The Valuation Effect of Changes in Exchange Rates

The problem presented to the United States by the huge deficit in its balance of payments on current account is that US earnings of foreign exchange, through exports of goods and services, are insufficient to meet US demand for foreign exchange to pay for imports of goods and services without reliance on foreign credit. The problem presented to Japan by its current account surplus is not so serious, but it means excessive accumulation of foreign assets and friction with deficit countries. On either side the problem consists in an imbalance between receipts and payments *in foreign exchange*. It is therefore rather incongruous that most countries publish their balance of payments statistics in their domestic currency.

There are various practical reasons for this. The balance of payments forms part of the national accounts which are naturally published in domestic currency. It is the balance of payments valued in domestic currency that is relevant to domestic income and employment effects and to the responsiveness of domestic supply and demand to changes in import and export prices. Nonetheless, the practice of publishing balance of payments statistics, and analysing balance of payments developments, in domestic currency has one unfortunate consequence. In the event of a major change in the exchange rate, domestic-currency valuation can give a very misleading picture because of the valuation effect of a change in the exchange rate from a position of initial imbalance.

It is the purpose of this article to draw attention to this valuation effect which has been largely ignored in the literature and to state the case for presenting balance of payments statistics in foreign as well as in domestic currency.[1]

The valuation effect

The valuation effect of a change in the exchange rate on the balance of payments measured in domestic currency from a position of initial imbalance is a simple matter of arithmetic.

Take the simplest case of the "small country" which is a pure price-taker in international trade. Depreciation leaves the foreign-currency prices of its exports and imports unaffected but raises the domestic-currency prices in proportion to depreciation. If depreciation occurs from a position of current account deficit, as will usually be the case, it raises the domestic-currency value of imports by a larger absolute amount than the domestic-currency value of exports. The current account deficit therefore widens in domestic currency, even though (pending subsequent volume changes and macroeconomic repercussions) the balance of payments in foreign currency, which indicates the condition of external imbalance, has not changed. To give a simple numerical example: if imports are initially A$ 50 billion and exports A$ 25 billion, a 50 per cent devaluation of the Australian dollar will, with unchanged foreign-currency prices, raise the A$ value of imports to A$ 100 billion and of exports to A$ 50 billion. In other words, it will double the initial deficit in A$.

The valuation effect operates in the same way for a country large enough to exert some influence on the foreign-currency prices of its exports and imports. If export prices are sticky in domestic currency, whether because, as is commonly the case for exports of manufactures, they are priced on a cost-plus basis or because prices in commercial contracts are denominated in domestic currency, currency depreciation will have the familiar J-curve effect on the balance of payments: the terms of trade deteriorate as export prices in foreign currency fall initially; the balance of payments (in foreign currency) gets worse before (as volumes respond to the change in relative prices) it gets better. There can be no corresponding J-curve effect on the import side; for if foreign suppliers make price concessions to protect their market shares, this reinforces the equilibrating volume effects of depreciation. The valuation effect, it should be noted, far from being absent in the large-country case, is actually magnified by J-curve effects since these widen the initial deficit.[2]

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[2] This is quite distinct from potential cumulative "imbalance effects" of a depreciation on the foreign-currency balance (*cf.* OECD 1986a, p. 62).

There is a similar valuation effect if a surplus country appreciates its currency. But it operates in reverse. Whereas in the case of a depreciation by a deficit country, the valuation effect reinforces the J-curve effect, appreciation by a surplus country causes a valuation effect which offsets the J-curve effect: the J-curve effect widens the surplus in foreign currency but the valuation effect *reduces* it in home currency since, for given foreign-currency prices, the domestic-currency prices of exports and imports fall in proportion to the appreciation, thus reducing the export surplus. Here again, the larger the J-curve effects, the larger the valuation effect, but in this case in an offsetting direction.

In the absence of autonomous capital movements, depreciation by a deficit country and appreciation by a surplus country correspond to what would happen in response to imbalance between supply and demand in a free foreign exchange market. If capital flows overcompensate the current account imbalance, a current-account deficit country's currency will appreciate and a current-account surplus country's will depreciate in a free foreign exchange market. Here, too, the valuation effect reinforces the J-curve effect for the deficit country, but offsets it for the surplus country.

Table 1 summarises the pattern of these effects.

TABLE 1

J-CURVE AND VALUATION EFFECTS OF EXCHANGE RATE CHANGES

	J-curve effect	Valuation effect
Deficit country:		
depreciation	−	−
appreciation	+	+
Surplus country:		
appreciation	−	+
depreciation	+	−

Notes: + = move towards external balance.
− = move away from external balance.

The valuation effect is clearly of no significance for a country's balance of payments position in the conventional sense of "external balance". The gap between supply and demand for foreign exchange is unaffected. The J-curve effect actually worsens the imbalance, but the valuation effect merely makes it *look* worse in the case of the deficit country and *look* better in the case of the surplus country. In this way, it can convey a very misleading impression.

This is not to say that the widening of the deficit in domestic currency has no economic significance. A currency depreciation raises the domestic-currency prices of tradables relative to those of non-tradables. The object of this change in the price ratio is to induce a shift of resources into tradable goods industries in order to reduce the external gap, and this change in the price ratio redistributes the national income in favour of producers at the expense of consumers of tradables. (Among the latter are taxpayers if the country has foreign-currency denominated external debt.) These domestic effects may have longer-term repercussions on the responsiveness of the balance of payments to the depreciation, in other words, on the slope of the upward stroke of the J. But as regards the current balance of payments situation, the valuation effect causes a statistical illusion.

If the change in the exchange rate is large, the impression of the effect on the country's balance of payments situation conveyed by domestic and foreign currency valuation may be very different indeed. The US dollar peaked in the first quarter of 1985 at an average (TWI) rate of 135.0. By the third quarter of 1987, the rate had fallen to 95.2, in other words by 29.5 per cent. During the same period, the US current account deficit (seasonally adjusted annual rate) rose from US$ 10 4.4 to US$ 173.5 billion. This suggests that, of the US$ 69.1 billion increase in the current account deficit, as much as US$ 30.7 billion or not much less than one-half, was accounted for by the valuation effect of depreciation. In terms of foreign (partner country) currencies, the current account deficit rose by only US$ 38.4 billion. Conversely, during the preceding period of appreciation of the US dollar, 1982-85, the valuation effect partially offset, and therefore masked, the increasing external imbalance.[3]

Figure 1 shows the magnitude of the valuation effect on Japan's balance of payments of appreciation of the yen during 1985-86. Measured in US dollars, Japan's current account surplus increased by 84 per cent, but measured in yen the increase amounted to only 14 per cent.

This in substance is the case for publication of individual countries' balance of payments statistics in foreign as well as in domestic currency and for focusing on the foreign-currency valuation in assessing the

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[3] Measurement of the valuation effect over a period of depreciation runs into a difficulty if, as in the case of the US dollar, the currency begins to depreciate when the current account is still in surplus or balance. To overcome this difficulty, the valuation effect needs to be measured for successive periods, *e.g.* from year to year.

effects of a change in the exchange rate on external balance. Most countries publish their balance of payments statistics in their domestic currency. A few, such as Indonesia, Korea, the Philippines and Taiwan, and until recently Japan, publish them in US dollars. OECD *Annual Surveys* rely mostly on the domestic-currency balance of payments accounts. The IMF *International Financial Statistics* present the balance of payments statistics in domestic currency in each country section but also in a summary table for all countries in SDR. Given the volatility of the US dollar, it is not at present the ideal unit of account. We shall return later to the question of the appropriate foreign-currency unit.

Literature survey

In the large literature of textbooks of international economics and monographs and articles on foreign exchange theory, there is hardly a reference to the valuation effect of changes in exchange rates.

In 1949, A.O. Hirschman, in a note in the *Review of Economics and Statistics,* pointed out that "the 'Marshall-Lerner' condition for devaluation to have a favorable effect on the trade balance (sum of the elasticities larger than unity) holds only when imports are equal to exports... When imports and exports are not equal, two different conditions obtain, one for the balance expressed in foreign currency, another for the balance expressed in domestic currency... When imports exceed exports, the more stringent condition for a favorable effect of devaluation is the one relating to the balance of payments expressed in domestic currency... It follows ... that when imports exceed exports it is possible for the devaluation to have a favorable effect on the foreign exchange balance, but an unfavorable effect on the domestic currency balance" (Hirschman 1949, p. 52). After demonstrating the point algebraically, he concluded: "It is only the balance expressed in foreign exchange that matters when devaluation is undertaken to meet the typical balance-of-payments problem. The habit of evaluating the success of devaluation in this respect by comparing trade or current account balances before and after devaluation in domestic currency can be seriously misleading" (*ibid.*, p. 53).

This clear statement of the significance of the valuation effect — it might well be called the Hirschman effect — has been completely forgotten by the international profession. Haberler quoted Hirschman in his well-known *Kyklos* article of 1949, stressing with Hirschman that

FIGURE 1

YEN APPRECIATION AND CURRENT ACCOUNT SURPLUS
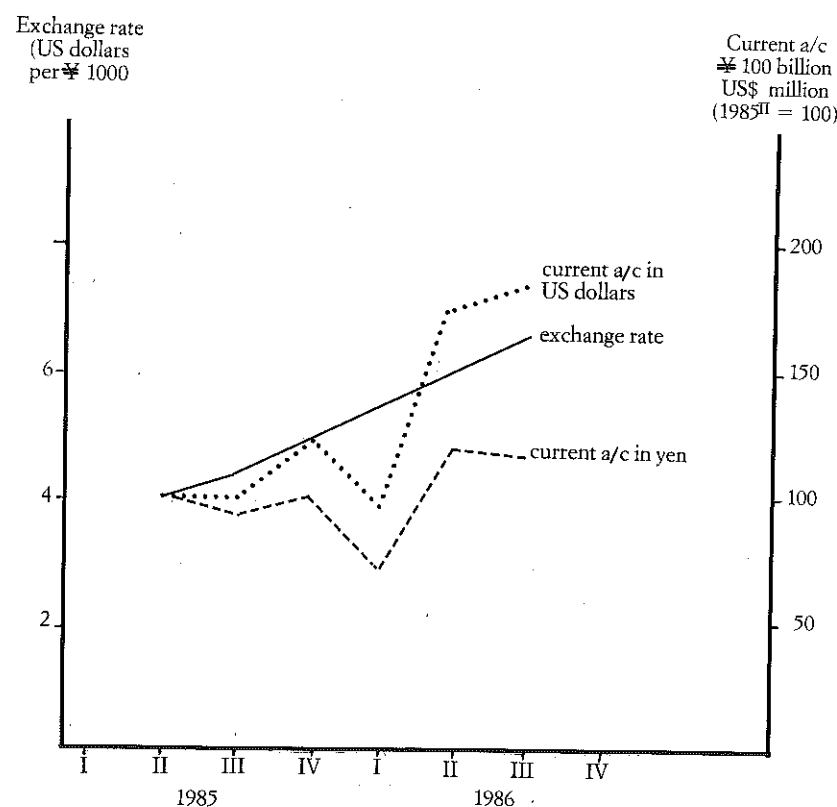
Sources: Exchange rate: IMF, *International Financial Statistics.* Current a/c: Ministry of Finance, Tokyo.

"the usual balance-of-payments problem is the task of eliminating a deficit of gold or dollars. Hence what matters is the value of exports and imports in terms of the foreign currency" (Haberler 1949, 1969, p. 112). But he did not specifically refer to the implications about the misleading character of the balance of payments in domestic currency. R.N. Cooper, in three papers published in 1971 referred to Hirschman's demonstration that a devaluation may improve the balance of payments in foreign but worsen it in domestic currency; but his concern was to point out that in such a situation the appropriate combination of policies for external and internal balance is devaluation together with

expansionary (rather than, as in the usual case, contractionary) domestic fiscal-monetary policy (Cooper 1971a, b, c). The valuation effect also lurks in Magee's taxonomy in his 1973 article on currency contracts and devaluation (Magee 1973, p. 310).

With these partial exceptions, not a single reference to the valuation effect has been found between 1949 and 1982.[4] The basic explanation for this neglect, before and since Hirschman, is that discussion of the effects of exchange rate changes started almost invariably, and perversely, from a position of initial balance (0 in the conventional diagram). The valuation effect therefore never appeared.

Frequently, authors expounded foreign exchange theory in terms of domestic currency. This was logical if, as in the case of Joan Robinson's 1937 essay (Robinson 1937), they were concerned with the domestic income and employment effects. But often, especially in the US literature, they did so merely because valuation in US dollars was taken for granted (*e.g.* Krugman & Obstfeld 1987, p. 442). Most commonly, they failed to specify which currency was assumed (*e.g.* Kindleberger 1958, Krueger 1983, Ethias 1983, BIS 1986). Starting with zero balance of payments, it did not matter.

The 1980s, with their large fluctuations in exchange rates, have brought occasional references to the more stringent condition for a favourable effect of devaluation than the Marshall-Lerner rule if the initial position is one of imbalance (*e.g.* Thirlwall 1982, p. 76; Chacholiades 1978, p. 182; OECD 1987, pp. 97f). There have even been references to the valuation effect, especially in the context of appreciation of the yen and DM. But for the most part the authors either mix up J-curve and valuation effects or, while clearly distinguishing them, either express no preference between foreign and domestic currency valuation or explicitly insist that domestic-currency valuation is to be preferred.

Thus, a 1986 monograph on exchange rate adjustment points out that devaluation in the small-country case widens the deficit in domestic currency but then lumps together J-curve and valuation effects in "the price effect" (Brooke *et al.* 1986, pp. 193f.; also Spitaeller 1980). The

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[4] An anonymous referee has drawn my attention to two books by the Italian economist, G. GANDOLFO (1970, 1986), in which Hirschman is mentioned as the first to have pointed out that in certain conditions a devaluation may improve the balance of payments in foreign but worsen it in domestic currency. But Gandolfo does not draw Hirschman's inference that, for this reason, valuation in domestic currency may be seriously misleading. Gandolfo also argues unconvincingly that a reserve centre cannot have a balance of payments problem (1986, p. 84), a proposition which the United States is in the process of refuting, as the United Kingdom did in the inter-war years.

OECD *Economic Outlook* for December 1986 explains that "the [Japanese] trade balance measured in current dollars is projected to increase. Measured in yen, however, the trade balance may fall quite significantly in 1988" (OECD 1986b, pp. 58f.; also OECD 1986c). But, perhaps diplomatically, it leaves it at that. The author of a recent Princeton Study in International Finance actually uses the term "valuation effect" but so much takes domestic-currency valuation for granted that he uses the term for the effect of yen appreciation on the Japanese trade balance measured in *dollars* (Golub 1986, p. 25). A 1988 report for the Economist Intelligence Unit also takes domestic-currency valuation for granted but attributes the failure of the volume effect of depreciation of the US dollar to outweigh the nominal rise in the US current account deficit to the fact that "the trade gap is now being measured in a currency that is worth much less" (Crook 1988).

Japanese economists have tended to take the view that yen valuation of the Japanese balance of payments is more appropriate than foreign-currency valuation, claiming that dollar valuation "greatly overstated" Japan's trade surplus (*e.g.* Kuroda 1988) or rejecting the Hirschman argument as simply "erroneous" (*e.g.* Fukao 1988, p. 18). But statements of the same position are also to be found among non-Japanese economists; thus, the statement on "The Global Economic Crisis" published by Thirty Economists from Thirteen Countries in 1987 referred to growing US imbalance in current dollars — "which are what have to be financed" (Thirty Economists 1987, p. 5).

Objections

As the quotations in the preceding paragraph show, the point first made by Hirschman — that for the purpose of evaluating the effects of changes in exchange rates on a country's balance of payments situation or "external balance", it is the balance in foreign exchange that matters and that the balance in domestic currency may be seriously misleading — has not won universal acceptance. It has been particularly firmly rejected by Japanese economists, but has also been questioned by others. The case for Hirschman's view having been set out and the literature surveyed, it remains to consider the objections that have been raised.

1. *Small country case?* It has been suggested that the Hirschman argument is valid only for the "small country" which is a pure price-taker in its foreign trade. Thus, Corden has argued, with reference to Japan, that "there are two extreme cases — two standard models: the small country case, where export prices are fixed in dollars, in which case the surplus stays constant in dollars and falls in yen; and the specialisation case, where export prices are fixed in yen, in which case the surplus stays constant in yen and rises in dollars. The reality is likely to lie between these two extreme cases" (Corden 1988, p. 37).[5]

Corden's "specialisation case" derives from Magee's "currency contract analysis" (Magee 1973) which has gained wide currency in the US literature of foreign exchange theory (*cf. e.g.* Krueger 1983, Williamson 1983). Magee assumed that exports are normally sold under contracts which denominate the price in the exporter's currency and he focused on "that brief period immediately following a devaluation... in which contracts negotiated prior to the change fall due" (Magee 1973, p. 305). The assumption is undoubtedly realistic for much of international trade, but the contract price is unlikely to remain unchanged for long following a major depreciation or appreciation. Sooner or later, even a large country's exporters must adjust their prices to world market conditions. Prices under contracts will be renegotiated. In other words, the J-curve effect in the Magee case is as much due to (temporary) stickiness of export prices in domestic currency as in the case of cost-plus pricing of exports in the British version of the J-curve (*cf.* Arndt-Dorrance 1987).

In any case, the valuation effect operates as much in the large as in the small country case. If there is a J-curve effect (that is, if the terms of trade deteriorate because export prices are sticky in domestic currency), the initial imbalance in foreign currency widens temporarily after a change in the exchange rate. The valuation effect on the balance of payments in domestic currency must be seen as superimposed on this widened foreign-currency imbalance. It appears to increase the imbalance further following depreciation and to reduce it following appreciation of the currency. In both cases, the J-curve effect moves the country further away from external balance, while the valuation effect leaves the balance of payments situation in this sense unaffected.

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[5] Note that Corden's second extreme is not that of a pure price-maker; obviously, no country has complete control over the foreign-currency prices of all its exports and imports.

Clearly, the validity of the Hirschman argument is not confined to the small country case.

2. *Which foreign currency?* Japanese economists have objected to the suggestion that valuation in US dollars presents a truer picture of Japan's balance of payments situation than valuation in yen, on the ground that the US dollar is no longer stable and can no longer serve as the unit of account (*e.g.* Fukao 1988, p. 21). There is substance to this objection. Since the US dollar depreciated more during the period than most other major currencies, US dollar valuation can reasonably be said to have overstated the further rise in Japan's surplus. Even SDR may not be entirely appropriate since they give the US dollar a disproportionate weight. The most appropriate unit for valuing any one country's balance of payments as an indication of external balance is one based on a trade-weighted average of partner currencies. But even this can serve only as an approximation since there is an underlying index number problem. SDR has the great merit of serving as a single international *numéraire*. But the choice of foreign-currency unit is really a secondary consideration. *Any* foreign-currency unit which keeps reasonably in line with the country's trade-weighted average is preferable to domestic-currency valuation since it avoids the misleading impression caused by the valuation effect.[6]

3. *Domestic-currency valuation as approximation to volume effect.* Japanese economists have argued that yen valuation is preferable "because the yen-based current account balance follows the movements of the quantity effect more closely" (Fukao 1988, p. 18). This is at best an argument applicable only to the case of currency appreciation since only in this case does the valuation effect go in the opposite direction to the J-curve effect. But even in the appreciation case, it is unconvincing. It is only by coincidence that the valuation effect would exactly offset the J-curve (and exogenous terms of trade change) effects, so that the yen-based current account would indicate the volume effect. One can imagine a case where terms of trade effects are quite small but the valuation effect (because of a large initial imbalance) very large; and *vice*

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[6] For purposes of international comparison of the size of current account imbalances, these are often expressed as percent of GNP, necessarily in domestic currency. It is worth noting that this, too, is misleading since it contains the valuation effect implicitly, though only in part. Since the GNP deflator is a weighted average of the prices of tradables and non-tradables, the ratio of the current account to GNP rises with rising domestic-currency prices of tradables, even without any increase in the foreign-currency deficit.

versa.[7] In any case, constant-price export and import data are usually available to indicate volume movements.

4. *Reconciliation with internal balance.* How, it may be asked, does one reconcile foreign-currency valuation for purposes of external balance with domestic-currency valuation for purposes of internal balance between saving and investment, given that $X-M\equiv I-S$? The answer is that a current account deficit is financed by capital inflow. Depreciation increases the domestic-currency value of the current account deficit but it also increases the domestic-currency value of a given capital inflow. The converse holds in the case of appreciation.

5. *Appropriate valuation depends on purpose.* It has been argued that there is "no a priori basis for choosing between the US dollar or yen values" (Nakakita 1988, p. 25). The appropriate course is to "present the results in either foreign or domestic currency according to the issue being discussed" (Marris 1988). This is obviously sensible. As was pointed out above, there are a number of purposes concerned with domestic economic effects of exchange rate changes for which the domestic currency valuation is relevant. The contentious question is whether for purposes of assessing a country's balance of payments situation, in the sense of external balance, it is the foreign-currency valuation, and only the foreign-currency valuation, that is relevant.

The rational for this view is the fundamental assumption which has been implicit in traditional foreign exchange theory, from Hume to Haberler, and also in Hirschman's argument, that the exchange rate is the price in the market for foreign exchange. "We associate external balance generally with equilibrium in the exchange market" (Caves and Jones 1973, p. 78). A country is in external balance when its supply of foreign exchange is just sufficient to meet its demand. It is in balance of payments difficulties if the supply is insufficient, and it will not want to accumulate an excess supply of foreign exchange indefinitely. What matters is the balance in foreign currency because it is foreign currency that represents command over foreign real resources, as is apparent

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[7] Note also that the valuation and J-curve effects have quite different time profiles. The valuation effect is once-for-all for the period immediately following the change in the exchange rate. J-curve (terms of trade) effects are largest immediately following the change in the exchange rate but then peter out over a period that may vary between a few quarters and several years. Once the J-curve effect has vanished, the valuation effect leaves behind an apparent change in the current account balance valued in domestic currency which has no significance for external balance.

from the analogy between a national economy and a private individual. We say that an individual lives beyond his means when his expenditure exceeds his income. A country lives beyond its means when its expenditure in foreign exchange (claims on foreign resources) exceeds its income from abroad in foreign exchange.

The validity of this proposition has hardly been explicitly disputed in relation to a deficit country (though it has been ignored by economists who have failed to distinguish between domestic and foreign currency valuation or have treated the choice as optional). But it has, as we have noted, been rejected as inapplicable to the case of a surplus country, such as Japan in recent years.

An ingenious, at least partial, defence of the Japanese view has been put forward by Corden. He argues that, for a surplus country, the appropriate currency depends on the purpose for which the accumulated foreign assets are ultimately to be used. "When the time comes to use the accumulated foreign assets and thus run a deficit, domestic expenditure (absorption) will have to increase. If the increase in expenditure were to go wholly on United States goods, what is relevant is the purchasing power of the assets over United States goods. This would be measured by the accumulated surplus in terms of dollars... [But] suppose that in the later years — when Japan runs a deficit — this deficit is brought about by extra domestic expenditures on Japanese goods, so that Japanese exports decline... What then matters is the value of the accumulated assets in terms of yen... In practice, it is likely that extra spending would be partly on United States goods and partly on Japanese goods, so that the best measure of the real effects on an existing surplus of an appreciation that is expected to be lasting is some measure between the dollar and the yen measure. In other words, there is a straightforward index number problem" (Corden 1988, pp. 39f).

The answer is ingenious but not convincing. Even if and when Japan wants to use its accumulated foreign assets by running a deficit, these assets still represent command over foreign goods. If Japan wanted yen to finance expenditure on Japanese goods and services, it could always print them. [8]

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[8] Corden has suggested that "we should be interested in the effects [of appreciation] on the real value of the inherited stock of foreign assets as well as the increment of it that year" (CORDEN 1988, p. 38) and Fukao may have the same point in mind when he refers to Japan's "creditor loss" (FUKAO 1988, p. 22). Holders of US dollars as part of their international reserves have suffered capital losses when the dollar depreciated; but these are surely irrelevant to the choice between domestic and foreign currency valuation of the change in the current account.

In any case, the answer clearly has no relevance to the case of a deficit country. It is difficult to believe that the answer is not symmetrical for both surplus and deficit countries.

6. *The politics of imbalances*. Finally, from the Japanese side, US dollar valuation of Japan's balance of payments has also been thought undesirable on the political rather than analytical ground that, by overstating the surplus while it is being rectified in yen terms, it has "exacerbated economic friction" between Japan and the United States (Nakakita 1988, p. 25). Similarly, one has heard Americans argue that foreign currency valuation of the US balance of payments over the recent period of depreciation of the US dollar is undesirable because it is liable to foster complacency among members of Congress about the tough measures needed to correct the imbalance in the current account.

Economists will regard this sort of argument as unhelpful. Neither politicians nor the general public will be content to be told that US dollar valuation of the US balance of payments was desirable during 1982-85 because it masked the growing current account imbalance and during 1985-87 because, by exaggerating the actual deterioration, it promoted a sense of urgency in the United States, while in Japan yen valuation had the advantage during 1985-87 of presenting a more pleasing picture of the trend towards external balance.

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