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## The Causes of Real Exchange Rate Movements

by Beate Reszat, Hamburg\*

**Increasing exchange rate fluctuations, such as those that have occurred in the US dollar, have recently revived the discussion about the causes of such movements and the criteria for calculating the long-term over- or undervaluation of a currency. This article stresses some aspects that have attracted little attention hitherto.**

Notions about the main factors influencing exchange rate developments are often coloured by the purchasing power parity theory, which states that the exchange rate of a country's currency is determined, at least over the long term, by differences in price trends between that country and the rest of the world. The theory rests on the assumption that domestic and foreign goods are highly interchangeable, so that if domestic prices rise while those abroad remain stable or increase less sharply, the difference will be offset by corresponding exchange rate changes as a result of international arbitrage in goods. Under a system of fixed exchange rates, this offsetting effect takes the form of price adjustments to changes in domestic and foreign demand. In a more diluted version of the theory, it is assumed that this "law of one price" applies only to the prices of internationally tradable goods, but that each country also produces goods that can only be traded nationally and are not directly subject to the price rule. If price differences develop, shifts in the domestic demand for internationally tradable and non-tradable goods over time lead to price adjustments for these goods, too.<sup>1</sup>

According to the purchasing power parity theory, the real exchange rate of a currency, that is to say the nominal exchange rate adjusted for differences in inflation rates, is therefore constant over the long term. In reality, however, the real exchange rates of the industrial countries' currencies vis-à-vis those of their main trading partners (i.e. their effective real rates) also show marked changes over very long periods that cannot be explained merely in terms of lags in the adjustment of prices (see Figure 1). The literature gives two main reasons for such deviations from purchasing power parity: the fact that price structures in the various countries shift over the long term and that the international price link itself can be disturbed by numerous factors.

If the prices of internationally tradable and non-tradable goods develop differently within a country and in relation to other countries, the general price level in that country will not be an accurate reflection of purchasing power parities. Such shifts in price structures can occur during a phase of economic growth, for example, if productivity gains affect the tradable goods sector more strongly than the non-tradable sector.<sup>2</sup> In this instance, if the prices of tradable goods remain unchanged because they are constrained by the international price link and if at the same time the productivity gains lead to wage increases that spill over into the non-tradable goods sector owing to a close domestic wage link, the prices of non-tradable goods will rise. The general price level therefore also rises without there being any offsetting fall in the exchange rate. In terms of the overall relative price level, the currency appears to be overvalued.<sup>3</sup> A similar argument applies to the effect of divergences in technological development.<sup>4</sup>

Besides supply factors such as productivity gains and technical progress, asymmetries on the demand side can also lead to shifts in a country's price structure. For example, if the income elasticity of demand for non-

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<sup>1</sup> Cf. Irving B. Kravis, Robert E. Lipsey: Price Behavior in the Light of Balance of Payments Theories, in: *Journal of International Economics*, Vol. 8, 1978, p. 196.

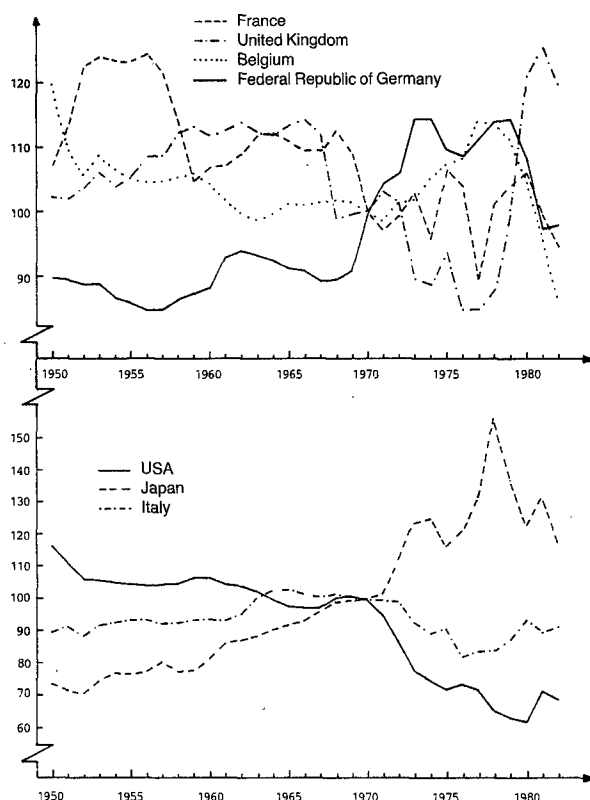
<sup>2</sup> This "productivity bias" hypothesis was originally formulated by Balassa. Cf. Bela Balassa: The Purchasing-Power Parity Doctrine: A Reappraisal, in: *Journal of Political Economy*, Vol. 72, 1964, pp. 584-596. For an empirical examination of this hypothesis, see also Lawrence H. Officer: The Productivity Bias in Purchasing Power Parity: An Econometric Investigation, in: *International Monetary Fund Staff Papers*, Vol. 23, 1976, pp. 545-579.

<sup>3</sup> Another possibility is that the prices of tradable goods fall owing to productivity gains while wages remain constant. Since the prices of non-tradable goods do not change, the accompanying exchange rate movement will be larger than the fall in the overall price level, so that in this instance too the currency will appear to be overvalued. Cf. Richard Jaekel: *Die Integrationswirkung des Europäischen Währungssystems*, Hamburg 1985, pp. 55 f.

<sup>4</sup> See for example David Bigman: Exchange Rate Determination: Some Old Myths and New Paradigms, in: David Bigman, Teizo Taya (eds.): *Exchange Rates and Trade Instability*, Cambridge, Mass., 1983, p. 86.

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**Figure 1**  
**Effective Real Exchange Rates,<sup>a</sup> 1950-1982**



<sup>a</sup> On the basis of GDP price indices (1970 = 100), vis-à-vis 19 partner countries.

Source: Commission of the European Communities.

tradable goods is greater than unity, the prices of non-tradable goods will rise in relation to those of tradable goods as incomes increase.<sup>5</sup> However, the supply and

demand effects described above need not be induced only by growth; they may also occur as a result of a general change in the structure of the economy, when they will again lead to long-term real exchange rate movements.<sup>6</sup>

In certain circumstances, monetary and fiscal policy measures may also have long-term real exchange rate effects by causing a shift in price structures. For example, if such measures induce an increase in residents' net holdings of foreign financial assets, and hence in their net receipts from foreign currency investments, over the long term the country has more foreign currency resources available to buy imports. If certain assumptions are made, this means that proportionately more resources are deployed in producing non-tradable goods and that their prices will rise in relation to the prices of tradables.<sup>7</sup> Here again, the currency of the country in question appears to be overvalued if measured in terms of overall relative prices.

Finally, it is frequently pointed out that exogenous disturbances emanating from the real economy can lead to shifts in price structures. Obvious examples of this are the two oil price shocks of 1973/74 and 1979/80, which caused substantial changes of this kind.<sup>8</sup>

The causes of deviations from purchasing power parity described hitherto are based on the assumption that there is a very close international price link for tradable goods and that a general price index is not an appropriate yardstick by which to demonstrate it. However, it is also conceivable that for various reasons such a close relationship between prices and exchange rates does not exist, even over the long term.

### Limited International Price Link

Some authors have attempted to prove the validity of purchasing power parity for individual goods or product groups.<sup>9</sup> However, the results of these studies are not conclusive. Whereas a very close price link was discovered in the case of products traded on international commodity exchanges,<sup>10</sup> the existence of such a link could not be generally confirmed where other more or less disaggregated product groups are concerned.<sup>11</sup> There may be a number of reasons for this; the simplest explanation is that even in highly disaggregated form the product groups examined cannot be regarded as sufficiently close substitutes<sup>12</sup> and that in fact it requires a high degree of standardisation, market transparency and competition such as prevail in international commodity markets to ensure that the "law of one price" will apply.

<sup>5</sup> Cf. Hans Genberg: Purchasing Power Parity under Fixed and Flexible Exchange Rates, in: *Journal of International Economics*, Vol. 8, 1978, pp. 267 f. Here Genberg also indicates another conceivable demand asymmetry. For example, long-term shifts in the price structure may occur if non-tradable goods account for a larger proportion of government expenditure than of private expenditure.

<sup>6</sup> See Bernhard Heitger: *Strukturwandel und realer Wechselkurs*, Tübingen 1983.

<sup>7</sup> Cf. Jürg Niehans: Static Deviations from Purchasing-Power Parity, in: *Journal of Monetary Economics*, Vol. 7, 1981, p. 67.

<sup>8</sup> Cf. for example David Bigman, op. cit., pp. 86 f.

<sup>9</sup> A survey of the relevant literature is to be found, for example, in Hans Genberg, op. cit.

<sup>10</sup> See Hans Genberg, op. cit., p. 249.

<sup>11</sup> Cf. for example Peter Isard: How Far Can We Push the "Law of One Price"?, in: *The American Economic Review*, Vol. 67, No. 5, 1977, pp. 942-948; Irving B. Kravis, Robert E. Lipsey, op. cit.; J. David Richardson: Some Empirical Evidence on Commodity Arbitrage and the Law of One Price, in: *Journal of International Economics*, Vol. 8, 1978, pp. 341-351.

<sup>12</sup> Cf. also Peter Isard, op. cit., p. 946.

<sup>13</sup> Cf. for example David Bigman, op. cit., pp. 80 f.; Peter Isard, op. cit., p. 943.

Another explanation is that even if the international price link exists in principle it is disturbed by a number of factors, the main ones mentioned in the literature being<sup>13</sup>

- ☐ customs duties and subsidies,
- ☐ non-tariff trade barriers,
- ☐ central-bank interventions and
- ☐ international capital movements.

Whereas changes in customs duties and subsidies have a direct impact on relative prices, non-tariff barriers to trade limit the international exchange of goods and thus prevent price differences from being completely offset by means of arbitrage. Central-bank interventions and international capital movements, on the other hand, affect the nominal exchange rate<sup>14</sup> and thereby influence the real rate.

A completely different aspect emerges in this connection, namely the extent to which movements in the nominal exchange rate can be the cause of long-term divergence of the real exchange rate from the purchasing power parity. In principle, a country's real exchange rate is defined as the quotient of a domestic and a foreign price index, multiplied by the index of the nominal exchange rate. Changes in this value may be due both to price effects and to movements in the nominal exchange rate.

### The Role of the Nominal Exchange Rate

As a rule, the nominal exchange rate is hardly regarded as an independent explanatory factor for long-term changes in the real rate. In a system of fixed exchange rates it is assumed to be constant, ignoring the fact that in the Bretton Woods system, for example, there were frequent and large parity changes that had a significant impact on real exchange rates.<sup>15</sup> In a system of flexible exchange rates, the nominal rate is regarded primarily as an adjustment mechanism that offsets

inflation differentials over time. As in the short term it is influenced by international capital movements which are determined by interest rate differences and exchange rate expectations and react to parameter changes much more quickly than merchandise trade, it can fluctuate during the adjustment process and also "overshoot" its long-term equilibrium level set by the purchasing power parity. If fluctuations in nominal exchange rates cause movements in real rates, these are due primarily to exchange rates having a higher variability than prices<sup>16</sup> and are thus temporary phenomena.

This interpretation neglects all those factors which – irrespective of the development of relative prices – trigger lasting international payments and capital flows and thus cause longer-term changes not only in nominal exchange rates but also in real rates.<sup>17</sup> For example, the asymmetries in overall demand mentioned above and productivity gains and technological progress affecting the international competitiveness of a country not only cause internal shifts within the price structure but also lead to current account deficits or surpluses. The latter may be associated with long-term changes in nominal exchange rates that are not directly related to international price relationships. A particularly clear example in this respect is the development of the nominal and real exchange rates of the yen between 1974 and 1978, which were due primarily to Japan's large current account surpluses and the country's strong competitiveness during that period.

International capital movements also generate long-term nominal exchange rate effects that have nothing to do with relative prices. It is true that the inflation performance of one country in relation to that of others affects the investment decisions of international investors and, insofar as this influences exchange rates, reinforces the tendency to reduce inflation differentials. However, this is only one factor in the investors' long-term profit expectations and risk considerations. Besides economic developments and economic policy aspects the general political climate is another important factor in determining that certain currencies, such as the US dollar, the Deutsche mark and the yen rather than other currencies, play an international role as investment and reserve currencies, so that their exchange rates are influenced more strongly by capital movements than by trade flows.<sup>18</sup> The fact that the general political climate can also affect the exchange rates of non-reserve currencies over the long term through its effect on capital movements is demonstrated particularly clearly by the Italian lira; the lira's nominal and real depreciation in the years following the collapse

<sup>14</sup> However, sterilised central-bank interventions are often attributed with having only a short-term effect on the exchange rate. If that is the case, they are unlikely to have longer-term effects on the real exchange rate. Cf. Beate Reszat: Die kurz- und langfristige währungspolitische Effizienz von Regeln für Devisenmarktinterventionen, Berlin 1984, pp. 31 ff.

<sup>15</sup> In this context, see the results of the individual country studies, especially those for Germany and France, in: Beate Reszat: Einflußfaktoren realer Wechselkurse, Hamburg 1985 (subsequently quoted as: Beate Reszat: Einflußfaktoren ...).

<sup>16</sup> See for example Hans Genberg, op. cit., p. 271, and Jacob A. Frenkel: The Collapse of Purchasing Power Parities during the 1970's, in: European Economic Review, Vol. 16, 1981, pp. 145-165.

<sup>17</sup> In this regard and in the paragraphs that follow, see also Beate Reszat: Einflußfaktoren ..., Section I.2, and the country studies with regard to the examples given.

<sup>18</sup> For example, after 1970 the Deutsche mark was increasingly affected by long-term portfolio switching from other currencies, primarily the US dollar; cf. Beate Reszat: Einflußfaktoren ..., Section II.1.

of the Bretton Woods system was greatly reinforced by capital outflows due to the increasing political instability of the country.

Hence, if an examination of real exchange rates is also to take account of those causes that affect nominal exchange rates via payments and capital flows irrespective of international price relationships, it is necessary to consider a host of different economic and non-economic factors that have a direct or – via their effect on expectations – an indirect influence. The long-term objectives of a country's monetary and exchange-rate policies are particularly important in this respect; for example, whether they have a strong domestic or external slant and whether they give priority to economic growth or to combatting inflation if conflicts develop between objectives.

### **Long-term Effects of Monetary and Exchange-rate Policies**

The development of both the nominal exchange rate and relative prices may depend on the options chosen. The smaller the influence of international payments and capital flows on the nominal exchange rate, the more apparent will be the price effects of monetary policy on the real exchange rate. This can be illustrated by a few examples.

Belgium's monetary policy can be described as generally restrictive between 1950 and 1980. Until the changeover to floating in 1971, priority was given mainly to combatting inflation, as the authorities wanted to prevent the emergence of a wage/price spiral in view of the Belgian system of wage and price indexation. After 1971 the essentially restrictive monetary stance can be explained in terms of the external orientation aimed at tying the Belgian franc to the Deutsche mark and the Dutch guilder, the currencies of Belgium's main trading partners, in order to counter inflationary pressures from outside. The fact that the effective real exchange rate of the Belgian franc declined until 1971 owing to shifts in relative prices and rose after that date as a result of tying the franc's nominal rate to the DM and the guilder was due primarily to the success of this policy. The opposite example is Italy, another country with wage indexation but which pursued a more expansionary policy in order to promote economic development. This generally gave the economy a large margin of liquidity, which favoured the development of a wage/price/exchange rate spiral after the transition to floating. The resultant price and exchange rate effects were reflected alternately in the behaviour of the real lira exchange rate, depending on which of these factors was the dominant influence at the time.

The monetary and exchange rate policy of a country can also be of decisive importance in determining what effects external disturbances from the real economy will have on real exchange rates, as demonstrated by the reaction of monetary policy in Germany and the United Kingdom after the first oil crisis. Whereas the Deutsche Bundesbank switched to a restrictive stance to stem the inflationary threat posed by rising oil prices, British monetary policy remained essentially expansionary and therefore reinforced expectations of devaluation and inflation, depressing the nominal exchange rate of the pound and contributing to the decline in its real exchange rate. By contrast, the Bundesbank's policy prevented devaluation expectations from developing and also succeeded in keeping Germany's inflation rate below that prevailing abroad. This shift in relative prices, which was larger at a time of falling current account surpluses than the rise in the nominal exchange rate after 1974, caused the real exchange rate of the DM to fall.

These examples point to another aspect that is often paid too little attention in analyses of real exchange rate movements – namely the general price effects deriving from national institutional and economic policy conditions, such as the wage and price formation process, and from the country's monetary policy stance, which contribute quite substantially to shifts in international price relationships. Such effects should not be left out of account, particularly when general price indices are used to calculate real exchange rates, the formula for which often being based on a specific macro-economic concept,<sup>19</sup> as these effects are often the decisive influence on real exchange rates calculated in this way.

### **Conclusions**

To summarise, it can be seen that there is a multitude of possible causes of divergence from the purchasing power parity. As the real exchange rate is constructed from the nominal exchange rate and relative prices, a distinction must be made between factors that cause real changes in exchange rates via international payments and capital flows and factors that lead to price differences in individual countries. Two aspects that have attracted little attention hitherto are of especial importance in this regard: the role that the nominal exchange rate plays in real exchange rate movements in the long term (rather than just as an adjustment mechanism) and the effects on the general level of prices stemming from the country's monetary policy.

<sup>19</sup> Cf. Hans Genberg, *op. cit.*, p. 263. For the concepts often associated with the calculation of real exchange rates, see Beate Reszat: *Einflussfaktoren...*, Section I.