Effective Exchange Rates in the Nineteen-Thirties: The European Gold Bloc and North America *

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(I)

The use of a multilateral or effective exchange rate instead of a bilateral exchange rate (usually with the pound or the dollar as the numeraire currency) has now become a well established practice following the collapse of the Bretton Woods adjustable peg system and in the absence of any fixed or semi-fixed exchange rate regime to replace it. It is now widely accepted that in a period of floating exchange rates a bi-lateral exchange rate cannot adquately reflect the movements of the currency of any major trading country. Moreover, even in the case of minor currencies which are pegged to a major currency, changes in the exchange rate of countries who do not use the same peg or float independently mean that its effective exchange rate changes even though its exchange rate against the major currency to which it is pegged may remain fixed.

A plausible implication of this recent development is that the usefulness of the effective exchange rate concept is not confined to the 1970s but must surely extend to all periods of general floating and an obvious application relates to much of the inter-war period. A number of inter-war sterling effective exchange rates have recently been calculated [1] and the approach is extended here to four European countries — France, Belgium, Holland and Switzerland, the members of the gold bloc with relatively "free" currencies — and the two North American currencies (the US and Canadian dollars). The calculations cover the 1930-39 period.

There are several problems involved in calculating effective exchange rates and numerous limitations implied by those problems which are discussed below. Section II deals with the actual calculation and compares different variants of each country's effective exchange rate. Finally Section III compares

* I am indebted to Professor A.G. Ford for helpful comments on an earlier draft. Any remaining errors are my own.

[1] See Dimsdale (1981), Redmond (1980) and (1984) and also some unpublished work by B.P.A. Andrews (Balliol College, Oxford).

the effective rates of each country with its bilateral rates against the major currencies and draws some conclusions.

In principle an effective exchange rate seeks to provide an average of the movements of a currency against all others to allow for bilateral exchange rate changes which will differ in degree and even direction during a period of floating exchange rates. These differences are illustrated in Table 1 which covers the 1931-1936 period. Thus the Belgiam franc appreciated 21% against the US and Canadian dollars but only 19% against the pound sterling whilst it depreciated by 28% against the French franc and by 8% against the Spanish peseta and so on. The case for calculating an effective rate (also shown in Table 1) would therefore seem to be a strong one.

Unfortunately moving from the general definition above to a more specific definition of an EER (effective exchange rate) is not so easy because an "average" exchange rate implies a weighting system and hence that the EER must be related to some other variable(s). The most common approach is to relate it to the balance of trade (or occasionally the balance of payments) and this practice is adopted here. For example, a change in France's EER is, therefore, defined as the proportionate change in the value of the franc, against all other currencies (expressed as an index) that would have the same effect on the French balance of trade as all the changes in franc bilateral exchange rates that actually did occur.[2]

Having defined the EER, there are three important methodological problems which require attention: the choice of base year, the precise form of the weighting scheme and the selection of countries to be included in the index. A base year is required simply because EERs are expressed in terms of changes rather than absolute values. Consequently, it is not particularly important which year is selected for most purposes except insofar as there is sometimes a tendency to treat the base period as in some sense "normal" or more specifically a period in which the exchange rate was at an equilibrium level. This is a mistake as the choice is usually more pragmatic:

> "The base date is normally chosen so as to make the index show deviations

[2] The basic definitional problem is that EERs cannot really be "general" because of their very nature. An EER is calculated to shed light on a particular policy issue and its exact definition (and weights) are determined by the policy issue or variable of specific interest. The use of the balance of payments as the basis for the weighting system probably constitutes the most general and widely acceptable approach but would not provide an appropriate source of weights if an EER were being calculated for a more specific purpose; in addition the tendency in some calculations to use a subsection of the balance of payments in practice – such as the balance of trade (as is done in the present study on the grounds of data availability) or even trade in manufactures only – reduces the generality of the EER although it does become more useful as an indicator of changes in competitiveness due to exchange rate movements, the provision of which is often an important purpose of calculating an EER.

Table 1

PERCENTAGE CHANGE IN EXCHANGE RATES
(Jan. 1931 to Jan. 1936)*

Against that of: / Appreciation (+) or Depreciation (−) of the currency of:	U.S.A.	Canada	France	Belgium	Holland	Switz.	U.K.	Argentina	Denmark	Spain	Australia	Composite Effective Rate
France	+69.0	+67.9	—	+39.1	− 0.3	+ 0.1	+65.4	(+73.7)	(+103.9)	+28.1	(+72.1)	+45.0
Belgium	+21.5	+21.2	−28.1	—	−28.3	−28.0	+18.8	(+24.8)	+ 46.5	− 7.8	(+23.6)	+ 3.3
Holland	+69.4	+69.2	+ 0.3	+39.5	—	+ 0.4	+65.7	(+74.1)	(+104.4)	+28.1	(+72.5)	+45.0
Switzerland	+68.7	(+68.4)	− 0.1	+38.9	− 0.4	—	+65.1	(+73.4)	(+103.6)	+27.7	(+71.8)	+42.5
U.S.A.	—	− 0.1	−40.8	−17.7	−41.0	−40.7	− 2.1	− 7.3	+ 20.6	−24.3	(+ 1.9)	− 7.5
Canada	+ 0.1	—	−40.5	−17.5	−40.9	(−40.6)	− 2.0	−12.1	+ 20.6	−24.3	+ 2.0	− 5.1

* Figures in parenthesis are based on cross-rates.

> from a set of rates to which general interest attaches, say from par values in existence at the time when they were last generally observed".[3]

This is the approach adopted here and 1929 is used as the base as it represents a year in which all of the countries were still on the gold standard.

The second and most difficult problem relates to the choice of weights. The definition of an EER adopted here (which is the general one) implies that weights should be based on visible trade flows. An initial difficulty relates to the choice of period from which to take the data on which the weights are to be based; this will generally differ from the base period of the EER itself. The practice for the calculation of current effective rates is to use recent data and periodically update this to allow for the fact that trade patterns may change over time for reasons other than changes in exchange rates. The problem of finding up-to-date data on trade flows is in principle easier for past periods. However, in practice the data may not exist, be incomplete or at least extremely difficult to gather for the number of countries involved. Therefore use has been made of the League of Nations "Network of World Trade" which has complete data on visible trade flows for a large number of countries for three years: 1928, 1935 and 1938.

This still leaves the question of which year to choose and in fact effective rates (not presented here) were calculated based on all three. It would also be possible to produce a Paasche index with weights (for example) for 1930-32 based on 1928 trade flows, for 1933-36 on 1935 trade flows and for 1937-39 on 1938 trade flows but the differences between the three effective exchange rates using weights based on the three different years are in fact quite small and so the weights chosen for all the actual indices presented below are an (arithmetic) average of the weights derived from all three years for which suitable data are available.

However, the most important decision about the weighting system relates to the precise method by which the weights are derived from data on trade flows. Either a simple weighting scheme based on trade shares or a more complex system based on a model of world trade could be used. The former method is appealing because of its simplicity but, in actual fact, it is less straightforward than it may seem; in a calculation of the French EER, for example, weights based on shares of bilateral French trade would neglect countries which engaged in little direct trade with France but were important competitors in third countries whilst the alternative — shares of total world trade — would allow for the latter effect but only at the expense of ignoring important bilateral ties. Of course, the basic problem is that (unlike a weighting scheme based on a model of world trade) weighting schemes based on trade shares do not actually do what is required, that is, model the effect of exchange rate changes on the balance of trade.[4]

[3] Rhomberg (1976), p. 88.

[4] Instead they make implicit assumptions about the key parameters. For example,

This would seem to imply that weights derived from a model of world trade would be superior to any based on simple trade shares. Such a model is provided by the International Monetary Fund's multilateral exchange rate model (MERM) for current EER calculations.[5] The problem is that whilst, in principle, this avoids simplistic assumptions about price elasticities, in practice, a great deal of information about price elasticities of different goods in different countries (and about a variety of other important parameters) is required in order to avoid equally simplistic assumptions. The task of obtaining reliable estimates of these parameters is difficult enough for the calculation of current EERs and frequent recourse to assumptions is required. Consequently, it seems not unreasonable to take the view that:

> "whilst this approach is, for many purposes, an improvement over the simpler weighting schemes from a conceptual viewpoint, it has the practical limitation that existing techniques for estimating elasticities, as well as data problems, are such as to raise the question of whether the inevitable wide margin of uncertainty surrounding the elasticity figures offsets the advantages of the more elaborate technique for deriving the weights".[6]

Clearly whether there is any advantage to be had from using a MERM-type model for the 1930s is debatable and, in any case, the creation of a model of world trade, even on a modest scale, is a separate and very substantial piece of research in itself. Therefore a weighting scheme based on simple trade shares is adopted here. In fact two different sets of weights are used (and eventually combined): "bilateral weights" based on shares of bilateral trade of the country whose EER is being calculated and "global weights" derived from each country's share in total world trade.

The third and final problem relates to the selection of countries for inclusion in the calculations. Fortunately lack of data does not create difficulties because

in a calculation of the French EER, the use of bilateral trade shares assumes that France has the same elasticity of demand for all goods demanded, whatever their nature or origin, whilst weights based on shares of total world trade assume identical elasticities of demand for all French exports in all countries.

[5] MERM is a general equilibrium model which considers the simultaneous interaction amongst prices, income and spending of countries (and their trading partners) and the effects on trade flows where exchange rates have echanged. It includes eighteen countries, two groups of countries and six groups of goods. The various basic parameters – price elasticities, expenditure elasticities, trade shares, supply elasticities and supply shift factors – have to be calculated from existing studies, estimated or assumed for the model to be used. MERM is continually being further developed and two versions have been described in the IMF Staff Papers: Artus and Rhomberg (1973) and Artus and McGuirk (1981). A critique is provided by Dixon (1976).

[6] Blackhurst and Tumlir (1980), p. 64.

of the existence of the League of Nation's "Network of World Trade" which provides comprehensive data on world trade flows for three inter-war years. A potentially more serious question is raised by the argument that it may be desirable to exclude some countries — mainly primary producers — on the grounds that their exports are priced in foreign currency and consequently a change in their exchange rate is likely to be principally reflected in local currency prices and hence will not affect trade with countries whose EER's are being calculated.

However, the extent of this effect is a matter of degree and to exclude wholly countries on such grounds may be too drastic and may actually create more inaccuracy than it removes. In short the argument can be carried:

> "...to the point where the 'index' [of the EER] is more like the prediction of a complex model, based on many unproven assumptions, than a simple summary measure of a range of exchange rate movements".[7]

Therefore it was decided to include as many countries as possible initially and the indices presented here have thus simply concentrated on maximising the number of countries included subject to availability of data. Consequently all the major trading countries are included along with a large number of less important ones with the result that countries accounting for approximately 90 per cent of bilateral trade and three-quarters of total (global) trade flows are included.[8] Most of the conclusions are then drawn from these wider (29 country) EERs but then, partly in recognition of this exclusion argument, 7 country EERs (the six in this study plus the UK) are also calculated and compared to the wider, 29 country EERs.

(II)

For each of the six countries in the study nine principal 29 country EERs were calculated: four "bilateral" indices based on bilateral trade flows (imports plus exports) in 1928, 1935 and 1938 and on an arithmetic average of the weights in each of these three years; four parallel "global" indices based on total (global) trade flows in the same three years; and a "composite" EER using weights which were an arithmetic average of those used in the average bilateral and average global indices. This approach allowed for considerable variation in the weights, thereby reflecting the uncertainties associated with the derivation of the weighting system. Further details of the calculations along with numerical values of some of the EERs and the weights are provided in the appendix. The base period is 1929 for which the indices were set at one hundred and conse-

[7] Honohan (1979).

[8] The figure for the bilateral trade of the USA is slightly lower (80 per cent) than for the other five countries.

quently a value greater than a hundred implies an appreciation since the base date, and a value lower than a hundred a depreciation. A graphical comparison of the differently weighted EERs is presented for each of the six currencies in Figures 1-6 in which the average bilateral, average global and composite indices are plotted.

In all six cases the composite effective exchange rate index lies between the bilateral and global indices which was to be expected. In addition for the four European countries the global index is higher than the composite and bilateral indices (with the exception of France after the third quarter of 1936); thus a global index would indicate a greater appreciation of the European gold bloc currencies in the 1931-35/6 period than the others. This is perhaps not surprising as the bilateral indices generally give greater weights to major trading partners which tend to include countries with currencies against which the bilateral exchange rate was more stable (possibly because they were major trading partners) including other members of the gold bloc and colonies. Furthermore, the fact that the bilateral indices rise to a less extreme value indicates that they were more stable (in the sense of lack of variation) than their globally weighted equivalents.

The two North American currencies seemingly follow a different pattern. However, the Canadian indices are similar to those of the European currencies to the extent that the global index is the higher during periods of appreciation (early and late 1930s) but the lower during periods of depreciation (mid-1930s); this clearly indicates that the bilateral EER is less volatile. The US indices are different in that the bilateral version remains above the global even during appreciated periods. Nevertheless, a comparison of standard deviations (Table 2) does show that the bilateral version was (marginally) less variable. Furthermore Table 2 also gives more precise evidence of the lesser volatility of bilateral indices generally.

Table 2
STANDARD DEVIATIONS OF DIFFERENT EFFECTIVE EXCHANGE RATES

	Composite	Bilateral	Global
France	25.7	20.8	30.7
Belgium	14.3	12.8	16.1
Holland	15.9	12.4	19.6
Switzerland	15.5	12.0	18.9
United States	12.1	11.9	12.7
Canada	4.6	2.3	7.2

Fig. 1
FRENCH EER'S COMPARED

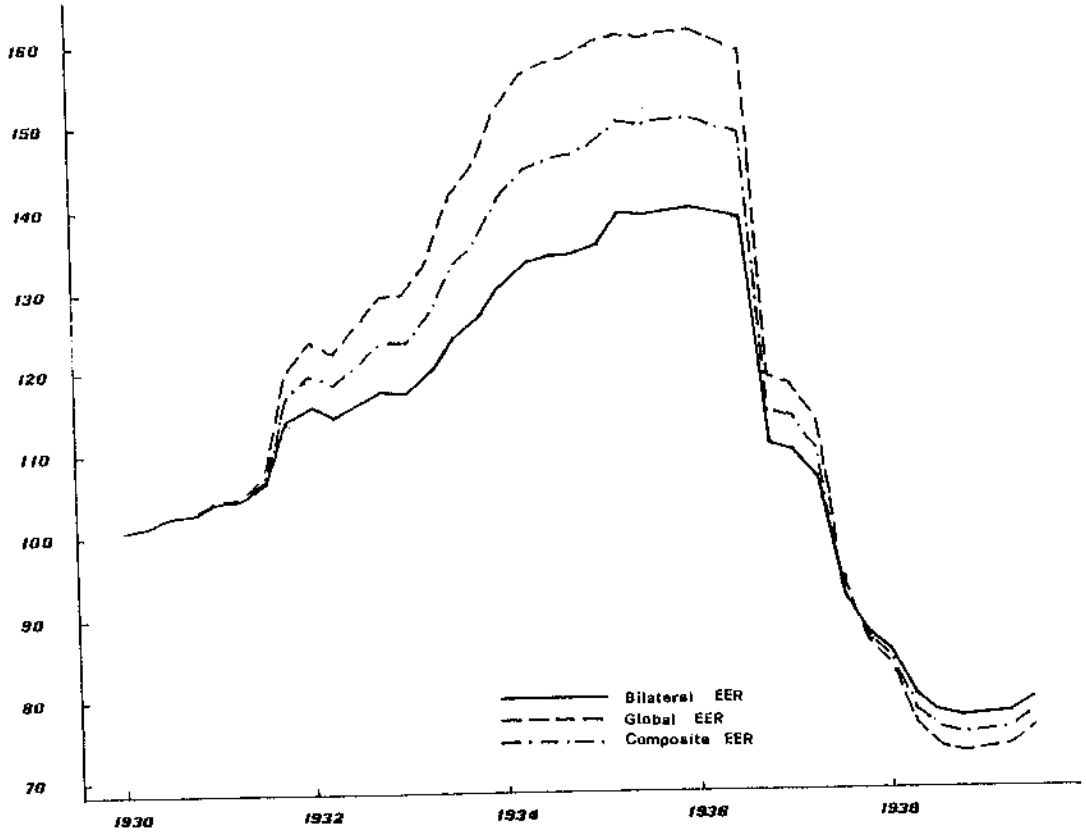


Fig. 2
BELGIAN EER'S COMPARED

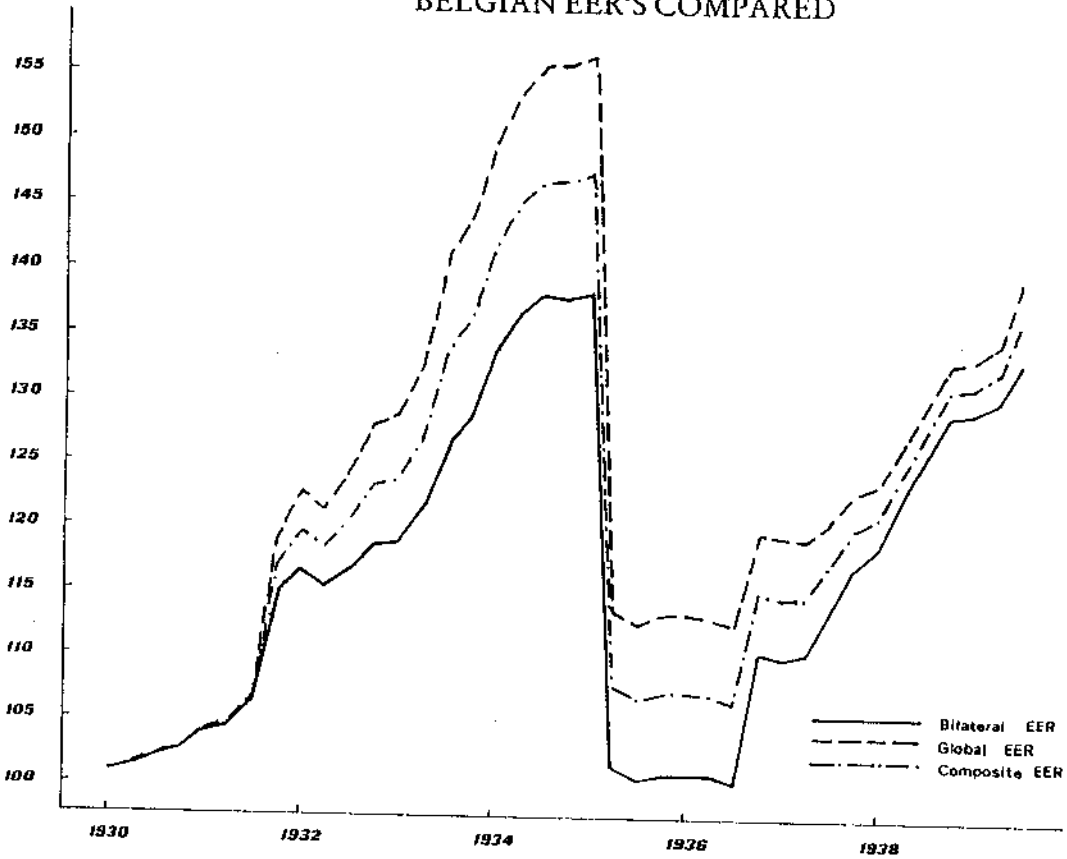


Fig. 3
DUTCH EER'S COMPARED

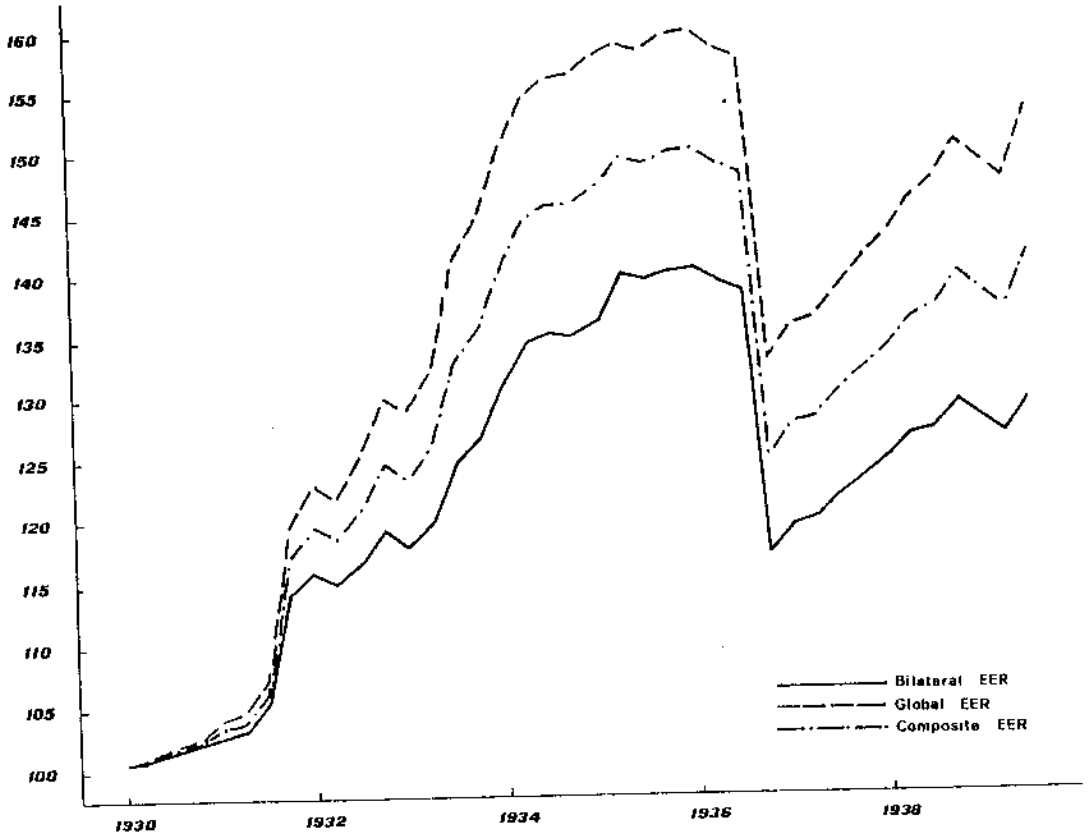


Fig. 4
SWISS EER'S COMPARED

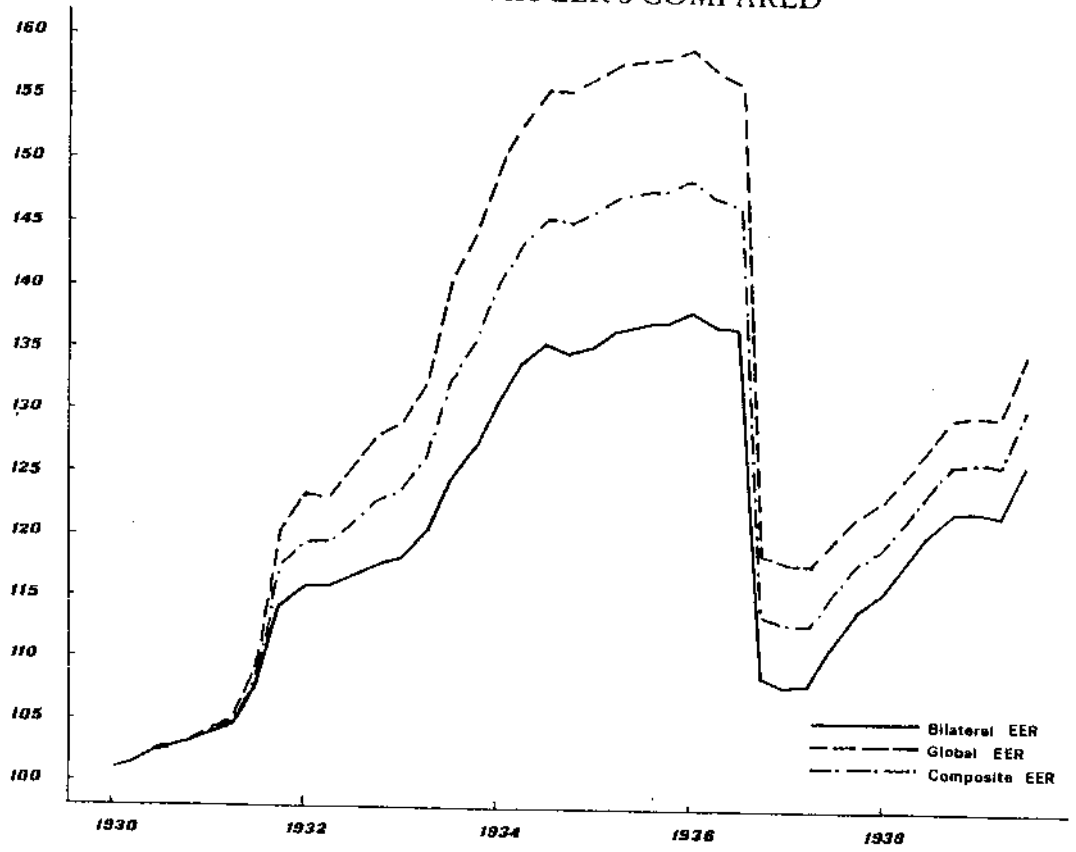


Fig. 5
U.S. EER'S COMPARED

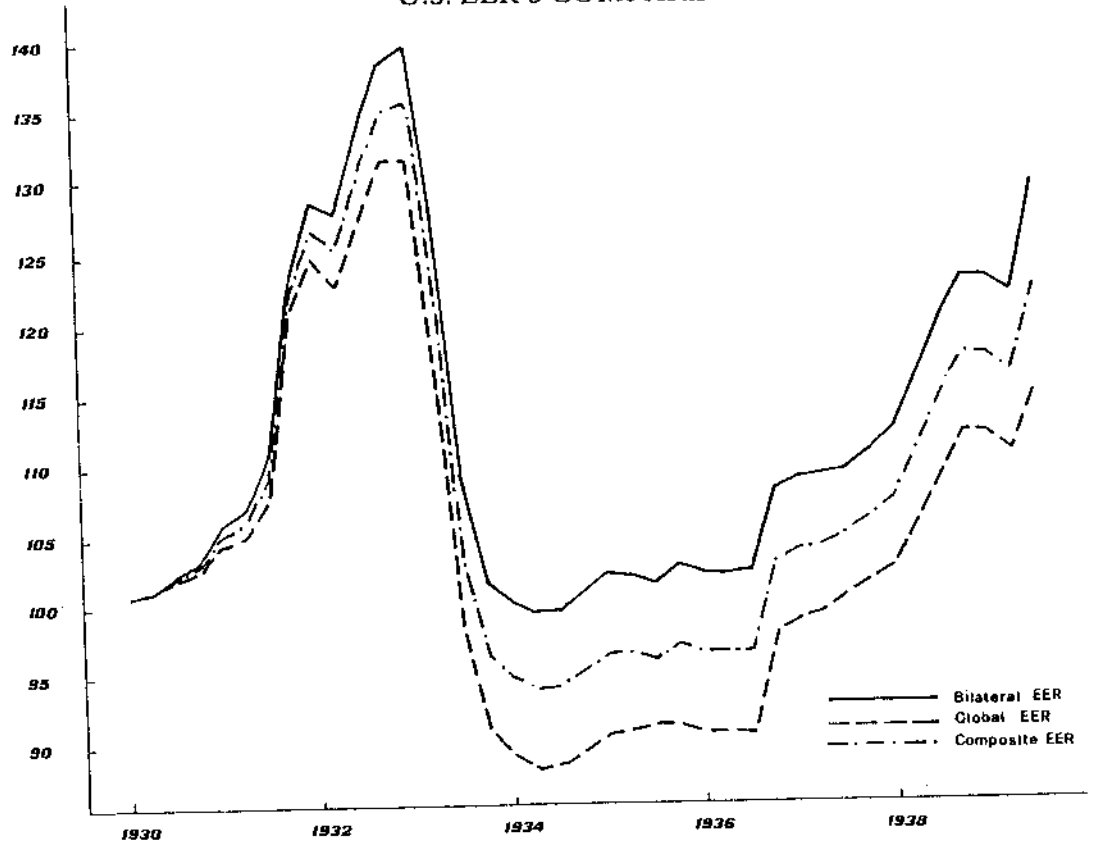
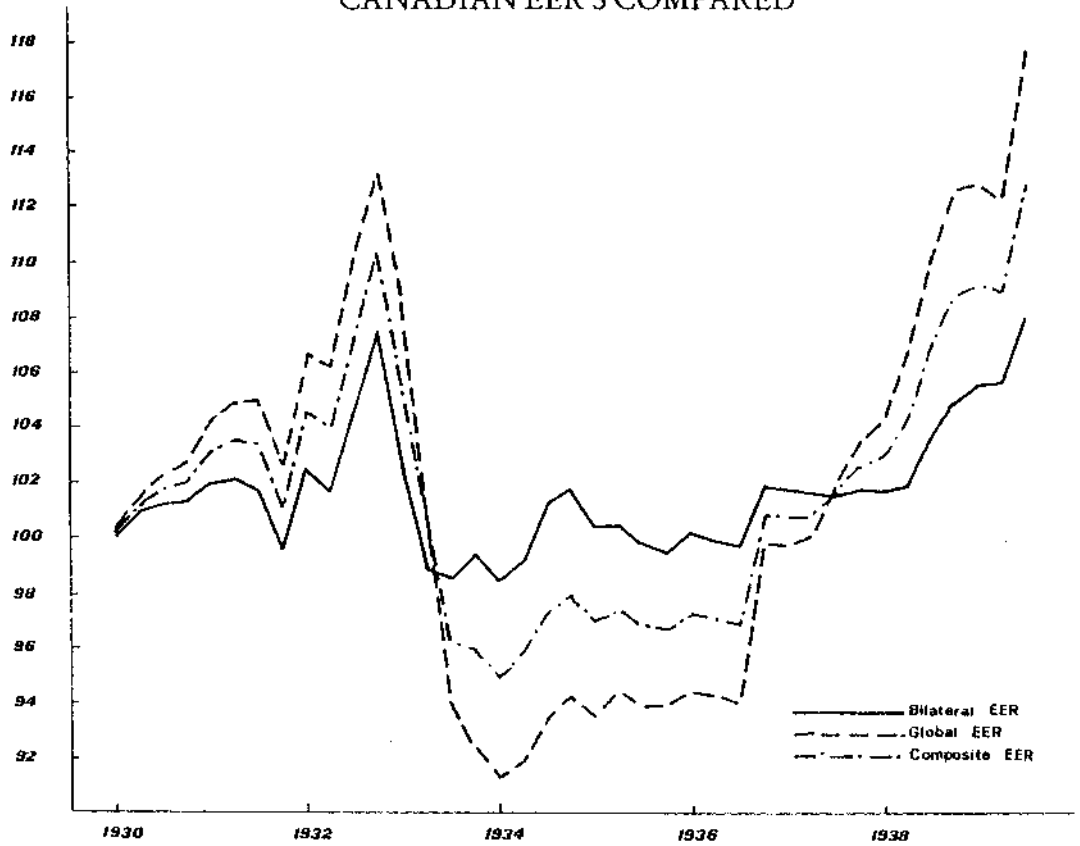


Fig. 6
CANADIAN EER'S COMPARED



This lesser volatility is interesting in that whilst both global and bilateral indices have drawbacks, an argument can be presented for preferring the latter in the 1930s because of the existence and, more especially, the nature of the widespread protectionist policies of the period. Since protection, and later its relaxation, were pursued in such a way as to give (usually reciprocal) preferential treatment to major trading partners then any change in the exchange rate of the latter was likely to have a greater effect on the trade flows of a given country than a similar change by a country which was an important competitor in third markets but not important in bilateral trade. Hence a bilateral EER is arguably more accurate (in terms of the usual definition of an EER) and the fact that they are less volatile emphasises the inference (made below) that EERs were more "stable" (in this simplistic sense) in the 1930s than bilateral exchange rates.

However, this argument is not sufficiently strong to rule out a global index completely. Consequently the conceptually difficult task of reconciling the two weighting systems remains and indeed is crucial in view of the relatively large differences in level between bilateral and global indices. Since each system has a major theoretical drawback it is useful to draw on empirical evidence. This is provided by two studies which have compared different variants of EERs for recent periods.[9] They both find that MERM-based EERs, which are arguably optimal (at least in theory) fall between bilaterally and globally weighted indices. An average of the latter two indices is preferable on the grounds that both bilateral trade flows and third country effects can be taken into account. If it is also the case that an EER based on weights derived from a world trade model lies between the two then there is a strong case for adopting an average; the composite index is therefore a simple arithmetic average.

Nevertheless, whilst the composite version is preferred as the most appropriate "general purpose" EER, the most striking feature of Figures 1-6 remains the appreciable differences between bilateral and global indices in terms of levels but similarities in trends. Consequently, it is more prudent to consider trends whenever possible and examine levels only insofar as a range of EERs is being considered of which all, or at least most, is clearly above or below something else. For this reason the composite index, when compared with bilateral exchange rates in Figures 7-12, is flanked by its upper and lower limits (based on the highest and lowest values of the other eight indices that were calculated).

[9] See Rhomberg (1976) and Morgan Guaranty Trust Company (1979).

(III)

The (composite) EERs and major bilateral exchange rates are compared in Figures 7-12. There are two obvious features: firstly, the appreciation of all but the French EER from late 1936 which is presumably largely explained by the depreciation of the French franc and secondly, the lesser variability of the EERs compared to bilateral exchange rates. This lesser variability is further illustrated by the lower standard deviations of the EERs (Table 3). The latter observation is important because of the widespread characterisation of the 1930s as a period of exchange rate disorder and volatility.[10] Whilst instability and volatility are not the same thing (since changes in exchange rates may simply reflect volatility of their determinants) there is nevertheless a tendency to blur the distinction. The results presented in Table 3 indicate that the use of an EER rather than bilateral rates reduces the force of the argument that exchange rates were "unstable" in the 1930s.

Table 3
STANDARD DEVIATIONS OF BILATERAL AND EFFECTIVE EXCHANGE RATES

Exchange Rate of → Against ↓	France	Belgium	Holland	Switzerland	U.S.	Canada
Composite index	25.7	14.3	15.9	15.5	12.1	4.6
Pound	35.2	19.5	21.9	23.9	15.0	8.5
US Dollar	36.6	21.7	27.6	28.1	—	5.0
French Franc	—	32.6	36.2	26.6	29.2	—

In addition to this general point, some specific observations relating to individual currencies can be made. The most striking feature of the the four European currencies is that the EER remains at a considerably lower level than the major bilateral exchange rates in the 1931-35/6 period. This is not surprising given that a fairly large proportion of the gold bloc countries' trade was with each other and with colonies. However, it does indicate that the role of an appreciated currency in contributing to the depression in these countries should not be overstated and that any decline in exports should be attributed less to a high exchange rate and perhaps more to protection. Simi-

[10] The most well known (and one of the earliest) works which makes this assertion is Nurkse (1944); in particular see p. 118.

Fig. 7
FRENCH BILATERAL AND EFFECTIVE EXCHANGE RATES

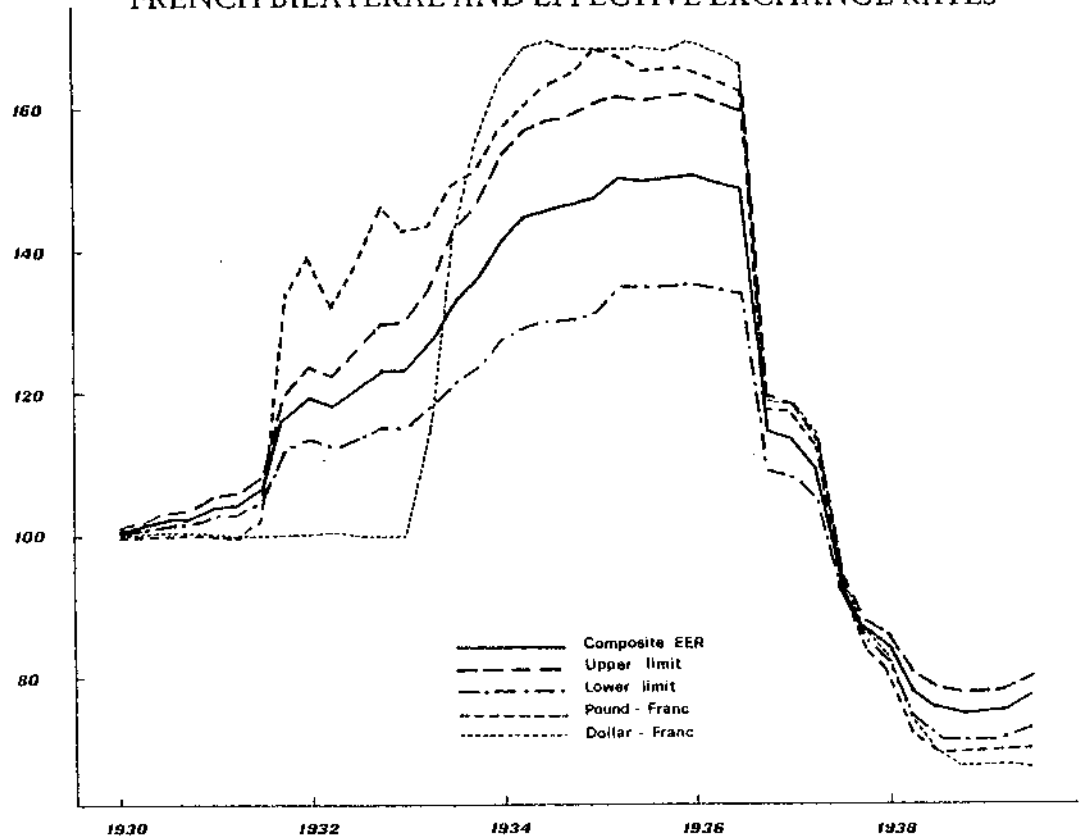


Fig. 8

BELGIAN BILATERAL AND EFFECTIVE EXCHANGE RATES

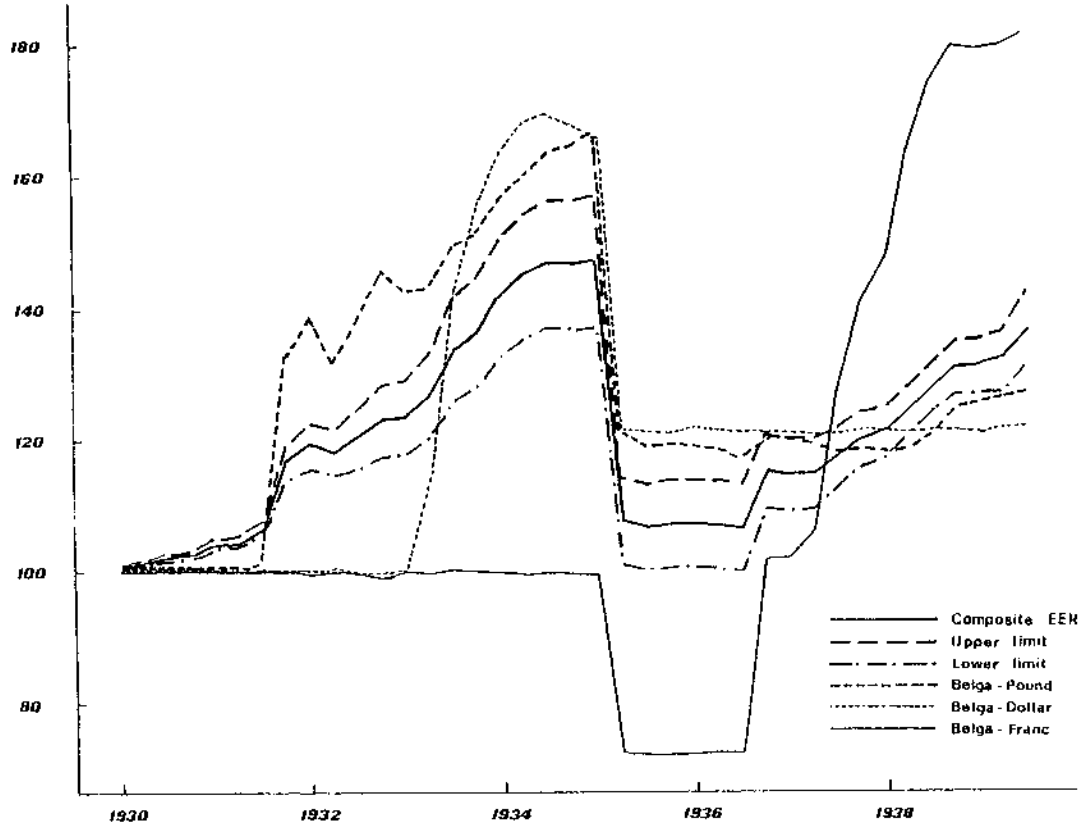


Fig. 9
DUTCH BILATERAL AND EFFECTIVE EXCHANGE RATES

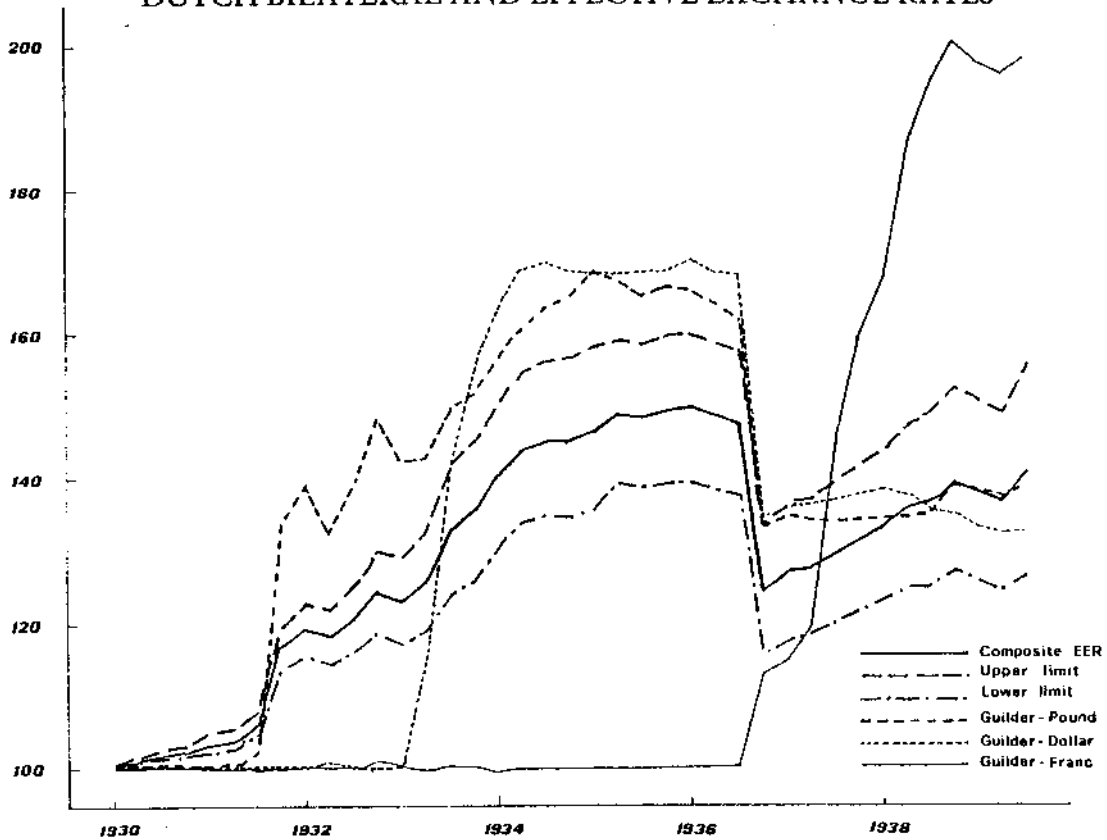


Fig. 10
SWISS BILATERAL AND EFFECTIVE EXCHANGE RATES

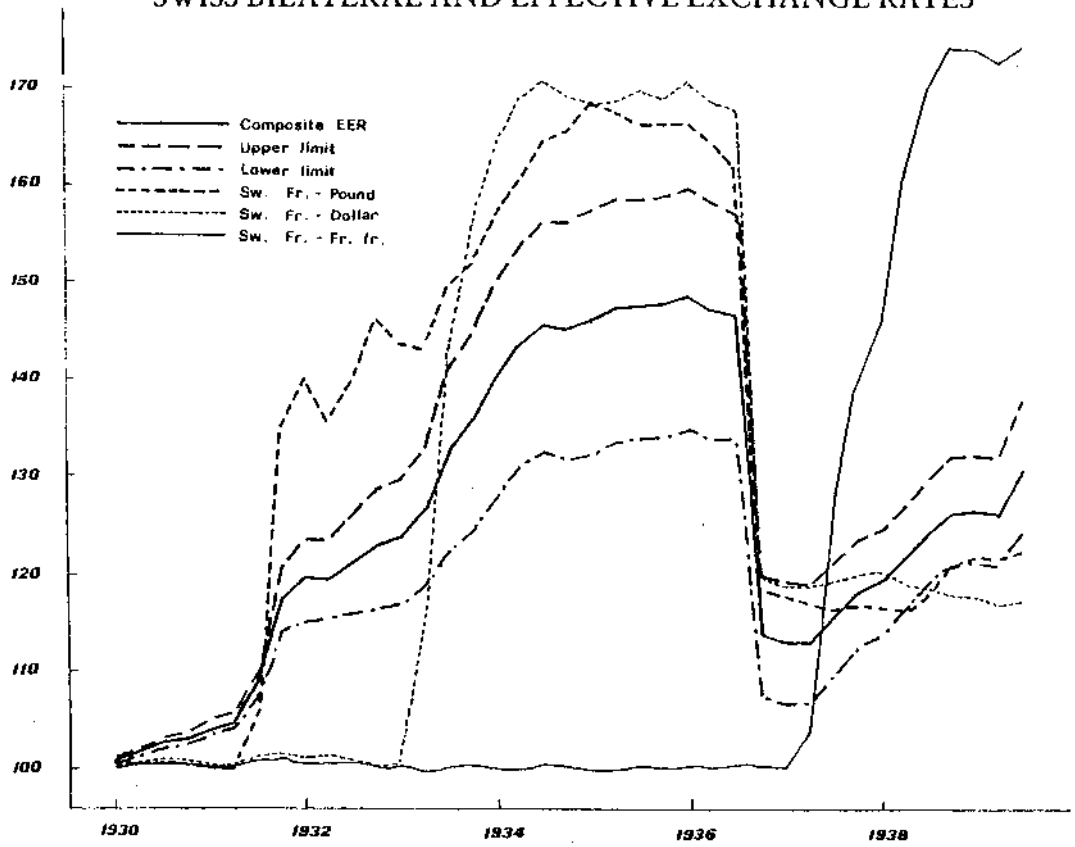


Fig. 11
U.S. BILATERAL AND EFFECTIVE EXCHANGE RATES

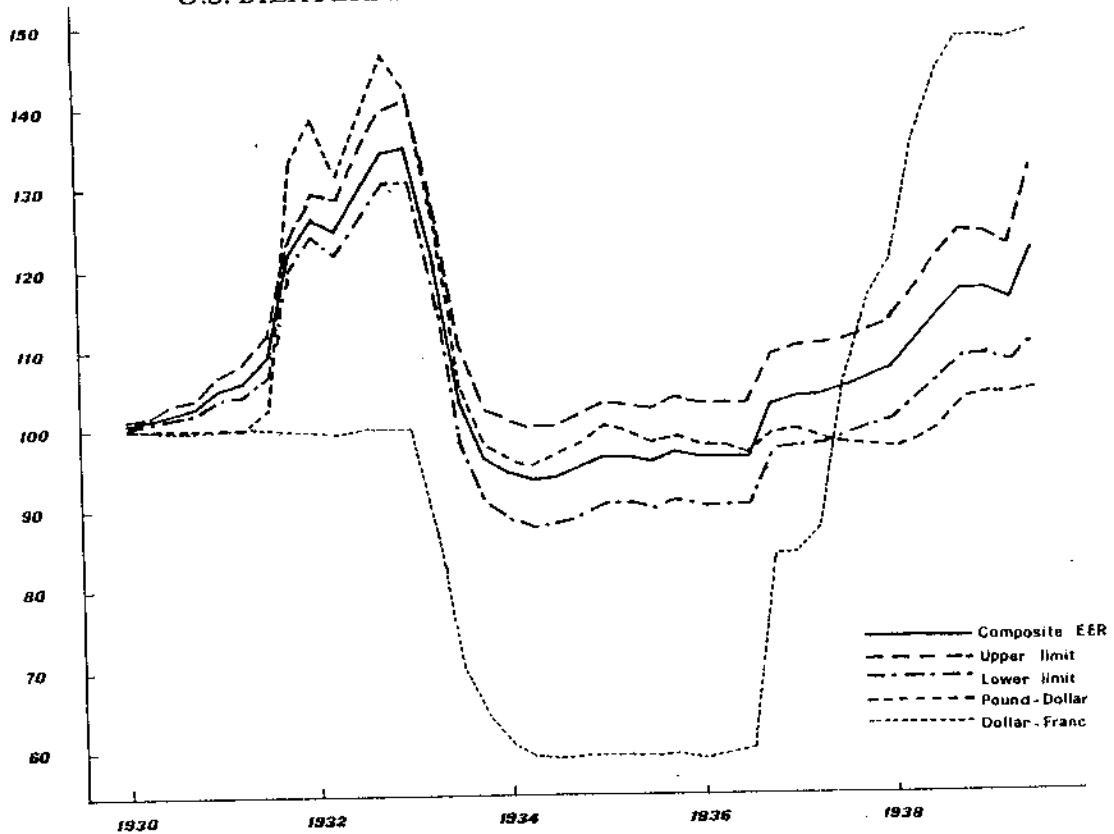
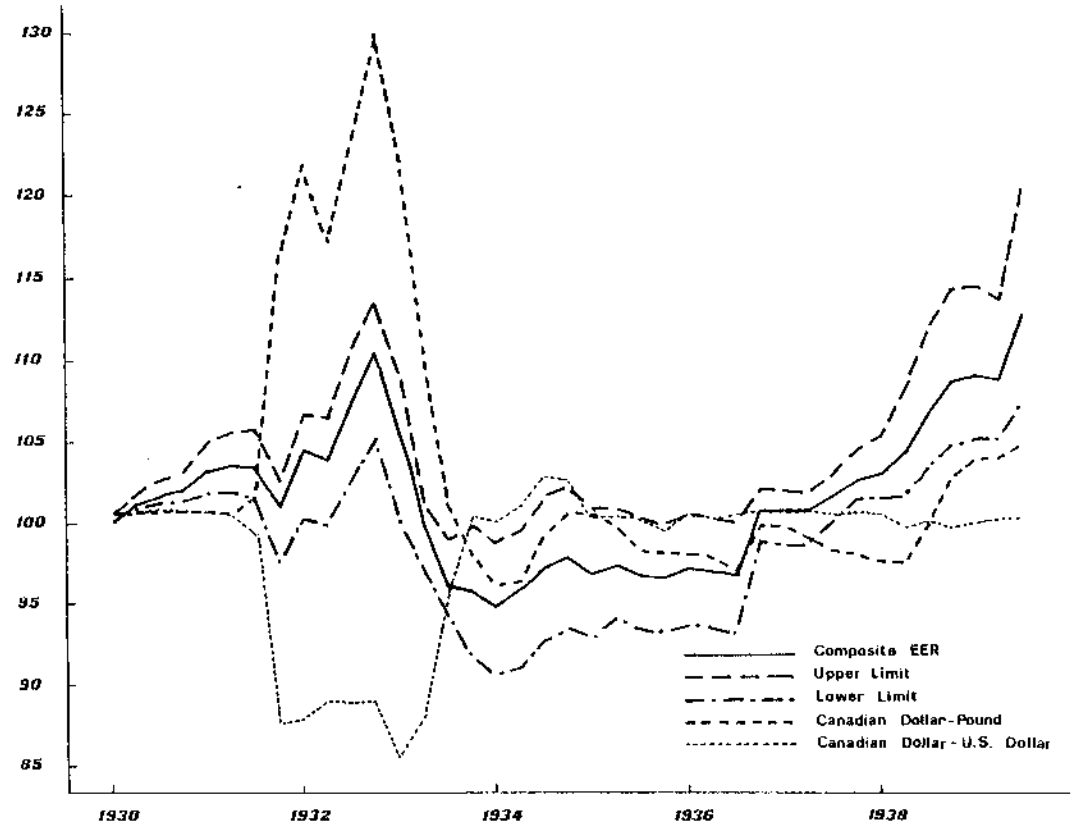


Fig. 12
CANADIAN BILATERAL AND EFFECTIVE EXCHANGE RATES



larly, the fall in the EERs when these countries did eventually devalue in 1935/6 is smaller than in the bilateral rates. Consequently, although the EERs actually drop nearer to 1929 levels, any stimulus to recovery provided by devaluation appears correspondingly less important if reference is made to EERs rather than bilateral rates.

In general, therefore, the movements of the four European currencies are rather less extreme if reference is made to EERs. Another implication of this lesser variation and, in particular, of the smaller appreciation in the 1931-35/36 period would suggest the importance of competitive depreciation in the 1930s (if it did occur) in aggravating the depression is exaggerated by sole reference to bilateral rates. A final observation, relating only to the French EER, is that the depreciation of the franc after 1936 dominates all French bilateral rates to such an extent that their movements do not differ significantly from those of the EER; hence, a reasonable approximation of French exchange rate movements in the 1936-39 period is provided by either of the main bilateral rates and little advantage is gained by using an EER for this period.

The major divergences between the US dollar's EER and its exchange rate with the pound (its main bilateral rate) occur in 1931-33 and 1937-39 with it being lower in the former period and higher in the latter. As with the European currencies the lower level of the EER in 1931-33 would indicate that any role the exchange rate had in contributing to the depression was somewhat less than the main bilateral rate suggests. Conversely (if rather tenuously) the higher EER in 1937-9 may be interpreted as suggesting some role for the exchange rate in the 1937-8 recession which is not apparent from examining only the dollar-pound rate. In the September 1937 – July 1938 period the latter fluctuated between 96.8 and 98.5 (slightly below its 1929 level) whilst the EER rose sharply from 105.2 to 113.3 (an appreciation of 7.7%) in the same period. The EER subsequently levelled off and, although it resumed its upward trend immediately before the onset of war, this can be dismissed as much of the exchange rate data had become unreliable by that stage.

The Canadian example illustrates perfectly the case for calculating EERs in the 1930s with both major Canadian exchange rates displaying large movements in opposite directions. Consequently, the most striking, if unsurprising, feature of the Canadian EER is that it smooths out the path of the Canadian exchange rate and reduces variability especially in 1931-33. This was a difficult period for Canada: there was a desire to depreciate with the pound in order to maintain export competitiveness in a major market and keep import prices down but, on the other hand, a great deal of Canadian debt was held in the USA and had to be repaid in US dollars. In the end a middle path was followed with the Canadian dollar depreciating by about half as much as the pound (against the US dollar). A second interesting feature of the Canadian EER occurs in the 1933-36 period when it remained several percentage points below both major bilateral rates and, indeed, its 1929 level until the

1937-39 appreciation common to all countries except France. This would imply a competitive advantage in export markets which is not apparent from examination of bilateral exchange rates (although Canadian exports were arguably most dependent on foreign income levels).[11]

An examination of the 7 country EERs (which takes some account of the argument that primary producers ought to be excluded) leads to similar conclusions to those drawn from the 29 country EERs. The different indices are compared in Table 4. It is clear that the two EERs for each country are broadly similar, particularly in terms of trends, for all six currencies. The main difference is that the 7 country EERs tend to be lower in all cases (possibly because they exclude primary producers with depreciating currencies). However, this feature tends to give further support to the inferences drawn from the 29 country EERs: the level of the gold bloc EERs is even lower in the 1931-35/6 period and their decrease following devaluation remains less than the fall in bilateral rates; similarly the American and Canadian EERs are substantially lower in 1931-33 and 1933-36 respectively and the former increases by more than the bilateral rate in 1937-8. Finally, the lesser variability of the EERs (compared to bilateral rates) is maintained; in fact the standard deviations of the 7 country EERs are actually slightly lower for four of the six currencies.

This completes the examination of some of the more obvious implications of the movements of the effective exchange rates of the USA, Canada, France, Belgium, Holland and Switzerland in the 1930s. The main objective remains to highlight the potential inadequacy of using bilateral exchange rates based on a numeraire currency as the basis for examining the effect of exchange rate changes in a period of widespread floating. However an attempt has also been made to provide a discussion of the problems involved in the construction of effective rates. Those calculated here are by no means free from these problems (although data deficiencies make some of them virtually unavoidable) and, for this reason, the results that have been presented and the conclusions derived from them should be treated with caution. Nevertheless some of the points made do carry some authority since they can be derived from any of the nine 29 country EERs calculated for each country and are further supported by reference to the 7 country EERs; for example, it has been argued that the main bilateral exchange rates overstate the extent of overvaluation of the four gold bloc currencies in the 1931-5/6 period and this is apparent whichever variation of any particular country's effective rate is

[11] This argument is put forward by E. Marcus: "Canada and the International Business Cycle, 1927-39" (1954) p. 107, A. Safarian: "The Canadian Economy in the Great Depression" (1959) p. 72 and R.W. Thompson: "International Trade and Domestic Prosperity: Canada, 1926-38" (1970) Ch. 4.

Table 4
COMPARISON OF 7 COUNTRY AND 29 COUNTRY EFFECTIVE EXCHANGE RATES (1929 = 100)

	Standard Deviation	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939
France (29)	25.7	101.7	108.2	120.7	129.9	144.5	149.5	140.9	101.1	78.4	76.1
France (7)	29.1	100.0	102.9	112.5	124.7	142.5	150.1	141.0	95.9	68.5	64.0
Belgium (29)	14.3	101.7	108.0	120.5	130.4	145.3	117.3	109.0	116.9	126.4	133.3
Belgium (7)	13.9	100.1	102.6	111.1	122.3	137.7	110.3	103.0	114.7	125.9	131.1
Holland (29)	15.9	101.4	107.6	120.8	129.4	144.0	148.7	143.0	129.4	136.6	138.4
Holland (7)	17.5	100.0	103.3	114.2	125.1	141.8	149.3	144.0	130.8	138.2	138.2
Switzerland (29)	15.5	102.0	108.6	120.7	129.5	143.6	147.2	139.0	114.9	122.7	127.2
Switzerland (7)	15.2	100.4	103.4	111.7	122.4	138.4	142.7	134.7	113.6	124.7	127.7
U.S. (29)	12.1	101.7	110.6	129.3	114.5	94.4	96.5	98.1	104.8	112.6	118.2
U.S. (7)	10.8	99.7	104.1	117.4	102.4	84.5	87.4	88.7	94.7	100.6	103.9
Canada (29)	4.6	101.3	102.8	106.6	99.5	96.5	97.1	98.1	101.6	105.8	110.1
Canada (7)	4.1	100.5	99.5	100.1	93.5	91.7	92.2	93.3	97.2	100.2	102.8

considered since the whole range of indices calculated – from the highest to the lowest values – lies below the main bilateral rates in all four cases.

Moreover, the assertations made in the first major area in which conclusions have been derived – exchange rate stability – would seem to carry some weight also. In all six cases the effective rates were consistently less volatile and thus some doubt has been cast on the characterisation of the 1930's as a period of extreme exchange rate instability. Of course this refers to exchange rate stability in the fairly naive sense of lack of variation (which is perhaps not entirely inappropriate). However a comparison of bilateral and multilateral exchange rate stability in the 1930s in a more fundamental sense would require a model of exchange rate determination and as a first stage could involve some testing of the purchasing power parity hypothesis.[12] The second major area which has been discussed relates to the influence of exchange rates in depression and recovery. The most important conclusion here is the lesser role for exchange rate overvaluation in the gold bloc countries and in the US implied by the lower level of their effective rates (compared to the main bilateral rates) although some rather more tentative inferences have also been put forward relating to the apparently low level of the Canadian effective exchange rate in 1933-36 and the contribution of the American exchange rate to the 1937/8 recession.

[12] Such an exercise will form part of a later study.

Appendix

Nine 29 country EERs were calculated for each of the six countries with weights based on trade flows in 1928, 1935 and 1938: four indices were based on bilateral trade flows, one for each year and one (the average bilateral) averaging the weights for each year; four were based on shares of total world trade ("global" weights), one for each year and one (the average global) averaging the weights for each year; the "composite" EER averaged the average bilateral and average global weights. The weighting system for the 7 country EERs was derived (like the composite 29 country versions) from an arithmetic average of average bilateral and average global weights: the former were based on bilateral shares of each other's trade, the latter on shares of total world trade where the "world" comprised of the seven countries and consequently "world trade" consisted only of trade between those seven countries. All the EERs were calculated according to the simple formula:

$$\text{Index in time period } i = \prod_{n}^{i} w R^{i}$$

where n = the number of countries (7 or 29)
R = an index of the value of a bilateral exchange rate ($R^{o} = 1.00$)
R^{i} = the index for a bilateral exchange rate in time period i
w = a weight.

The composite, average bilateral and average global 29 country EERs are presented (for each country) in Tables A-1 to A-6 below, along with indices of the main bilateral exchange rates, on an annual basis. Annual values of the 7 country EERs are given in Table 4 of the main text. Tables A-7 and A-8 list the weights used in the 29 country composite EERs and 7 country EERs respectively.

Table A-1
29 COUNTRY EERs OF FRANCE

	Composite Index	Average Bilateral	Average Global	Franc-Pound	Franc-Dollar
1929	100	100	100	100	100
1930	101.7	101.8	101.7	100.1	100.2
1931	108.2	107.2	109.1	109.0	100.1
1932	120.7	116.0	125.4	139.2	100.0
1933	129.9	122.0	137.9	146.7	127.8
1934	144.5	133.1	156.0	161.7	167.7
1935	149.5	138.4	160.5	167.0	168.6
1936	140.9	132.1	149.8	152.6	155.8
1937	101.1	99.3	103.0	101.6	103.3
1938	78.4	80.2	76.6	73.0	73.5
1939	76.1	78.1	74.1	70.1	67.5

Table A-2
29 COUNTRY EERs OF BELGIUM

	Composite Index	Average Bilateral	Average Global	Belga-Pound	Belga-Dollar	Belga-Franc
1929	100	100	100	100	100	100
1930	101.7	101.7	101.7	100.3	100.3	100.0
1931	108.0	107.3	108.8	108.7	100.1	100.0
1932	120.5	116.9	124.2	138.9	100.0	99.5
1933	130.4	123.9	136.8	146.8	128.0	100.0
1934	145.3	136.8	153.9	161.3	167.3	100.3
1935	117.3	110.4	124.2	131.6	132.7	78.9
1936	109.0	103.2	114.9	118.8	121.6	79.5
1937	116.9	113.0	120.8	119.2	121.3	119.3
1938	126.4	124.2	128.5	120.7	121.4	166.2
1939	133.3	130.9	135.7	126.5	121.7	180.3

Table A-4
29 COUNTRY EERs OF SWITZERLAND

	Composite Index	Average Bilateral	Average Global	Sw. fr. - Pound	Sw. fr. - Dollar	Sw. fr. - Franc
1929	100	100	100	100	100	100
1930	102.0	102.0	102.0	100.4	100.7	100.3
1931	108.6	107.6	109.6	110.2	100.8	100.5
1932	120.7	116.5	125.0	140.4	100.8	100.4
1933	129.5	122.5	136.5	147.2	128.4	100.2
1934	143.6	133.9	153.4	161.9	168.1	100.1
1935	147.2	136.6	157.7	167.0	168.8	100.0
1936	139.0	130.2	147.9	152.6	156.6	100.3
1937	114.9	110.4	119.4	116.9	119.2	117.2
1938	122.7	119.1	126.3	117.9	118.8	162.4
1939	127.2	123.2	131.3	121.8	117.2	173.5

Table A-5
29 COUNTRY EERs OF THE U.S.A.

	Composite Index	Average Bilateral	Average Global	Dollar - Pound	Dollar - Franc
1929	100	100	100	100	100
1930	101.7	101.9	101.6	99.9	99.8
1931	110.6	111.7	109.5	108.9	99.9
1932	129.3	132.1	126.5	128.9	99.7
1933	114.5	119.4	109.7	118.1	80.7
1934	94.4	100.1	88.8	96.4	59.6
1935	96.5	102.2	90.8	99.1	59.3
1936	98.1	103.7	92.5	97.7	65.6
1937	104.8	109.6	100.0	98.3	98.5
1938	112.6	117.8	107.3	99.4	136.9
1939	118.2	124.1	112.3	104.0	148.2

Table A-6
29 COUNTRY EERs OF CANADA

	Composite Index	Average Bilateral	Average Global	C. Dollar - Pound	C. Dollar - U.S. Dollar
1929	100	100	100	100	100
1930	101.3	100.9	101.7	100.5	100.6
1931	102.8	101.4	104.2	104.6	97.0
1932	106.6	104.1	109.1	123.2	88.8
1933	99.5	99.9	99.0	107.9	92.5
1934	96.5	100.2	92.8	98.2	101.8
1935	97.1	100.1	94.0	99.4	100.2
1936	98.1	100.5	95.7	98.4	100.7
1937	101.6	101.7	101.4	99.0	100.8
1938	105.8	103.1	108.5	99.6	100.2
1939	110.1	106.3	114.0	104.3	100.3

Table A-7
WEIGHTS USED IN 29 COUNTRY COMPOSITE EERs

	U.S.A.	Canada	Switzerland	France	Belgium	Holland
Egypt	0.73	0.49	1.11	1.15	0.83	0.64
S. Africa	1.49	1.22	1.01	1.14	1.30	1.10
Canada	11.38	—	3.12	2.90	3.01	2.81
U.S.A	—	32.43	10.34	11.03	10.87	9.98
Brazil	3.16	1.01	1.41	1.62	1.52	1.23
Argentina	3.25	1.76	2.98	2.84	4.03	3.60
India	3.78	2.48	2.70	3.17	3.27	2.83
Japan	6.68	2.63	2.53	2.17	2.09	2.02
China	2.36	1.16	1.45	1.46	1.23	1.18
Russia	1.58	0.78	1.15	1.38	1.73	1.63
Austria	0.66	0.54	1.84	0.76	0.67	0.80
Belgium-Lux.[1]	3.60	2.61	3.66	7.67	1.87	7.78
Czechoslovakia	1.40	0.99	2.53	1.34	1.22	1.60
France [2]	7.79	5.34	11.72	13.39	13.85	7.93
Germany	8.46	5.97	16.46	9.55	11.45	16.90
Italy	3.06	1.73	5.43	2.88	2.25	2.16
Holland [3]	5.29	3.35	4.58	4.68	8.84	4.51
Sweden	2.31	1.32	1.90	1.84	2.04	2.34
Switzerland	1.44	1.11	—	3.29	1.92	1.80
Denmark	1.31	1.01	1.47	1.21	1.29	1.34
Finland	0.80	0.50	0.63	0.74	1.04	0.95
Norway	1.03	0.79	0.82	0.89	1.08	1.11
Poland	1.01	0.62	1.48	1.06	1.19	1.25
Spain	1.30	0.72	1.59	1.69	1.11	1.14
Ireland	0.68	0.58	0.51	0.54	0.65	0.58
Australia	2.47	2.37	1.98	2.49	2.25	1.55
N. Zealand	0.97	1.12	0.61	0.68	0.63	0.62
U.K.	19.98	24.77	14.32	15.75	16.11	18.02
Mexico	2.03	0.57	0.66	0.69	0.63	0.60

[1] For the list of Belgian weights read "Belgian colonies".
[2] For the list of French weights read "French colonies".
[3] For the list of Dutch weights read "Dutch colonies".

Table A-8
WEIGHTS USED IN 7 COUNTRY EERs

EER of → / Weight of ↓	France	Belgium	Holland	Switzerland	U.S.A.	Canada
France	—	22.8	13.3	24.1	13.9	8.2
Belgium	18.8	—	18.2	9.1	9.2	6.2
Holland	8.0	14.7	—	7.8	7.8	5.0
Switzerland	7.5	3.6	3.7	—	3.1	2.2
U.S.A.	26.4	22.6	22.8	23.6	—	45.2
Canada	11.2	10.8	10.5	11.1	31.2	—
U.K.	28.1	25.5	31.5	24.3	34.8	33.2

Data sources.

(1) *Trade Flows.* League of Nations: Network of World Trade (1942).

(2) *Exchange Rates.* London and Cambridge Economic Service Bulletin. Economist. Bank of England Statistical Summary. Official Yearbook of the Commonwealth of Australia. Federal Reserve Bulletin. The Canada Yearbook. Ministère de L'Economie Nationale de la France: Annuaire Statistique. Bulletin de la Statistique générale de la France. Ministère de l'Intérieur: Annuaire Statistique de la Belgique et du Congo Belge. Annuaire Statistique de la Suisse.

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