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Exchange Rates and Economic Recovery in the 1930s

BARRY EICHENGREEN AND JEFFREY SACHS

Currency depreciation in the 1930s is almost universally dismissed or condemned. This paper advances a different interpretation of these policies. It documents first that depreciation benefited the initiating countries. It shows next that there can be no presumption that depreciation was beggar-thy-neighbor. While empirical analysis indicates that the foreign repercussions of individual devaluations were in fact negative, it does not imply that competitive devaluations taken by a group of countries were without mutual benefit. To the contrary, similar policies, had they been even more widely adopted and coordinated internationally, would have hastened recovery from the Great Depression.

WHETHER they are concerned with the magnitude of the initial contraction or the retardation of the subsequent recovery, most analyses of the Great Depression attach considerable weight to the effects of economic policy. The misguided actions of the Federal Reserve and the unfortunate commercial initiatives of the executive and legislative branches are blamed for transforming the American recession into an unprecedented depression.¹ Perverse monetary and fiscal responses in such countries as Germany and France are blamed for reinforcing the deflationary pressures transmitted from the United States to the rest of the industrial world.² In desperate attempts to promote recovery, or at least to provide insulation from destabilizing

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¹ The classic indictment of the Fed is of course Milton Friedman and Anna Schwartz, *A Monetary History of the United States, 1867-1960* (Princeton, 1963). For analyses which emphasize also the effects of protectionist initiatives, see Alan Meltzer, "Monetary and Other Explanations for the Start of the Great Depression," *Journal of Monetary Economics*, 2 (1976), pp. 455-72; and Christian Saint-Etienne, *The Great Depression, 1929-1938: Lessons for the 1980s* (Stanford, 1984).

² Charles P. Kindleberger, *The World in Depression, 1929-39* (Berkeley, 1973); Karl Hardach, *The Political Economy of Germany in the Twentieth Century* (Berkeley, 1976); and A. Sauvy, *Histoire économique de la France entre les deux guerres* (2nd ed., Paris, 1984). This is not to imply that the Great Depression in Europe was solely a reflection of the downturn in the United States. (On Europe's difficulties in the 1920s, see Ingmar Svennilson, *Growth and Stagnation of the European Economy* (Geneva, 1954); or Peter Temin, "The Beginning of the Depression in Germany," *Economic History Review*, 2nd ser., 24 (1971), pp. 240-48.) All that is necessary for the argument is that the Depression in Europe was heavily affected by concurrent developments in America. Space limitations do not permit us to formally address the causes of the Depression.

foreign shocks, national authorities had recourse to currency devaluation and tariff escalation. Such initiatives are typically characterized as beggar-thy-neighbor policies. Individually they are seen as attempts to better a country's position at the expense of its neighbors; together, it is argued, they disrupted international economic relations and, by impeding foreign trade, destroyed one of the only remaining sources of autonomous demand.³

With notable exceptions, such as "cheap money" in Britain after 1931, fiscal expansion in Sweden, and industrial policy giving way to central control in Germany, public policy receives little credit for helping the economies of Europe find their way out of the Great Depression.⁴ One can conceive of various policies these nations might have pursued: devaluation, protection, monetary expansion, and fiscal stimulus. In practice, however, there was little scope for significant policy initiative within the institutional and intellectual framework inherited from the 1920s. Fiscal policy, except in Sweden, would continue to be guided by the principle of balanced budgets until the adoption of Keynesian approaches to taxation and spending.⁵ Even had there existed a belief in the efficacy of countercyclical fiscal policy, it might have been of little practical consequence on the national level so long as the fixed parities of the gold-exchange standard served as an external constraint. The potential of monetary initiatives, although more widely recognized and acknowledged, was equally inhibited by the gold standard constraint.

The critical decision for national economic authorities therefore concerned the stance of external policy. Not only might currency devaluation, exchange control, tariff protection, and quantitative trade restrictions have macroeconomic effects of their own, but by changing the external constraints they could open the way for initiatives on other fronts. Some have argued, however, that such policies provided a country relief from the Depression only at the expense of its neighbors, and that by eliciting retaliation they only exacerbated the global crisis.

³ For a statement of this view, see Ragnar Nurkse, *International Currency Experience* (Geneva, 1944).

⁴ Even these cases have been disputed. Lars Jonung, "The Depression in Sweden and the United States: A Comparison of Causes and Policies," in Karl Brunner, ed., *The Great Depression Revisited* (Boston, 1981), pp. 286–315, has questioned the role of fiscal policy in Swedish growth. M. Beenstock, F. Capie, and B. Griffiths, "Economic Recovery in the United Kingdom in the 1930s," Bank of England Panel of Academic Consultants, *Discussion Paper* (London, 1984), have attempted to show that policy had little role in Britain's recovery. The German situation is in many ways special and will be given relatively little attention here.

⁵ An extensive literature analyzes the extent to which public officials, especially in Britain, were or were not converted to Keynesian views in the 1930s. See for example Susan Howson and Donald Winch, *The Economic Advisory Council, 1930–1939* (Cambridge, 1977); G. C. Peden, "Keynes, the Treasury and Unemployment in the Later Nineteen-thirties," *Oxford Economic Papers*, n.s., 32 (1980), pp. 1–18; and Alan Booth, "The 'Keynesian Revolution' in Economic Policy-Making," *Economic History Review*, 2nd ser., 26 (1983), pp. 103–23.

Thus, many studies of the Depression which do not dismiss the effects of policy as negligible condemn them as positively harmful.

A proper understanding of the role of external economic policy must begin with a sharp analytical distinction between protectionist measures (such as tariffs and quotas) and exchange rate management. Tariffs and devaluation are often spoken of as two sides of the same coin, both being policies designed to shift demand from foreign countries to the domestic economy. But in fact the general equilibrium implications of the two sets of policies are very different. Tariff changes inevitably create output price distortions, while a series of devaluations in many countries can leave relative output prices unchanged.⁶ A tariff increase in one country is likely to reduce economic welfare in other countries and provoke retaliation; and a global round of tariff escalation is likely to reduce welfare in all countries.⁷ The implications of exchange rate management are far more complex. One country's devaluation need not beggar the remaining countries, and a series of devaluations can easily leave all countries better off.

This paper offers a new interpretation of the effects of currency depreciation in the 1930s. We will argue that depreciation was clearly beneficial for the initiating countries.⁸ We then establish that there is in fact no theoretical presumption that depreciation in the 1930s was a beggar-thy-neighbor policy. While there is evidence that the foreign repercussions of individual devaluations were negative—that policy had beggar-thy-neighbor effects—the finding does not support the conclusion that competitive devaluations taken by a group of countries were without benefit for the system as a whole. Although it is difficult to determine whether the devaluations which actually took place had on

⁶ Exchange control is effectively a combination of tariff and devaluation policy, in the sense that it both changes the relative prices of national currencies and causes distortions in output prices.

⁷ See Harry G. Johnson, "Optimum Tariffs and Retaliation," *Review of Economic Studies*, 21, no. 2 (1953/54), no. 55, for one of the original game-theoretic analyses of tariff wars. Johnson shows that all countries suffer from a tariff war with retaliation if their economies are symmetric, while some countries may be better off, relative to free trade, in an asymmetric environment.

⁸ In this respect, our work supports the findings of E. Choudri and L. Kochin, "The Exchange Rate and the International Transmission of Business Cycle Disturbances," *Journal of Money, Credit and Banking*, 12, no. 4 (1980), pp. 565–74. Choudri and Kochin document the relationship between exchange depreciation and relative national price levels and outputs for several European countries. An analysis almost identical to theirs appears in George F. Warren and Frank A. Pearson, *Prices* (New York, 1933). Neither set of authors, however, works with a formal macroeconomic model, as in this paper, and thus they do not attempt to describe the structural mechanisms linking exchange rates with other aggregate variables. Neither do they discuss the foreign repercussions of exchange rate changes. The conclusion that the currency depreciation in the 1930s benefited the initiating country is itself controversial, since it has recently been argued, in the spirit of the new classical macroeconomics, that the effects of depreciation were in some instances negligible. Beenstock, Capie and Griffiths, "Economic Recovery," *passim*. The new classical macroeconomics insists that purely monetary changes, such as changes in the price of gold, can have no real effects since other nominal values will adjust proportionately to the monetary change. We argue that the experience of the 1930s is clearly inconsistent with this doctrine.

TABLE I
PRINCIPAL MEASURES AFFECTING EXCHANGE RATES AS OF 1937
(month and year of introduction)

Country	Official Suspension of Gold Standard	Exchange Control	Depreciation or Devaluation
Belgium	3.35	3.35	3.35
Denmark	11.31	11.31	11.31
Finland	12.31	—	10.31
France	—	—	9.36
Germany	—	7.31	—
Italy	—	5.34	3.34
Netherlands	9.36	—	9.36
Norway	9.31	—	9.31
Sweden	9.31	—	9.31
United Kingdom	9.31	—	9.31

Source: League of Nations Economic Intelligence Service, *Monetary Review* (Geneva, 1937), appendix table 1.

balance an expansionary or contractionary impact on the world economy, there is little doubt that similar policies, had they been adopted even more widely and coordinated internationally, would have hastened economic recovery from the Great Depression.

I. CURRENCY DEPRECIATION IN THE 1930S

Table 1 sets out the basic chronology of departures from the gold standard in the ten European countries whose macroeconomic experience is considered here.

Britain's departure from the gold standard in 1931 is often taken to signal the beginning of the "devaluation cycle" of the 1930s.⁹ It is important to recognize therefore that the start of the cycle preceded Britain's departure from gold by nearly two years. Argentina and Uruguay suspended gold payments in December 1929, while Hungary, Paraguay, and Brazil found themselves unable to maintain their currencies at par.¹⁰ In 1930 the exchanges of Chile, Venezuela, Peru, Australia, and New Zealand fell and remained below the gold export point. Most of these countries were both primary producers and international debtors. The reasons for their difficulties will have a familiar ring to modern observers: first, the decline in foreign lending by the United States starting in 1928; second, the fall in primary commodity prices which accelerated dramatically in 1929; and third, the

⁹ The phrase is from Nurkse, *International Currency Experience*. We elaborate on its meaning below.

¹⁰ In addition, at the end of 1929, Canada, which like the United States until 1914 adhered to the gold standard without the benefit of a central bank, introduced new restrictions on the operation of the gold standard in response to its deteriorating economic position.

imposition of protective tariffs by industrial countries, notably on their imports of food.¹¹

The international system, then, had already shown signs of weakness when financial difficulties surfaced in Europe and America in 1930. Banking crises in the United States at the end of 1930 and in Austria and Germany the following summer led to the introduction of exchange control by Germany, in July 1931. By undermining the credibility of the gold standard the controls helped to set the stage for Britain's departure from gold, in September.¹² Britain was forced to devalue, but many of the countries that followed sterling off the gold standard were not. Their reasons for depreciation varied, but the fear that export market share would otherwise be lost to countries with depreciated currencies surely bulked large. In this sense their actions have been viewed as competitive depreciations. By the end of October 1931 all of the British Dominions (except South Africa), the rest of the British Empire, the four Scandinavian countries, and Portugal, Egypt, Bolivia, and Latvia had turned to depreciation.¹³ They were followed within six months by Japan, Greece, Siam, and Peru.¹⁴

The next round of depreciation commenced with the fall of the U.S. dollar in 1933. In March of that year President Roosevelt unexpectedly restricted foreign exchange dealings and gold and currency movements, and the following month he issued an executive order requiring individuals to deliver their gold coin, bullion, and certificates to Federal

¹¹ U.S. foreign lending began to contract in 1928 as the New York stock exchange boom drove up interest rates and diverted funds from foreign lending to domestic financial markets, and this contraction accelerated as the Federal Reserve failed to accommodate the rising demand for credit. The decline in primary commodity prices following the downturn in the United States was not an entirely new development, as commodity prices had been trending downwards for much of the decade owing to the vast expansion in non-European productive capacity that had taken place during World War I. See Svennilson, *Growth*. The same can be said of the move toward protection, which was well underway before the onset of the Depression. See for example H. Liepman, *Tariff Levels and the Economic Unity of Europe* (London, 1938); or J. B. Condliffe, *The Reconstruction of World Trade* (New York, 1940).

¹² The Austrians followed the Germans with a lag, imposing exchange control in October 1931. Britain's devaluation has been examined recently by Alec Cairncross and Barry Eichengreen, *Sterling in Decline: The Devaluations of 1931, 1949 and 1967* (Oxford, 1983). There is some dispute over the importance of financial difficulties such as the Continental bank failures relative to the development of Britain's balance of payments position. See also Donald Moggridge, "The 1931 Financial Crisis—A New View," *The Banker* (1970), pp. 832–39.

¹³ South Africa's decision must be understood in terms of its unusually strong external position and exceptional attachment to a stable gold price, attributable to its position as a gold producer.

¹⁴ By December 1931, when sterling reached a trough, it had depreciated by 40 percent relative to the currencies which remained on gold. This raises the question of how countries which did not engage in depreciation could ignore such a large relative price effect. The answer is that they concluded almost universally that the costs of a loss of competitiveness were more than outweighed by the benefits of avoiding the inflation that devaluation might provoke. This was clearly the basis for the French decision: see Marguerite Perrot, *La Monnaie et l'opinion publique en France et en Angleterre, 1924–1936* (Paris, 1955). Despite the popularity of competing explanations, Kindleberger, *World in Depression*, pp. 163–64, concludes that this was the basis for the German decision as well.

Reserve Banks. From this point the dollar began to float. By setting a series of progressively higher dollar prices of gold the Administration engineered a substantial devaluation. When the dollar was finally stabilized in January 1934 at \$35 an ounce it retained but 59 percent of its former gold content.¹⁵ The U.S. action is typically viewed as a clear instance of beggar-thy-neighbor policy, since on the eve of decision the American balance of payments was already strong; depreciation represented a further shift of demand away from the products of the rest of the world.

The dollar's depreciation set off another wave of retaliatory devaluations. South Africa joined the emerging Sterling Area, and the South American currencies, many of which established links with the floating dollar, fell at accelerating rates. The Japanese yen, which had remained relatively stable in terms of sterling, now moved lower, rupturing its de facto link with the Sterling Area. The only major currencies that remained freely convertible were those of the Gold Bloc countries: France, Belgium, Holland, Italy, Poland, and Switzerland.

The international financial history of the subsequent two years was dominated by the battles fought by the Gold Bloc countries against the forces threatening to undermine their parities. The devaluation of the dollar weakened their international competitive positions and induced a reflux of capital to the United States.¹⁶ The need for increased public expenditure on rearmament compromised the fiscal position of even the countries most committed to a deflationary policy in defense of the gold standard. The financial positions of the Gold Bloc countries deteriorated seriously beginning in 1934, culminating in May 1935 in a marked loss of confidence in the sustainability of their parities and flight of international capital. Belgium, which suffered exceptionally because of unusual dependence on foreign trade, and which had experts studying the devaluation option as early as 1933, was the first Gold Bloc country to leave the fold, in March 1935.¹⁷ Similar difficulties were experienced in all of the other Gold Bloc countries except Poland. In each of these

¹⁵ There is considerable dispute over the extent to which the U.S. administration understood the relationship of its gold-buying program to the exchange rate and the price level. See John Morton Blum, *From the Morgenthau Diaries, vol. I: Years of Crisis, 1928-1938* (Boston, 1959), p. 73; or Kindleberger, *World in Depression*, pp. 226-27.

¹⁶ These difficulties were reinforced by the downward movement of sterling and its allied currencies, the tightening of exchange control by countries that used this device to reconcile expansionary initiatives with the balance-of-payments constraint, and by growing social resistance to further reductions in wages and nominal incomes.

¹⁷ In addition, the deterioration of economic conditions in its colonial possessions further undermined Belgium's budgetary position. Moreover, late in the summer of 1934, the government turned to a reflationary program, lowering the central bank discount rate and expanding credit in an effort to revitalize the economy. These efforts were sufficient to undermine confidence in the currency but inadequate to stimulate recovery. See H. van der Wee and K. Tavernier, *La Banque Nationale de Belgique et l'histoire monétaire entre les deux guerres mondiales* (Brussels, 1975).

countries, as the burden of deflation mounted, working-class resistance grew, and devaluation was increasingly discussed.¹⁸

By the second quarter of 1936 the external situation in the Gold Bloc countries had reached a crisis. Poland in April 1936 imposed exchange control for the first time. France, Holland, and Switzerland resisted exchange control, and suffered heavy gold losses. In France, the Popular Front, which came to power in April 1936, committed itself to a vigorous reflationary policy and to defense of the gold standard. Within months of its accession, the incompatibility of the two goals was recognized. Currency depreciation was postponed to September, with considerable difficulty, while the French negotiated with the British and Americans to prevent competitive depreciations.¹⁹ But once the franc was allowed to begin its descent the other Gold Bloc currencies followed without delay. Devaluation had come full circle.

II. FORMS OF CURRENCY DEPRECIATION

Currency depreciation in the 1930s took a number of forms, with differing implications for domestic and foreign economies. The precise character of the devaluations hinged on the domestic and international financial policies that accompanied the change, including the allocation of profits on revalued central bank reserves, the restrictions on dealings in foreign exchange, and the mechanisms to control fluctuations in the exchange rate.

Not all countries wrote up the book value of foreign reserves to reflect the higher domestic-currency price at which gold would now be traded. The United Kingdom and many members of the Sterling Area, for example, continued to value gold reserves at par. Revaluation profits were put to various uses. One option was to use them to support an expansion in the money supply, without reducing the proportionate backing of the currency by international reserves. Revaluation profits were transferred directly to the fiscal authorities (the method used in

¹⁸ These difficulties were least pronounced in Holland, whose trade was heavily concentrated in its seven colonies and hence immune to the effects of foreign tariffs, and whose coal, electricity, and cement industries actually continued to expand between 1929 and 1933. See Fernand Baudhuin, "Europe and the Great Crisis," in Herman van der Wee, ed., *The Great Depression Revisited* (The Hague, 1972). The French case bears a remarkable resemblance to that of Belgium. In September 1935, the French government, which had previously remained firm in its commitment to deflation, demanded new constitutional powers to enable it to carry through its program, which were ultimately denied. This government fell and was replaced by another which included a policy of domestic credit expansion as part of its program. See Sauvy, *Histoire*.

¹⁹ These negotiations culminated in the Tripartite Agreement of September 1936. See S.V.O. Clarke, "Exchange-Rate Stabilization in the Mid-1930s: Negotiating the Tripartite Agreement," *Princeton Studies in International Finance*, no. 41 (Princeton, 1980); and Barry Eichengreen, "International Policy Coordination in Historical Perspective: A View from the Interwar Years," in Willem Buiter and Richard Marston, eds., *The International Coordination of Economic Policies* (Cambridge, 1985) for details.

Argentina, Italy, and to a limited extent in Romania), or else were allocated to special funds designated for purchases of government securities (the method used in Belgium starting in April 1935 and in France starting in July 1937). The alternative of using revaluation profits to extinguish government debt held by the central bank—adopted wholly or in part by France in October 1936, Czechoslovakia, Romania, and Japan—had no direct effect on the money supply.²⁰

Another alternative was to allocate the revaluation profits to newly established exchange stabilization funds, as was done in the United States, Belgium, Switzerland, and France in 1936. In these cases, the profits on revalued gold reserves were reflected neither in the book value of the central bank's reserves nor in its reserve ratio. But to the extent that a fund was entitled to use the currency it got to purchase securities held by the public, through the intervention of the fund the revaluation profits might ultimately support an expansion in the money supply.

The ostensible purpose of these funds was to smooth short-term fluctuations in the exchange rate. If they restricted their intervention to damping temporary fluctuations, their operations would have no lasting impact on the money supply. Yet in practice many such funds intervened to defend the competitive advantage conferred by devaluation, preventing any subsequent appreciation of the exchanges. The actions of the British Exchange Equalisation Account, for example, among the most active funds, have recently been interpreted in this light.²¹ The American Exchange Stabilization Fund, in contrast, bought and sold dollars only occasionally, as required to maintain the \$35 gold price.²²

The other way in which exchange rates were regulated following devaluation was through the imposition of exchange control. In many cases exchange control had first been adopted during the 1931 financial crisis as a way of stemming capital flight. In nearly every instance the restrictions adopted then were retained after the immediate convertibility crisis subsided (for details, see Table 1). Restrictions on capital exports ranged from attempts to impose a complete prohibition on capital exports, as in Austria and Estonia, to relatively moderate disincentives such as the 4 percent tax imposed by Mexico on all remittances not of commercial origin. In order to prevent disguised capital transfers, countries imposing tight exchange control adopted new regulations on commercial transactions.²³ In many countries the authorities nonetheless proved incapable of preventing the development

²⁰ In France, some 35 percent of the profits were so applied.

²¹ For qualitative evidence see Susan Howson, "Sterling's Managed Float: The Operations of the Exchange Equalisation Account," *Princeton Studies in International Finance*, no. 46 (Princeton, 1980); and for econometric support see Cairncross and Eichengreen, *Sterling in Decline*.

²² The Fund instituted in Belgium was abolished once the exchange rate was stabilized. Similar funds were also created by Canada and China.

²³ In many cases this need to increase oversight of commercial transactions reinforced the tendency toward increased trade restrictions.

of black markets in foreign exchange.²⁴ Potential international borrowers attempted to discriminate in the treatment of new and old loans in such a way as to encourage further capital imports. Thus, provisions were included in several exchange control laws to guarantee the free transfer of service on new foreign investments.²⁵

III. SINGLE-COUNTRY EFFECTS OF DEPRECIATION

There are four principal channels through which the currency depreciations of the 1930s could have affected domestic and foreign economies: real wages, profitability, international competitiveness, and the level of world interest rates. Our analysis makes use of a simple two-country model, drawing on the work of Mundell and Fleming, but extended to encompass the determinants of aggregate supply and the gold-standard constraints. The model, whose elements appear in the note to Table 2, incorporates Keynes's characterization of labor and output markets: in each country nominal wages adjust only slowly, but prices adjust with sufficient speed to clear commodity markets. Aggregate supply in each country depends on profitability, as measured by the ratio of product prices to wages. Aggregate demand in each country depends on competitiveness (or the ratio of domestic to foreign prices) and on interest rates (which determine the division of spending between present and future). Money demand depends on output and interest rates, where interest rates are linked internationally by the open interest parity condition. Expectations of exchange rate changes are neglected; domestic and foreign interest rates can therefore be taken as equal, and no distinction need be made between real and nominal interest rates.

The effects of depreciation depend on its form, and in particular on the accompanying monetary measures. In "sterilized devaluation" the depreciating country expands the domestic component of its money supply sufficiently to leave gold reserves unchanged. In "unsterilized devaluation" the depreciating country adjusts domestic credit only enough to keep unchanged the ratio of gold backing to money in circulation. Gold reserves may rise or fall. Two other cases useful for analyzing competitive depreciation are simultaneous unsterilized devaluation, when both countries leave the ratio of gold backing unchanged but allow the total base to fall; and simultaneous devaluation in which both countries leave their monetary base, and money supply, unchanged. Following the notation in Table 2, sterilized devaluation is when $dg < 0$ but gold backing is adjusted to permit reserves to remain unchanged ($dr = 0$). Unsterilized devaluation is when $dg < 0$ and the gold backing remains unchanged ($d\psi = 0$).

²⁴ See Bank for International Settlements, *Annual Report* (Basle, 1934), for examples.

²⁵ For example, a regulation was adopted in Poland in November 1937, under which the transfer of principal and interest on new foreign loans was exempted from exchange control. Similar measures were adopted in Italy and elsewhere.

TABLE 2
IMPACT OF EXCHANGE-RATE DEPRECIATION ON ENDOGENOUS VARIABLES

Case	Variable				
	Domestic Output	Foreign Output	Domestic Reserves	Foreign Reserves	Interest Rate
I. Sterilized devaluation	+	-	0	0	-
II. Unsterilized devaluation	+	+/-	+/-	+/-	+/-
III. Simultaneous devaluation, unchanged gold backing	+	+	0	0	-
IV. Simultaneous devaluation, unchanged monetary base	0	0	0	0	0

Note: A plus or minus indicates the sign of the comparative statics result. +/- indicates that the direction of the effect cannot be signed.

These results are derived from a model of two symmetrical countries, in which each country is characterized by relationships of the following form. (Lower-case letters denote logs of variables, and asterisks denote foreign values.)

Aggregate supply is a negative function of the real product wage:

$$q = -\alpha(w - p)$$

where q is the log of GDP, w is the log wage (taken as fixed), and p the log price of domestic goods. Under a gold standard, each country fixes the domestic price of gold, where G is ounces of gold per unit of domestic currency. The foreign price of domestic currency is G/G^* and the log exchange rate $g - g^*$. Aggregate demand is a decreasing function of the relative price of domestic goods and of the nominal interest rate:

$$q = -\delta(p + g - g^* - p^*) - \sigma i$$

where the domestic interest rate i equals the foreign rate by open interest parity. The demand for money takes the form:

$$m - p = \theta q - \beta i$$

where m is the log of nominal money balances. Money supply is defined as the value of gold reserves R/G (where R is the volume of reserves) times the reciprocal of the gold-backing ratio $\psi = (R/G)/M$.

$$m = r - g - \psi$$

Since the (fixed) world gold stock is divided between the two central banks:

$$\gamma dr + (1 - \gamma) dr^* = 0$$

where γ is the domestic bank's initial share of the world total.

The effects of depreciation are summarized in Table 2. In all cases of unilateral devaluation, currency depreciation increases output and employment in the devaluing country. By raising the price of imports relative to domestic goods, depreciation switches expenditure toward domestic goods. The increased pressure of demand will tend to drive up domestic commodity prices, moderating the stimulus to aggregate demand and (by reducing real wages) stimulating aggregate supply, until the domestic commodity market clears. The same effect switches demand, of course, away from foreign goods, exerting deflationary pressure on the foreign economy. But the extent of the change in domestic production and the beggar-thy-neighbor outcome depend not only on adjustments in commodity markets; they depend also on

conditions in asset markets. Devaluation, if accompanied by sufficient monetary expansion to cause gold to flow abroad, will tend to reduce world interest rates and thereby stimulate demand in *both* countries. The stimulus from lower interest rates can exceed or fall short of the contractionary shift of demand away from foreign goods and towards the devaluing country. Thus foreign output may rise or fall after the devaluation. Necessary though not sufficient conditions for foreign output to increase are that the foreign country gain gold reserves after devaluation in the home country, or that the foreign country allow its own ratio of gold backing to decline.

The change in foreign output and employment depends, therefore, on the home-country measures that accompany depreciation. For example, the devaluing country could expand the domestic credit component of its monetary base sufficiently to prevent any international movement of reserves, the case of sterilized devaluation. Output rises at home and falls abroad, while world interest rates decline. Alternatively, the devaluing country might refuse to initiate any change in domestic credit. Since the volume of gold remains linked to the quantity of money at the initial ratio, the impact on the foreign country will be more contractionary than with sterilized devaluation. Domestic output rises, foreign output falls and, in the case of symmetrical countries, world interest rates are unchanged.

A third possibility is that the devaluing country recognizes the existence of capital gains on its gold reserves and expands the monetary base by the percentage devaluation, leaving the gold backing of the base unchanged (with gold valued at the new parity).²⁶ This is the case of unsterilized devaluation. The gold reserves of the devaluing country can either rise or fall. The decline in world interest rates may swamp the expenditure-switching effect, causing foreign output to rise.

This analysis is premised on a framework in which monetary variables are non-neutral. One may ask whether this is an appropriate premise. Figure 1 provides an example of the relationships which led to it. The figure shows the percentage change in the exchange rate between 1929 and 1935 and the percentage change in industrial production. The terminal date of 1935 is chosen to permit depreciations as much time as possible to work their effects.²⁷ We include all the economies of western Europe for which comparable data could be obtained.²⁸ A depreciation,

²⁶ To keep the percentage of gold backing unchanged, open market operations are required not just to inject into circulation currency in the amount of the capital gains on gold reserves but also to increase the domestic credit component of the monetary base by the proportion of devaluation. Compare Gottfried Haberler, *Prosperity and Depression* (Geneva, 1937).

²⁷ Still later dates are undesirable because by 1936 all countries had devalued and there hence remain no gold standard countries with which to compare, but also because the course of recovery becomes increasingly dominated by rearmament expenditure.

²⁸ We purposely excluded the United States on the grounds that the Depression to a large extent originated there rather than being imported from abroad and therefore would have had very

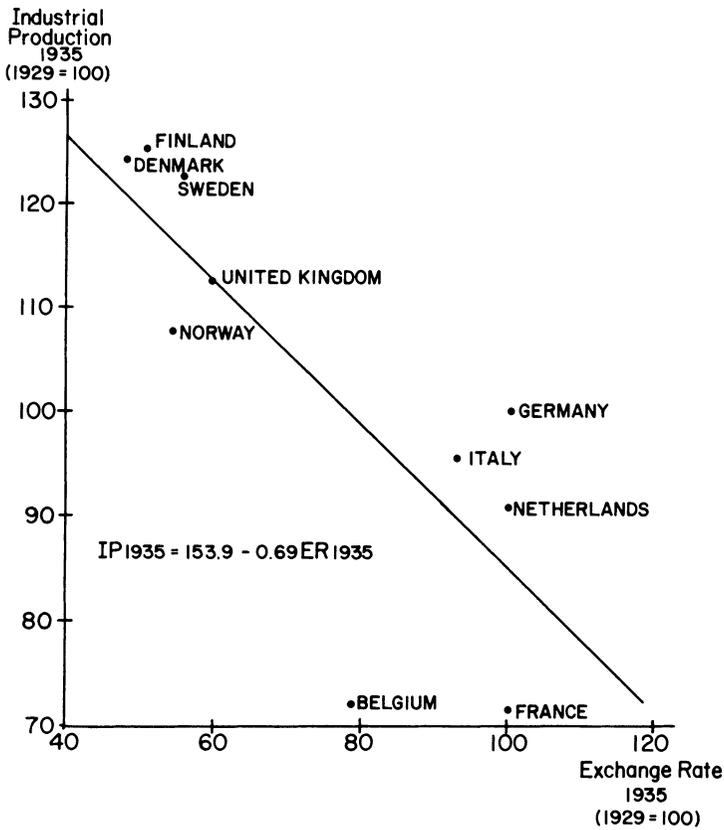


FIGURE 1
CHANGES IN EXCHANGE RATES AND INDUSTRIAL PRODUCTION, 1929-1935

plotted along the horizontal axis, is expressed as the gold price of domestic currency in 1935 as a percentage of the 1929 parity; a value of 100 for France indicates no depreciation, while a value of 59 for the United Kingdom indicates a 41 percent depreciation. The change in industrial production, plotted along the vertical axis, is the ratio of production in 1935 to 1929 multiplied by 100.

There is a clear negative relationship between the height of the exchange rate and the extent of recovery from the Depression. The countries of the Gold Bloc, represented here by France, the Netherlands, and Belgium, had by 1935 failed to recover to 1929 levels of industrial production. Countries which devalued at an early date (the United Kingdom, Denmark, and the Scandinavian countries) grew much more rapidly; and there appears to be a positive relationship between the magnitude of depreciation and the rate of growth. Germany

different implications for the characteristics of both the downturn and the recovery. We did no experimentation with different samples of countries but intend to increase the size of the sample in future work.

TABLE 3
REDUCED FORM REGRESSION RESULTS

Dependent Variable	Period	Constant Term	Exchange Rate Term	Dummy Variable for Germany	R ²
1. Industrial production	1929–1935	153.9 (10.06)	–0.69 (3.51)		.56
2. Industrial production (including U.S.)	1929–1935	142.9 (7.61)	–0.59 (2.32)		.32
3. Industrial production (including U.S.)	1932–1935	2.04 (7.40)	–0.97 (2.96)	0.58 (4.10)	.62
4. Real wage	1929–1935	0.73 (3.00)	–0.0065 (2.07)		.27
5. Export volume	1929–1935	1.39 (8.30)	–0.0075 (3.46)		.55
6. Discount rate	1929–1935	–4.29 (4.26)	0.031 (2.25)	–1.861 (1.95)	.47
7. Tobin's q	1929–1935	136.8 (5.62)	–0.933 (2.96)		.46
8. Gold reserves	1931–1935	2.40 (4.84)	–0.018 (2.79)		.43

Notes and Sources: *t*-statistics in parentheses. All variables are normalized to 100 in 1929 and defined as follows:

1. *Industrial production*: National indices of industrial production, from Mitchell, *European Historical Statistics*; and H. W. Methorst, *Recueil international de statistiques economiques 1931–1936* (La Haye, 1938).
2. *Exchange rate*: Gold value of currencies as a percentage of 1929 gold parity, from League of Nations Economic Intelligence Service, *Monetary Review* (Geneva, 1938).
3. *Real wage*: Nominal wage deflated by wholesale price index. Wages, from Mitchell, *European Historical Statistics*, measure hourly, daily, or weekly wages, depending on country. Note that wages for Belgium are for males in transport and industry only, that wages in France are for men only. Wholesale price indices are from Mitchell, *European Historical Statistics*.
4. *Export volume*: Special trade, merchandise only, measured in metric tons, from League of Nations, *Monthly Bulletin of Statistics* (Geneva, July 1936); League of Nations, *Review of World Trade, 1936* (Geneva, 1937).
5. *Discount rate*: From League of Nations, *Review of World Trade, 1936*.
6. *Gold reserve*: Gold stock valued in constant dollars of 1929 gold content, as of December of the year. From C. D. Hardy, *Is There Enough Gold?* (Washington, D.C., 1936); and Federal Reserve Bulletin (various issues).
7. *Security prices*: Indices of industrial share prices. From League of Nations, *Monthly Bulletin of Statistics*; and Methorst, *Recueil*.

and Belgium are outliers, Belgium presumably because she devalued only at the end of the period, leaving relatively little time for exchange rate changes to influence growth, and Germany presumably because of the influence of capital controls whose effects were analogous to an explicit depreciation.²⁹

The first regression in Table 3 shows the reduced-form relationship between changes in industrial production and the exchange rate. As explained above, the United States was excluded from the sample on

²⁹ Belgium's participation in the Gold Bloc and her decision to leave in 1935 are discussed in detail by van der Wee and Tavernier, *La Banque*. A detailed description of German exchange control is provided by Howard S. Ellis, *Exchange Control in Central Europe* (Cambridge, 1941).

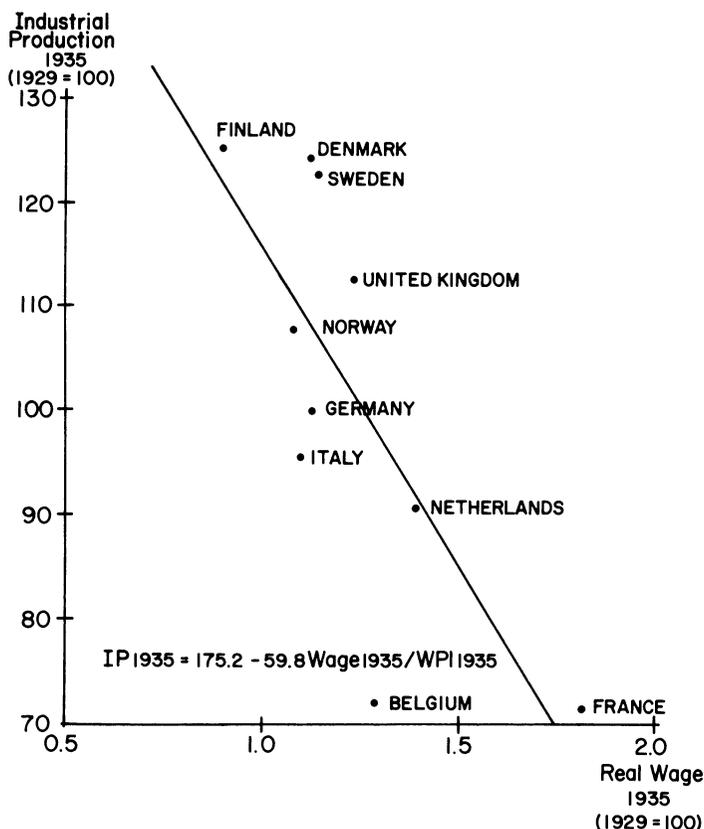


FIGURE 2
CHANGES IN REAL WAGES AND INDUSTRIAL PRODUCTION, 1929-1935

the grounds that the Great Depression to a large extent originated there, rendering the downturn unusually severe and differentiating the course of the subsequent recovery. In fact, including the United States weakens the relationship only slightly, as shown in the second line of Table 3. Moreover, if the distinguishing characteristics of the Depression in the United States had their greatest impact on the depth of the initial decline rather than on the effects of subsequent exchange-rate changes, then the relationship should be stronger when growth between 1932 and 1935 is compared with the extent of depreciation. Since the German economy becomes tightly regulated after 1931, it is necessary to add a dummy variable for Germany. The regression appears in the third line of Table 3.

It can be objected that both the exchange rate and industrial production are endogenous variables, so that we should not attribute variations in economic growth to movements in exchange rates rather than vice versa. We prefer our interpretation for several reasons. First is a matter of timing. In all cases, devaluation preceded the beginning of recovery, judged on the basis of annual data. Second is a matter of logic. It is hard to make a case for reverse causation, that faster growing countries were

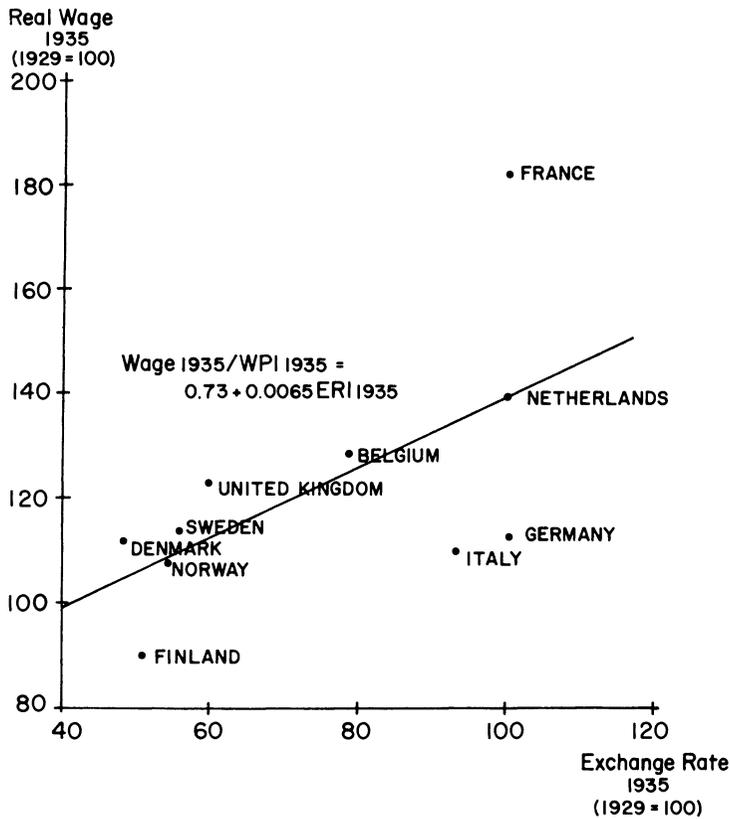


FIGURE 3
CHANGES IN EXCHANGE RATES AND REAL WAGES, 1929-1935

pushed into devaluation. Indeed, we will demonstrate that the faster growing countries were absorbing, not losing, gold, so that it would be tricky indeed to make the case that fast growth forced countries off their gold parities. Third is a matter of history. Exchange rates in the 1930s depended not merely on economic pressures but on national attitudes toward the monetary standard, where the attitudes towards the standards were predetermined relative to the events of the early 1930s. The allegiance of nations to their gold standard parities appears to have been largely dependent on their stabilization experiences in the early 1920s. Ironically, those nations which made the most concerted efforts to restore prewar gold standard parities in the early 1920s showed the least hesitation to devalue in the early 1930s. The obvious contrast is between Britain and France, although the point applies generally. French opinion was so traumatized by the successive "battles of the franc" that took place between 1922 and 1926 that it was hesitant even to contemplate the option of devaluation before 1936.³⁰ In Britain, where the decision

³⁰ French opinion on monetary and financial questions, along with British comparisons, is reviewed by Perrot, *La Monnaie*. Political aspects of the French debate are summarized by Sauvy, *Histoire économique*.

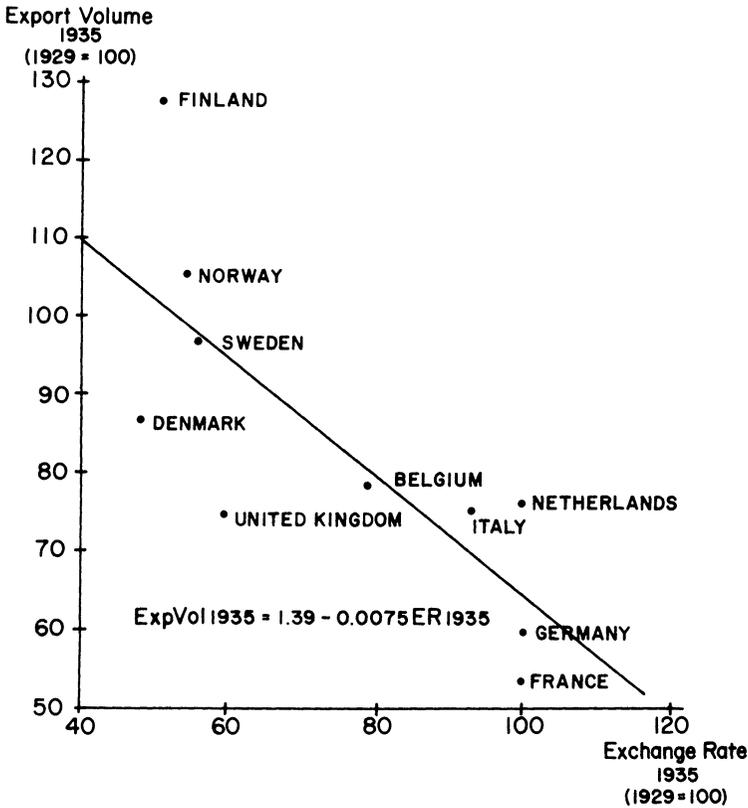


FIGURE 4
CHANGES IN EXCHANGE RATES AND EXPORT VOLUME, 1929-1935

to return to the prewar parity was little questioned in 1925, there was nearly no mention of a return to the gold standard once convertibility was suspended.³¹ The important point is that the decision of whether to devalue in the 1930s was heavily influenced by considerations exogenous to our macroeconomic model, namely, the historical experience of the 1920s.

Figures 2 through 5 show various aspects of the mechanism linking exchange rates to economic activity. In Figure 2 the change in real wages (on the horizontal axis) is plotted along with the change in industrial production (on the vertical axis). The clear negative relationship indicates that supply considerations strongly influenced the rate of economic recovery.³² Countries which succeeded in reducing real wages enhanced profitability and boosted aggregate supply. Again, Belgium appears as something of an outlier, perhaps because the late

³¹ The definitive analysis of the decision to return to par in 1925, which highlights the role of the few dissenters such as Keynes, is Donald E. Moggridge, *The Return to Gold, 1925* (Cambridge, 1969). An account which emphasizes the implications of the 1925 decision for attitudes toward depreciation in 1931 is Cairncross and Eichengreen, *Sterling in Decline*.

³² Although both industrial production and the real wage are endogenous variables, we report the regression for completeness.

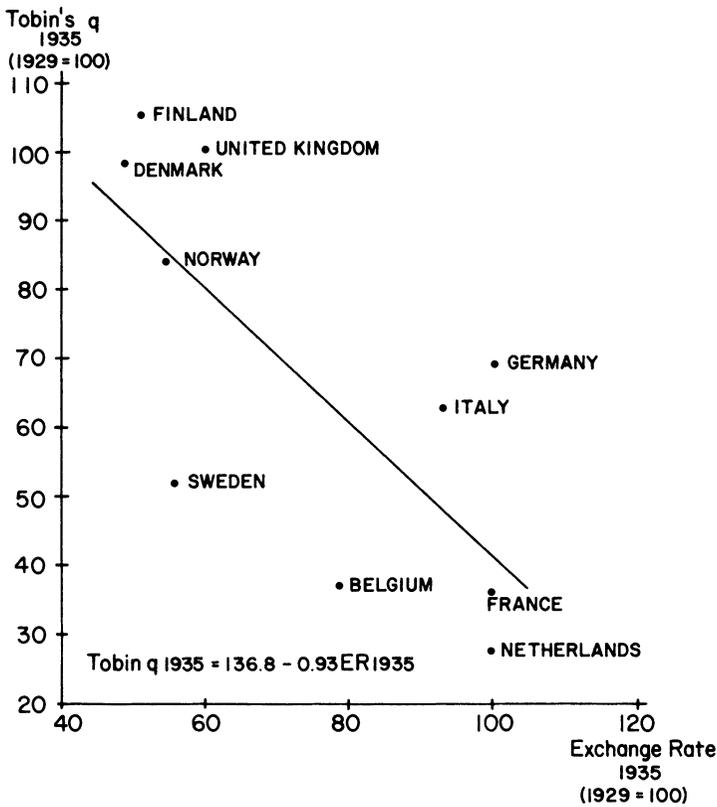


FIGURE 5
CHANGES IN EXCHANGE RATES AND TOBIN'S q, 1929-1935

date of devaluation there left little time for its effects. Figure 3 and Table 3 show the relationship between the change in the exchange rate and the change in the real wage, suggesting that depreciation, by putting upward pressure on prices, contributed to the reduction in the real wage which stimulated supply in devaluing countries. Of course, other factors in addition to exchange-rate policy influenced the evolution of real wages. These other factors appear to have played relatively large roles in Germany, Italy, Finland, and France. In Italy and especially in Germany the labor market came under increasingly strict government regulation as the 1930s progressed; it is not surprising that the change in real wages only moderately reflects the market forces considered.³³

$$IP1935 = 175.2 - 59.8 (WAGE1935/WPI1935)$$

(7.39) (3.14)

$$\bar{R}^2 = .50$$

Similar relationships are reported by Sheila Bonnell, "Real Wages and Employment in the Great Depression," *Economic Record* (1981), pp. 277-81.

³³ Control of the German labor market has been analyzed by Otto Nathan, *The Nazi Economic System* (Durham, 1944); and, more recently, by Frank Kim, "The German Economy during the Interwar Period: Preparation for War?" (thesis, Harvard College, 1983).

The impact of depreciations on demand is apparent in Figure 4, where they are plotted against the change in export volume. The fifth regression in Table 3 documents the statistical relationship: countries which depreciated succeeded in promoting the recovery of export volume compared with countries that remained on gold.³⁴ The result may or may not be consistent with the beggar-thy-neighbor characterization of exchange-rate policy, but it indicates that a single depreciation, taken in isolation, did increase demand in the depreciating country. In Figure 4, France and Finland are the noticeable outliers, presumably reflecting the impact of the same supply-side factors causing these countries to be outliers (in Figure 3) in terms of wage performance.

A second major channel through which depreciations could have influenced demand is through the world level of interest rates. Countries that devalued could have taken advantage of the relaxation of gold-standard constraints and engineered a reduction in interest rates through the adoption of accommodative money and credit policies. In the formal model, depreciation and accompanying monetary initiatives affect only the overall level of world interest rates. In a more general model, depreciation might give rise to interest-rate differentials among countries, creating not only the expenditure-increasing effect but also an expenditure-switching effect. In practice it is difficult to marshal evidence concerning the impact of exchange-rate policy on interest rates. Interest rate on assets with even approximately comparable maturities and risk characteristics are available for only a subset of European countries. In the sixth line of Table 3 we therefore report a regression of the change in the exchange rate against the change in the central bank discount rate. The discount rate is an administered price rather than a direct measure of market conditions. Yet in market economies the discount rate could not diverge markedly from freely determined rates, since central banks which discounted the eligible paper of the private sector could not afford to do so at rates far out of line from market levels. The regression indicates a positive relationship between the height of the exchange rate and the discount rate once account is taken of the extent of capital controls in Germany.³⁵ When currencies were devalued, central banks were able to capitalize on the increased strength of the external position by reducing interest rates.

A third major channel through which exchange-rate changes could have stimulated demand was by promoting domestic investment. In-

³⁴ The same picture would emerge were we to construct measures of the real exchange rate and plot them against export volume, since each country's real exchange rate is dominated by the movement of its nominal exchange rate.

³⁵ The relationship is strengthened when a further dummy variable is added for Italy, the other country with stringent capital and exchange market controls.

$$\Delta C B D R = -4.77 + 0.040 \Delta E R - 2.31 G E R M A N Y - 1.55 I T A L Y$$

(5.37) (4.19) (2.73) (1.92) $\bar{R}^2 = .51$

creased competitiveness, by raising current sales, could have enhanced profitability and provided an incentive to invest. To the extent that central banks were able to utilize the leeway provided by depreciation to reduce the level of interest rates, the present value of expected future profits also would have been raised, further increasing perceived profitability, while the reduction in interest rates at the same time lowered the cost of investment. Adequate data on the volume of domestic investment is available only for a few European countries. We therefore examine the behavior not of investment itself but of a measure of the incentive to invest: Tobin's q . In theory, q —the ratio of security prices to output prices—incapsulates all the information relevant to the investment decision.³⁶ Figure 5 plots the change in the exchange rate along with the change in the ratio of security prices to wholesale prices. Again, a negative relationship is evident: countries which depreciated their currencies in the 1930s succeeded in raising Tobin's q and increasing the incentive to invest. The result is consistent with the view that both domestic investment demand and foreign export demand promoted their economic recovery.

IV. INTERNATIONAL REPERCUSSIONS OF DEPRECIATION

Together this evidence on the structural relationships linking exchange rates to economic recovery suggests that the cross-section pattern depicted in Figure 1 is not a spurious correlation. Exchange-rate policy promoted growth not through one but through each one of the major channels: by reducing real wages, enhancing competitiveness, promoting exports, and permitting a reduction of interest rates. Whether the gain to devaluing countries had as its counterpart a loss to those which remained on gold—in other words, whether this policy was beggar-thy-neighbor—depends on the precise form of the devaluations. If the devaluing country increases its money supply sufficiently to induce an outflow of gold, the stimulus to demand of lower interest rates abroad may be sufficient to expand the foreign economy. As mentioned earlier, gold outflow is a necessary but not sufficient condition for the foreign expansion. Thus, the direction of gold flows provides an indicator of whether devaluation was necessarily beggar-thy-neighbor. The final equation in Table 3, therefore, regresses the exchange rate against the change in gold reserves. The negative relationship is apparent: depreciating countries gained rather than lost gold reserves. Further evidence to this effect appears in Table 4. Currency depreciation, beneficial from the individual country's point of view, was in fact beggar-thy-neighbor.

³⁶ See James Tobin, "A General Equilibrium Approach to Monetary Theory," *Journal of Money, Credit and Banking*, 1 (1969), pp. 15–29.

TABLE 4
GOLD RESERVES AND GOLD COVER RATIOS OF CENTRAL BANKS

Country	Ratio of Gold Reserves to Notes and Other Sight Liabilities (%)		Amount Held (in millions of 1929 U.S. dollars)	
	1929	1936 ^a	1929	1936
Belgium	38.1	67.8	163	373
Denmark	39.6	50.8	46	32
Finland	19.0	61.3	8	21
France	47.4	59.1	1,631	1,769
Germany	36.1	1.0	560	16
Italy	27.5	22.0	273	123
Netherlands	49.9	81.4	180	289
Norway	36.0	74.2	39	58
Sweden	29.0	63.8	66	142
United Kingdom	27.4	78.3	711	1,529

^a With gold at market prices.

Source: League of Nations Economic Intelligence Service, *Monetary Review* (Geneva, 1937), table 6.

Whether the gain to the devaluing countries outweighed the loss to their neighbors is an extremely difficult question. It remains true, however, that had such policies been adopted even more widely and in a coordinated fashion, they could have been beneficial for all the countries involved. In our model, a simultaneous devaluation taken by all countries may have no immediate effects; simply raising the domestic-currency price of gold in each country affects none of the equilibrium conditions in goods or asset markets.³⁷ But if money supplies are expanded to reflect the capital gains on gold reserves (thus holding the gold cover ratio constant), then the reduction in interest rates stimulates activity both at home and abroad.

The cogent criticism of exchange-rate depreciation in the 1930s, therefore, is not that it was used unfairly but that the policy was pursued sporadically, and was avoided altogether by some major countries. Often, exchange rates were adjusted in the wake of a crisis, although this was not uniformly the case.³⁸ Financial crises shifted from one country to another, because each time a country known to be in a delicate position devalued a new country was elevated to the position of being the next one expected to fall. Norkse labels this sequential pattern the "devaluation cycle." The resulting uncertainty about exchange

³⁷ This experiment is analyzed as Case IV in the appendix, available on request. We stress *immediate* effects. By raising the price of gold in terms of commodities, an increased flow supply of new gold could be elicited in the long run. For contemporary discussion of this mechanism, see Gold Delegation of the League of Nations, *Report* (Geneva, 1932).

³⁸ An obvious contrast is between the successive financial crises in Austria, Germany, and Britain in the summer of 1931, which gave rise to either devaluation or the imposition of exchange control, and the voluntary decisions of many of the countries which decided to follow Britain off gold in the course of subsequent months.

rates may have had the depressing impact on trade so emphasized by contemporaries but also may have led international investors (including central banks) to liquidate a portion of their foreign exchange holdings and replace them with gold. In our model the effects of such actions are captured by a rise in the gold cover ratio.³⁹ The same world stock of gold can then support only a smaller money supply, raising interest rates and exerting deflationary pressure. To the extent that demands for gold were increased by the "sequential" or "successive" nature of the devaluations of the 1930s, the benefits of an "all-round" devaluation were reduced.⁴⁰

Protection, like devaluation, also is capable of exerting expansionary effects at home. But the adoption of tariffs by all countries (reducing producer prices and lowering output and employment) leaves everyone worse off; coordinated devaluation both at home and abroad together with accommodative monetary measures is likely to leave everyone better off.⁴¹ Too often competitive devaluation and tariff protection have been viewed as interchangeable. They are not.

V. CONCLUSIONS

Given the number of unanswered questions posed along the way, our paper has been as much an agenda for research as a statement of results. The main limitation of the present analysis is the subset of policies on which it focuses. Currency depreciation was only one of several instruments of external economic policy, along with exchange controls and trade restrictions. Moreover, internal economic measures—notably fiscal policy—can and should be incorporated into the model, although their empirical analysis awaits construction of adequate measures of fiscal stance.⁴² Above all, we have taken the formulation of policy as exogenous to our analytical framework. A full understanding of the role

³⁹ This experiment is analyzed as Case V in the appendix, available on request.

⁴⁰ It is conceivable that this could yield the outcome suggested by Kindleberger, namely that devaluation could lower prices abroad while leaving home-country prices unchanged. Note, however, that the mechanism is very different from his argument concerning a ratchet effect in commodity markets. Kindleberger, *World in Depression*, chap. 4.

⁴¹ For a formal analysis of the effects of commercial policy, see Barry Eichengreen, "A Dynamic Model of Tariffs, Output and Employment Under Flexible Exchange Rates," *Journal of International Economics*, 11 (1981), pp. 341–59; Barry Eichengreen, "The Smoot-Hawley Tariff and the Start of the Great Depression" (unpublished manuscript, 1984).

⁴² To date, constant employment measures of the government budget have been constructed only for the United States and Britain. See E. Cary Brown, "Fiscal Policy in the Thirties: A Reappraisal," *American Economic Review*, 46 (1956), pp. 857–79; and Roger Middleton, "The Constant Employment Budget Balance and British Budgetary Policy, 1929–39," *Economic History Review*, 2nd ser., 34 (1981), pp. 266–86. For an extension to the analysis of commercial policy, see Barry Eichengreen, "The Australian Recovery of the 1930s in International Comparative Perspective" (unpublished paper presented to the conference on the Australian Economy in the 1930s, Canberra, August 1985, and forthcoming in the conference volume).

of policy in the economic recovery of the 1930s requires an integrated analysis of both policy's formulation and effects.

This much, however, is clear. We do not present a blanket endorsement of the competitive devaluations of the 1930s. Though it is indisputable that currency depreciation conferred macroeconomic benefits on the initiating country, because of accompanying policies the depreciations of the 1930s had beggar-thy-neighbor effects. Though it is likely that currency depreciation (had it been even more widely adopted) would have worked to the benefit of the world as a whole, the sporadic and uncoordinated approach taken to exchange-rate policy in the 1930s tended, other things being equal, to reduce the magnitude of the benefits.