability; and the apparently opposite view of Tibor Scitovsky [9, Ch. 2]¹ who favors a common currency because he believes that it would induce a greater degree of capital mobility, but further adds that steps must be taken to make labor more mobile and to facilitate supranational employment policies. In terms of the language of this paper Meade favors national currency areas while Scitovsky gives qualified approval to the idea of a single currency area in Western Europe.

In spite of the apparent contradiction between these two views, the concept of optimum currency areas helps us to see that the conflict reduces to an empirical rather than a theoretical question. In both cases it is implied that an essential ingredient of a common currency, or a single currency area, is a high degree of factor mobility; but Meade believes that the necessary factor mobility does not exist, while Scitovsky argues that labor mobility must be improved and that the creation of a common currency would itself stimulate capital mobility. In other words neither writer disputes that the optimum currency area is the region—defined in terms of internal factor mobility and external factor immobility—but there is an implicit difference in views on the

¹ These statements of course cannot do full justice to the arguments of Meade and Scitovsky.

precise degree of factor mobility required to delineate a region. The question thus reduces to whether or not Western Europe can be considered a single region, and this is essentially an empirical problem.

V. *Upper Limits on the Number of Currencies and Currency Areas*

A dilemma now arises: Factor mobility (and hence the delineation of regions) is most usefully considered a relative rather than an absolute concept, with both geographical and industrial dimensions, and it is likely to change over time with alterations in political and economic conditions. If, then, the goals of internal stability are to be rigidly pursued, it follows that the greater is the number of separate currency areas in the world, the more successfully will these goals be attained (assuming, as always, that the basic argument for flexible exchange rates per se is valid). But this seems to imply that regions ought to be defined so narrowly as to count every minor pocket of unemployment arising from labor immobility as a separate region, each of which should apparently have a separate currency!

Such an arrangement hardly appeals to common sense. The suggestion reflects the fact that we have, thus far, considered the reasons for keeping currency areas small, not the reasons for maintaining or increasing their size. In other words we have discussed only the stabilization argument, to which end it is preferable to have many currency areas, and not the increasing costs which are likely to be associated with the maintenance of many currency areas.

It will be recalled that the older economists of the nineteenth century were internationalists and generally favored a world currency. Thus, John Stuart Mill wrote [6, p. 176]:

. . . So much of barbarism, however, still remains in the transactions of most civilised nations, that almost all independent countries choose to assert their nationality by having, to their own inconvenience and that of their neighbours, a peculiar currency of their own.

Mill, like Bagehot and others, was concerned with the costs of valuation and money-changing, not stabilization policy, and it is readily seen that these costs tend to increase with the number of currencies. Any given money *numeraire* or unit of account fulfills this function less adequately if the prices of foreign goods are expressed in terms of foreign currency and must then be translated into domestic currency prices. Similarly, money in its role of medium of exchange is less useful if there are many currencies; although the costs of currency conversion are always present, they loom exceptionally large under inconvertibility or flexible exchange rates. (Indeed, in a hypothetical world in which the number of currencies equaled the number of commodities, the usefulness of money in its roles of unit of account and medium of exchange would disappear, and trade might just as well be conducted in terms of pure barter.) Money is a convenience and this restricts the optimum number of currencies. In terms of this argument alone the optimum currency area is the world, regardless of the number of regions of which it is composed.

There are two other factors which would inhibit the creation of an arbitrarily large number of currency areas. In the first place markets for foreign

exchange must not be so thin that any single speculator (perhaps excepting central banks) can affect the market price; otherwise the speculation argument against flexible exchange rates would assume weighty dimensions. The other argument limiting "Balkanization" concerns the very pillar on which the flexible exchange-rate argument rests. The thesis of those who favor flexible exchange rates is that the community in question is not willing to accept variations in its real income through adjustments in its money wage rate or price level, but that it is willing to accept virtually the same changes in its real income through variations in the rate of exchange. In other words it is assumed that unions bargain for a money rather than a real wage, and adjust their wage demands to changes in the cost of living, if at all, only if the cost-of-living index excludes imports. Now as the currency area grows smaller and the proportion of imports in total consumption grows, this assumption becomes increasingly unlikely. It may not be implausible to suppose that there is some degree of money illusion in the bargaining process between unions and management (or frictions and lags having the same effects), but it is unrealistic to assume the extreme degree of money illusion that would have to exist in small currency areas. Since the necessary degree of money illusion becomes greater the smaller are currency areas, it is plausible to conclude that this also imposes an upper limit on the number of currency areas.

VI. *Concluding Argument*

The subject of flexible exchange rates can logically be separated into two distinct questions. The first is whether a system of flexible exchange rates can work effectively and efficiently in the modern world economy. For this to be possible it must be demonstrated that: (1) an international price system based on flexible exchange rates is dynamically stable after taking speculative demands into account; (2) the exchange rate changes necessary to eliminate normal disturbances to dynamic equilibrium are not so large as to cause violent and reversible shifts between export and import-competing industries (this is not ruled out by stability); (3) the risks created by variable exchange rates can be covered at reasonable costs in the forward markets; (4) central banks will refrain from monopolistic speculation; (5) monetary discipline will be maintained by the unfavorable political consequences of continuing depreciation, as it is to some extent maintained today by threats to the levels of foreign exchange reserves; (6) reasonable protection of debtors and creditors can be assured to maintain an increasing flow of long-term capital movements; and (7) wages and profits are not tied to a price index in which import goods are heavily weighted. I have not explicitly discussed these issues in my paper.

The second question concerns how the world should be divided into currency areas. I have argued that the stabilization argument for flexible exchange rates is valid only if it is based on regional currency areas. If the world can be divided into regions within each of which there is factor mobility and between which there is factor immobility, then each of these regions should have a separate currency which fluctuates relative to all other currencies. This carries the argument for flexible exchange rates to its logical conclusion.

But a region is an economic unit while a currency domain is partly an ex-

pression of national sovereignty. Except in areas where national sovereignty is being given up it is not feasible to suggest that currencies should be re-organized; the validity of the argument for flexible exchange rates therefore hinges on the closeness with which nations correspond to regions. The argument works best if each nation (and currency) has internal factor mobility and external factor immobility. But if labor and capital are insufficiently mobile within a country then flexibility of the external price of the national currency cannot be expected to perform the stabilization function attributed to it, and one could expect varying rates of unemployment or inflation in the different regions. Similarly, if factors are mobile across national boundaries then a flexible exchange system becomes unnecessary, and may even be positively harmful, as I have suggested elsewhere.⁸

Canada provides the only modern example where an advanced country has experimented with flexible exchange rates. According to my argument the experiment should be largely unsuccessful as far as stabilization is concerned. Because of the factor immobility between regions an increase in foreign demand for the products of one of the regions would cause an appreciation of the exchange rate and therefore increased unemployment in the remaining regions, a process which could be corrected by a monetary policy which aggravated inflationary pressures in the first region; every change in demand for the products in one region is likely to induce opposite changes in other regions which can not be entirely modified by national stabilization policies. Similarly the high degree of external capital mobility is likely to interfere with stabilization policy for completely different reasons: to achieve internal stability the central bank can alter credit conditions but it is the change in the exchange rate rather than the alteration in the interest rate which produces the stabilizing effect; this indirectness conduces to a cyclical approach to equilibrium. Although an explicit empirical study would be necessary to verify that the Canadian experiment has not fulfilled the claims made for flexible exchange rates, the *prima facie* evidence indicates that it has not. It must be emphasized, though, that a failure of the Canadian experiment would cast doubt only on the effectiveness of a flexible exchange system in a multiregional country, not on a flexible exchange system in a unitary country.⁹

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⁸ In my paper, "The Monetary Dynamics of International Adjustment Under Fixed and Flexible Exchange Rates," [8], I advanced the argument that stabilization policy would be more difficult under fixed exchange rates if short-term capital were immobile than if it were mobile, and more difficult under flexible exchange rates if capital were mobile than if it were immobile. Although the method of analysis was fundamentally different the conclusions support the hypothesis of this paper that the fixed-exchange-rate system is better within areas where factors are mobile and the flexible-exchange-rate system is better for areas between which factors are immobile. The argument of my other paper imposes an additional argument against increasing the number of currencies.

⁹ Other economists have advanced arguments in favor of Balkanization of multiregional countries (see for example, A. D. Scott [10]); and the argument for regional currency areas adds to the list; but, as Scott is careful to emphasize, no country can make such decisions on purely economic grounds.

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Institutional Affiliation of the Contributors to Three Professional Journals

Two analyses of the institutional affiliations of authors of economics papers have appeared in past issues of the *American Economic Review*. One made some years ago referred to the origins of the participants (excluding the discussants) in the programs of the American Economic Association meetings for the five-year period 1950-54 [2]. A more recent one analyzed the affiliations of the contributors to the AER (apart from the Proceedings) for the decade 1950-59 [1]. Some interesting observations can be made by comparing the two studies. The omission of some schools in both cases is rather surprising. Fusfeld's list of the institutions who contributed two or more papers to the American Economic Association meetings over the five-year period did not include schools like Princeton University or Johns Hopkins University. Cleary and Edwards' list of institutions who aggregated 100 or more pages in the AER over the ten-year period did not mention schools like Columbia University or Duke University. With regard to the ranking of the institutions according to the volume of their aggregate contribution, the results are equally striking. In the case of the Proceedings, Harvard University, the University of California, the University of Chicago, and Columbia University top the list. In the case of the regular quarterly issues of the AER, the University of California, the Massachusetts Institute of Technology, Stanford University, and the University of Chicago ranked as the most important originators. From the four institutions that did not repeat in the top four, Columbia was conspicuously absent from the Cleary and Edwards' list while Harvard University