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The Bretton Woods System
as a Gold Exchange Standard

by

Toru Iwami
The University of Tokyo

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Abstract

Based on the gold convertibility of a key currency, the Bretton Woods System had much in common with the gold standards before and after World War I. However, econometric analyses suggest that this system is historically unique in that the key currency country (the United States) preferred to maintain the internal balance (employment) rather than the external balance of payments. In contrast, both Britain under the classical gold standard and the United States between the Wars observed the "rules of the game," adjusting domestic money supply to the levels of their gold reserves. Although the postwar fixed exchange rates forced other developed countries to follow this "rule," U.S. expansionary policy provided sufficient international reserves to manage balance of payments constraints, thereby resulting in rapid economic growth.

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1. Introduction

The Bretton Woods System collapsed in August 1971 when President Nixon suspended the gold convertibility of the dollar. This system of fixing exchange rates had two main features: 1) the parity for the currency of each member country was determined in terms of gold or the dollar, and 2) the price of gold was also fixed in terms of the dollar, which was convertible into gold. Its suspension was therefore a substantial blow to the international monetary system of the postwar years. Another characteristic of this system, namely the free convertibility between each currency, came into force for the most part in 1958, when the West European countries terminated their exchange controls. Thereafter until 1971, the Bretton Woods System worked in accordance with its initial idea, but only for a little longer than a decade. Compared with the fact that the floating exchange rate system has survived for nearly two decades, the Bretton Woods System seems to have had greater potential weakness, which led to its collapse.

Strictly speaking, the Bretton Woods System had two components: one determined by the Agreement itself and the other which existed initially outside the system, but functioned as an indispensable element. The best example of the latter is the gold convertibility of the dollar, which was legally based on the U.S. Gold Reserve Act of 1934, but served as an essential part of the Bretton Woods System[1]. The "Gold-Dollar Standard" had as its basis both the IMF Agreement and American domestic law. Moreover, during the reconstruction period after the last World War, the IMF and the IBRD (International Bank for Reconstruction and Development) could not afford to supply enough capital for both reconstruction and the balance of payments deficits , the major part of which was financed by the Marshall Aid Program (Gardner, 1956, P.293ff). In this paper, we define the Bretton Woods System, in a broader sense, as an international monetary and financial framework sustained by American leadership.

While a substantial literature on the breakdown of the Bretton Woods System exists, whether this System contributed to the "Golden Age" of capitalism (Maddison, 1982), and if yes in which way, is not yet clear.

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[1]When the Bretton Woods Agreement was drafted, all currencies were placed on an equal footing ("principle of uniformity"). The U.S. dollar was singled out on two occasions; in Article III, section 3(b) (the requirement to pay to the Fund) and in Article IV, Section 1 (the definition of parity), Dam (1982,P.86). Therefore, under the terms of the Agreement, it was impossible to require the gold convertibility of the dollar.

In this connection, the well-known argument by Robert Triffin (1960, in particular, pp.64-69) is very suggestive, because it seems to attribute both the success and the breakdown of the international monetary system to the same reason. The "Triffin dilemma" stressed the contradiction that a national currency has also to be the international currency, which constitutes a potential instability under the *gold exchange standard.* Since the key-currency's supply depends mainly on the balance-of-payment deficits of that country, this leads to a trade-off between the quantity and quality of international liquidity. One of the most crucial problems at the end of World War II was the shortage of international liquidity. The Triffin dilemma implies that as the liquidity supply increased and contributed to the good economic performances in the 1950s and 1960s, the core of the system, confidence in the key-currency, declined. The " dollar crisis " was an inevitable cost of the "Golden Age" of capitalist development.

Although Triffin was more concerned about the possibility that the shortage of liquidity might hinder world economic growth, his argument was interpreted as a prediction of the " dollar crisis " and greatly influenced the discussions on international monetary reforms in the 1960s. (See for example, van der Wee, 1986,p.454ff.)

While the "Triffin dilemma" predicted the inevitable decline of the system, a second argument holds that a breakdown would have been avoided if the United States had followed disinflationary policies[2]. The expenditures for the Vietnam War and the "Great Society" Program led to the inflation of the late 1960s. If this expansionary policy was unavoidable politically, the argument of policy failure, in fact, would admit the inevitability of the decline, in the sense that there could not have been any alternatives. Political economists emphasize that the dollar was destined to decline, because the U.S. balance-of-payment deficits, like military expenditures overseas and development aid, reflected the costs of the Pax-Americana[3]. However, given the inflationary tendencies, whether or not the American balance of payments could have been corrected through a dollar devaluation, and whether or not the surplus on other accounts could have

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[2]This kind of opinion is more popular among economists, for example, Johnson (1972, pp.412-13).

[3]This opinion is widely held by Japanese Marxist economists. Block (1977) differs from the cold-war historiography in arguing that U.S. diplomacy was guided by a desire for an open global economic system rather than for the East-West conflict. However, he admits the United States could not reduce military expenditures and development aid, because the reduction would damage the American policy goal.

been greater than the Pax-Americana costs, comes into question. In essence, the relevance of politico-social explanations should be judged on the basis of compensating economic policies.

With the above considerations in mind, the structure of this paper is as follows. In Section 2 following, we review in which sense the system of pegged exchange rates contributed to the success and failure of the Bretton Woods System. This is an indirect way of assessing importance of the liquidity problems. In Section 3, the demand for and the supply of international liquidity is examined quantitatively and qualitatively, first as regards the world as a whole, and then as regards individual developed countries. Section 4 shows, through historical examples, that the stability of the Gold (-Exchange) Standard depends on the adjustment policy of the key-currency country. This aspect has not been given much attention by Triffin himself. Finally, the main conclusion of this paper is summarized.

2. The Fixed Exchange-Rate System

1) The Parity Change

If the fixed exchange-rate system contributed to the economic growth of the "Golden Age," the first possibility is that stable exchange rates reduced uncertainty and thus promoted world trade. Historically, the growth rate of real exports was highest during the Bretton Woods period, whereas between the World Wars, the fixed exchange-rate system was short-lived and the export growth rate was low. Before 1913, world exports grew relatively fast under the international gold standard[4]. Indeed, stable exchange rates are, other things being equal, favorable to foreign trade, and also to overall economic growth. Nevertheless, it is questionable whether their influence is as great as the founders of the Bretton Woods System anticipated[5].

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[4]For the growth rate of real exports, see Maddison, (1982, Table 4-9). For the period after 1979, see OECD, *Historical Statistics, 1960-1987.*

[5]The influence of the exchange rate on trade is very difficult to distinguish from other factors. Certain exogenous shocks , for example the oil shocks, would bring about, simultaneously, volatility in exchange rates and slower growth in foreign trade, other than oil. For a review of the econometric studies, see IMF (1984a, 1984b pp.42-46).

In spite of the favorable effects of stable exchange rates, the pegged exchange-rate system turned out, in the long run, to be an unstable factor for the world economy, as the successive currency crises from the late 1960s to the early 1970s proved. The downfall of the system is sometimes attributed to the inconsistencies that developed between pegged exchange rates and the "uneven development of the capitalist countries" (Glyn, Hughes, Lipietz and Sigh, 1989, pp.99,102). But it seems that parities could have been better coordinated among countries, as the Bretton Woods Agreement allowed for parity changes, if necessary.

The theory of the N-th currency suggests that parity changes for the N-th currency (key-currency) are in fact impossible[6]. According to this theory, the United States could not independently decide the dollar parity rate, but could only accept passively whatever exchange rates were determined by other countries. Even if the dollar had been devalued against the D-Mark, for example, in order to stabilize this new parity, the dollar's exchange rate against other currencies would have had to be determined via the D-Mark. Such a situation implies that the D-Mark would have taken on the role of the $\underline{N}$-th currency, which is inconsistent with the above presupposition. As a corollary of this theory, the liquid liability of the United States was what the rest of the world demanded, because American balance-of-payment deficits depended on the exchange rates other countries preferred. If they had not wanted "dollar overhang," they would have opted to revalue their currencies[7].

However, the U.S. could have raised the dollar price of gold, thereby devaluing the dollar in terms of gold[8]. If other countries had not followed such a devaluation, the American balance of payments would have recovered. In this case, the dollar value of American gold reserves would have increased and its industries become more competitive. But would such moves have countered instability in the Bretton Woods System ? It appears new problems would have arisen. First, a devaluation of the dollar would have reduced

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[6]McKinnon (1979, P.28ff). Kenen(1969), Johnson(1972) also stressed the same point without using this terminology.

[7]Johnson(1972), Despres, Kindleberger, and Salant (1973).

[8] During President Eisenhower's second term, the U.S. Treasury sought advice from the IMF on how to devalue the dollar. Informed that a devaluation would be effective only if the link between the dollar and gold were broken, they refrained from considering it further. See de Vries (1987, pp.78-79).

the gold price of dollar assets held by the rest of the world. Other countries naturally would have resisted and might have compensated for their declining competitiveness by taking protective measures. Second, a more serious problem would have been that the devaluation itself might have damaged dollar credibility and accelerated the shift from the dollar into gold. In order to devalue the U.S. dollar while preserving its key-currency status, the demonetization of gold was indispensable. The sooner action was taken without consulting other countries, the better. Hence the reason why President Nixon's announcement was so startling. As a matter of fact, the dollar devaluation did not serve to save the Bretton Woods System, but started its breakdown.

Since the initial Agreement allowed for parity changes in case of "fundamental disequilibriums," the parity rates of other currencies were more flexible. Even under the classical gold standard, devaluation was theoretically feasible, but none of the advanced countries changed their parities until World War I. With the parities taken as given, they resorted solely to varied monetary policies in order to make external adjustments. The employment of exchange rates as a tool of macroeconomic policy was introduced gradually after the experiences of the interwar period; the "overvaluation " of the pound sterling, the "undervaluation " of the French franc, and later competitive devaluations in the 1930s. Those experiences provided lessons that devaluations were one of the most powerful weapons for a "beggar-thy-neighbor" policy and the cause of deflationary tendencies[9]. Needless to say, this lesson provided the background for the fact that parity changes were, in fact, very difficult under the Bretton Woods System.

As the "fundamental disequilibrium" was not clearly defined, past experience hindered parity changes. More precisely, it was not necessary to define the "fundamental disequilibrium," because past experience was supposed to have taught that parity changes should be exceptional. Moreover, attempts to change parities encounter stronger political resistance than other macroeconomic policy measures. Devaluations like that of the pound sterling in the 1960s, seem to damage the dignity of the government. Revaluations provoke strong objections on the part of exporters. Even in West Germany, where the government was more

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[9]However, if pursued multilaterally, devaluations may have acted to counter the Great Depression. See Eichengreen and Sachs(1985). Gardner argues that at the Bretton Woods Conference, both Keynes and White initially favored the pegging of exchange rates, but in the course of negotiations, both sides became more tolerant of the parity change (1956, pp.89-90,114-115).

forcefully inclined to prefer price stability than any other country, revaluations of the D-Mark were only possible after long periods of hesitation. In Japan, from the late 1960s to the early 1970s, even discussing a Yen revaluation was taboo within the government[10].

Midterm parity changes are unavoidable not only because of the gap in productivity growth among capitalist countries, but also because each government adheres to a discretionary macroeconomic policy. In addition, multilateral agreement on "appropriate exchange rates" is not easy to foster, both because of domestic resistance to changes in parities, and because of strong incentives toward the "beggar-thy-neighbor" policy. Multilateral parity alignments tend to be feasible only when facing a systemic crisis, like the Smithsonian Agreement. In this sense, the fixed exchange-rate system is potentially unstable. Under the international gold standard before 1913, this instability did not appear explicitly, because macroeconomic adjustment did not encounter serious political resistance.

2) The "Overvaluation" of the Dollar

The next question to be addressed is whether or not American balance-of- payment deficits would decrease because of a dollar devaluation. In the 1960s, government items (grants, flow of public funds and military transactions) and private long-term capital accounts were the main causes of the overall deficits, while the balance of trade as well as the balance on goods and services continued to be positive (See Table 1). Governmental expenditures were decided in accordance with political and military strategies, and were therefore inelastic to exchange rate variations. If the required level of real expenditures was determined exogenously, deficits denominated in the dollar would be greater following a dollar devaluation. Foreign direct investment, which constituted the largest private capital outflow, might have been reduced after devaluation, because previously "overvalued" dollars had made foreign investment cheaper. On the other hand, factors like the high level of federal tax and the tariff walls of the EEC and EFTA countries, which were considered to be the main causes of foreign direct investments (Block, 1977,pp.146-147), had nothing to do with exchange rate levels. Other factors, like wages, capital and transport costs, were influenced by the exchange rate, but not strongly enough to change the direction of foreign investments. Thus a dollar

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[10]Emminger (1977), Nakamura (1986,p.292).

devaluation could not have reduced dramatically the main components of the American balance-of-payments deficits.

The question to be answered is whether or not the surplus on goods and services could have increased through devaluation. While the American balance on goods and services was in surplus until 1970, the amount had been steadily declining from its 1964 peak. If the inflation of the late 1960s had caused deterioration in the balance on goods and services owing to declining competitiveness, this would have been reflected in rising real exchange rates. The fact is, however, that the dollar's real effective exchange rate rose somewhat in the years 1968 and 1969, but not so much as to change its early 1960s level. In short, contrary to the above expectation, the dollar's real effective exchange rate remained stable during the 1960s[11]. Moreover, the nominal effective exchange rate showed nearly the same tendency, which suggests a synchronization of price changes between the United States and her trade partners.

The international synchronization of prices took place also under the gold standard before 1913. One of the reasons was that active arbitrage transactions reduced price differentials within a short period (McClosky and Zecher, 1976). The " law of one price " naturally held better for interest rates than for goods prices. Since transportation and communication costs declined substantially thereafter, price synchronization in the 1960s should not be a matter of surprise. Another reason is that the monetary authorities of countries other than the United States had to intervene in foreign exchange markets to support dollar exchange rates. The money supply thus augmented caused "imported" inflation, which spilt over simultaneously with American inflation.

The fact that the U.S. balance on goods and services deteriorated until 1969, in spite of the relatively stable real exchange rate of the dollar, suggests that the deficits did not result mainly from price differentials. A dollar devaluation, accordingly, would not have dramatically helped recovery of the American balance of payments. In 1970 indeed, a decline in the real exchange rate coincided with a recovery in the balance on goods and services, but in the following years 1971 and 1972, this balance suddenly deteriorated even with a further decline in the real exchange rate. The larger surplus in 1970 reflected the American recession,

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[11]See IMF(1984a,Chart7, 8), where the quarterly real exchange rate is calculated from unit labor costs. Branson (1980, p.204) discussed the same tendency from the relative WPI.

whereas the deficits in 1971 and 1972 were caused by the economic recovery[12]. In order to reduce American deficits in the balance of payments, a cut in "absorption" by means of a tight macroeconomic policy would have been far more effective than a dollar devaluation.

3. Supply and Demand of International Reserves

1) Gold and Foreign Exchange

Triffin regarded international liquidity as a means of payment, and/or from the point of view of the precautionary motive for money. The critical index is the ratio of reserves to imports (See 1960, for example, pp.45-46). The precondition for this argument is that the "velocity" of international reserves is stable, otherwise the liquidity does not need to grow in line with world trade and hence the dilemma does not exist.

Historically, gold played the role of an international reserve, but as a natural resource, its supply is limited. Some economists argued that the international monetary system, which depended on gold, faced a potential liquidity shortage. For this reason, the Genoa Resolution of 1922 recommended the adoption of the Gold Exchange Standard (Dam, 1982, pp.55-56).

Table 2 reviews long-term trends in the share of gold and foreign exchange in international reserves. In the interwar years, especially in the 1930s, the share of gold increased, because currency depreciations reduced the gold price of foreign exchange reserves, on the one hand, and the loss of confidence in foreign exchange accelerated the shift toward gold, on the other hand. After World War II, the share of gold decreased from the 1960s onwards, the decline gaining momentum in the early 1970s. Compared with later years, the previous decrease was rather small. Since foreign exchange rates began to float, the share of gold has

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[12]Gordon (1980, pp.130-40) argues that the dollar devaluation had such a effect that the balance of trade in the first quarter of 1973, the peak of the economic boom, improved more than the fourth quarter of 1970, the trough of the recession. But he does not take into account the enormous deficits in 1971 and 1972.

declined considerably[13]. This long-term tendency illustrates how the Bretton Woods System spanned the transition from the metal currency (gold) to the credit currency (foreign exchange).

Did the shift from a metal to a credit currency promote world economic growth? In the interwar years, the rise in the share of gold coincided with economic stagnation, whereas in the postwar period the rate of economic growth was very high. Especially remarkable was the growth of real exports[14]. Briefly, Triffin's pessimistic forecast did not come true. Given the relatively small supply of new gold, a growing share for foreign exchange was at least a prerequisite for economic growth.

However, we should note the fact that international reserves did not increase in proportion with world trade. In other words, the velocity of international reserves was not stable in the long-run. The ratio of world total reserves to imports was 22% in 1913 (39% with gold in circulation), 43% in 1928 (46% with gold in circulation), and 118% in 1938 (Triffin, 1960, Table 3). Several factors may have contributed to this great change.

First, a "saving" of reserves is possible, as international financial markets enable countries to borrow liquidity. Second, the stable growth of world trade may reduce precautionary demand for reserves. The smaller ratio before 1913 is consistent with the fact that the growth of world trade was relatively rapid with fewer fluctuations[15] and the free movement of international capital made it easier to finance current account deficits. The larger ratio in 1938 compared with 1928 seems to reflect the slow recovery of world trade from the Great Depression, but the stagnation of trade and the malfunction of the international capital market should have increased the precautionary demand for reserves. How possibilities of international finance and fluctuations in world trade influence the demand for reserves, is to be empirically examined below through time-series data.

How did the relationship between world trade and reserves change in the postwar years ? Figure 1 shows

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[13]Based on the market price, the share of gold would have been 45.1% in 1978, and 36.9% in 1988, higher levels than in 1973. However, this share should not be overestimated, because the market price would not be sustained if monetary authorities were to sell a large amount of gold. Moreover, the amended IMF Agreement of 1976 demonetized gold.

[14]For long-term statistics on economic growth, see Maddison (1982, Table 4.9).

[15] For export fluctuations, see also Maddison (1982, Table 3.8).

that official world reserves increased moderately up to the late 1960s, and expanded enormously thereafter in the early 1970s. Since the amount of gold reserves remained almost constant, the share of gold in total international reserves (including the United States) decreased continuously from 74% in 1949 to 50% in 1968, and 29% in 1971. Meanwhile, foreign exchange reserves, in particular of the dollar, increased significantly. But dollar reserves did not exceed gold until 1971. Before then, the greater part of world reserves consisted of gold. Indeed, countries other than the United States held a larger share of foreign exchange reserves. But even in those countries, the share of gold remained larger than that of foreign exchange between 1958 and 1967 (See Figure 2). It is noteworthy that during the 1960s, the "gold-dollar standard" was based on gold rather than on the dollar, and the growth in total reserves remained fairly moderate.

There might be objection to considering official reserves equivalent to total world liquidity. Since most international payments are settled through private dollar assets, Figure 3 shows the official reserves plus liquid liabilities of American banks to nonresidents, and eurodeposits as well. The liquid liabilities of American banks remained smaller than official reserves, while eurodeposits expanded from the late 1960s onwards. But the eurodeposit is not an actual substitute for the official reserves, because part of the latter is contained in the former.

The ratio of total world reserves to imports declined between the late 1940s and the late 1960s (Figure 4). In 1971 and 1972, this ratio turned up remarkably with the growth of dollar reserves, but its level remained nearly the same as in the mid-1960s. The velocity of international reserves was, therefore, on an increasing trend in the two decades up to the end of the 1960s, which seemingly contradicts Triffin's presupposition. However, under closer observations, the facts reveal the opposite case. The dollar reserves-world imports ratio remained almost constant through the late 1960s, suggesting that the main reason for the declining reserves-import ratio was the relative decrease of gold to world imports. Moreover, the decline of the gold-world import ratio would be attributed to the United States, because the United States held the major part of monetary gold, particularly in the early postwar years. The reserves-import ratio outside the United States does not show a clear trend, apart from a minor decline in the gold-import ratio from the late 1960s (See Figure 5). These findings are rather consistent with Triffin's argument that international liquidity should be supplemented through sources other than gold, which did not increase as fast as world trade. Despite

acknowledgement of the "dollar overhang" from the late 1960s, dollar reserves do not seem to be excessive, at least in relation to the volume of world trade. Excessive dollar reserves became apparent only after 1971, when the United States suspended the gold convertibility of the dollar.

The examination of the world-reserves-to-import ratio so far does not reveal other factors which affect the amount of reserves held. According to the literature on the demand for international reserves[16], the amount of reserves actually held correlated positively with imports and with the degree of disturbances in the balance of payments. Moreover, as the previous discussion suggests, we suppose that there may have been elements that promoted saving reserves, such as "economies of scale", or innovation in the international payment system.

Table 3 shows the regressions of world reserves ($\underline{r}$), gold reserves ($\underline{g}$), and dollar reserves ($\underline{d}$) on world imports ($\underline{im}$), variability of world imports ($\underline{Vim}$) as an index of disturbance, and international finance possibilities ($\underline{f}$) as an innovation of payment facilities, respectively. As the previous literature suggests, signs for both $\underline{im}$ and $\underline{Vim}$ are supposed to be positive, while the sign for $\underline{f}$ should be minus, because the growth of the eurofinance market reduces the precautionary demand for reserves. The data for $\underline{f}$ corresponds to the sum of eurobonds issued and eurodeposits (net), in view of the fact that international finance denominated in dollars shifted from the United States to the eurofinance market from the mid-1960s. The time-trend is included as a variable in equations (2), (5), and (8). Of the coefficients for $\underline{lim}$ in equations from (1) to (9), those in (2), (7), (8) and (9) are statistically significant at the 95% level. Moreover, the signs are as expected. As Figure 4 shows, the correlations between dollar reserves and imports are particularly good. The t-statistics of $\underline{Vim}$ in (8) and (2) are large, but signs are contrary to the above expectations. Since world imports equal world exports, it is difficult to interpret this result. The relationship between trade disturbance and reserves is further discussed in the next Section, by means of individual country data.

More important is the result that the coefficient of $\underline{lf}$ is minus in equations (3) and (9). The t-statistics show this variable is significant at the 90% level, suggesting that the growth of the eurofinance market reduced the need to hold reserves and hence contributed to solving the liquidity dilemma.

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[16]See the literature cited in Footnote 23.

Triffin's argument also raises the question why international liquidity should be based on a certain country's currency. It is not because a country with enormous political and economic power forces other countries to accept its currency. The main reason is simply that transactions in that currency are most economical, and most advantageous for the rest of the world. Prerequisites for a key-currency conventionally include 1) the size of the national economy concerned, 2) the existence of an international financial market and, 3) the stability of the currency (For example Mckinnon, 1979, p.35). The best example is the pound sterling before World War I, when Britain was the largest trading country and the "world's banker."[17]

First, Britain was the largest trader,and shipper as well. Therefore it had bargaining power in selecting the currency of trade, while other countries were obliged to follow the use of sterling as a means of payment. Britain was the center of entrepôt trade, exchanging major primary trade goods, such as cotton, wheat, gold etc. Second, the greater part of world trade was financed by British financial institutions and payments were settled through sterling balances held in London. Third, sterling assets were the most liquid and least risky in the sense that the London financial market supplied a large amount of liquid assets and sterling's convertibility into gold was never in danger.

After the turn of the century, the franc and the mark began to command equal status with the pound, at least on the European continent, and confidence in the pound seemed to wane[18]. Compared with the 1920s, however, the pound was on a far more solid basis.

Table 2 shows that the share of the pound sterling is greater than that of the dollar in the early postwar years. The relative position of the pound declined in the 1920s, but rose again in the 1930s, continuing at higher levels up to the 1950s. Sterling's share of world trade finance stood at about a half before and after the last War, and a third in the early 1950s (Williams, 1968, p.268, 294). During at least the first decade of its operation , the Bretton Woods System employed the two key-currencies. In explaining this phenomenon,

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[17] For the following paragraph, see Brown,(1940, pp.774-778), for example.

[18] de Cecco (1974,p.125), Eichengreen (1990,pp.309-310). As evidence of declining confidence, de Cecco referred to the fact that the Bank of England could not stop the large scale outflow of gold to the United States in 1907, by conventional means, namely by raising the Bank Rate.

we cannot resort to the same reasons as were applied to the pre-World War I years.

First, the United States was by far the largest exporter. In 1948, its share of world exports was more than 20%, twice as large as Britain's. In particular, those countries in need of food and reconstruction materials had to pay for their imports in dollars. Second, the United States was the main supplier of capital to the rest of the world. In 1945-1955 decade, foreign bond issues amounted to 1.8 billion dollars, while 1.1 billion dollars were issued in Britain (Aubrey, 1964 Table 2). Third, the dollar was the sole currency convertible into any other currencies and into gold as well. In fact, it alone maintained a fixed price in terms of gold. These facts reflected American competitiveness and its huge accumulation of gold reserves. Despite these advantages, the dollar did not overtake sterling until the mid-1950s.

World trade depended still on short-term finance supplied by London through the 1950s. Trade finance facilities are an outgrowth of accumulated information and know-how, and not the direct outcome of a surplus in the current account (capital exports). More important is the fact that the sterling-area countries held a major part of the sterling balances, a legacy of British borrowing during World War II. Since this balance had only limited convertibility up to 1958, it served as a means of payment mainly within the sterling area. Nevertheless, as the share of trade with Britain and within the sterling area declined, these countries became independent from the pound. Finally, the devaluation in 1967 broke its key-currency status[19]. In short, the conditions for a key currency hold in the long-run.

The rise of the dollar is sometimes attributed to American political, and military hegemony. One argument holds that the liquidity shortage in the postwar period was solved through U.S. government aid (the Marshall Plan) and military expenditures (the Korean War). But given American potential as a supplier of capital goods and food, which Japan and European countries seriously needed during the reconstruction era, the currency most in demand could only have been dollars. The liquidity supply through political channels was merely one side of the story. On the basis of such American competitiveness has grown the international financial and foreign exchange market, with the dollar as a main transaction currency.

After the late 1950s, the basis of dollar competitiveness changed in two ways. First, the American share of world exports declined, while its share of world imports rose. The recovery of the manufacturing sector in the developed countries reduced the abnormally high level of American exports, and the composition of

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[19] Cohen (1971, Table 4-3, p.73 ff).

exports shifted back to traditionally competitive items, like capital goods, chemical, and agricultural products (Branson, 1980, p. 207). In transactions of these items in particular, the dollar had great advantage. Although the growing share of American imports further increased the bargaining power of the dollar, more significant factors were likely to have been foreign direct investments and technology transfers by American multinationals.

Second, while the position of the United States as a "world banker" promoted transactions in the dollar, the analogy of a "bank" invites the following remarks.

a) Up to the mid-1950s, as stated above, the United States supplied funds to the rest of the world, mainly through public channels. Indeed, the United States was already the largest exporter of private capital, but its private capital mainly consisted of Canadian bonds in the first postwar decade. In the United States, issues of securities other than Canadian bonds surpassed issues in Britain from the late 1950s. At about the same time, the New York market for short-term finance overtook the market in London[20].

b) Thereafter, the center of international finance was located within the United States for nearly a decade until the mid-1960s, when international finance denominated in dollars started to shift towards the eurofinance market (the eurobond and eurodollar markets). Of liquid dollar assets held by nonresidents, those invested in the United States were more than double eurodollar deposits in 1966, but by 1970 they were equal (Mikesell and Furth, 1974, Table 2.9).

The eurofinance market developed on a dollar basis because the United States was the core of the world economy. In addition, the demand for and supply of funds in the eurofinance markets largely depended on American multinationals[21]. American firms naturally prefer transactions in the dollar because of business relationships with the home country and accounting conventions. From the mid-1950s, foreign direct investments accounted for most of the capital outflow from the United States, and American multinationals con-

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[20]Statistics on foreign bond issues are from Aubrey (1964, Appendix Table 2). Aubrey (p.175) also reports that in the early 1960s, trade finance in dollars was greater than in pound sterling, while bank acceptance bills in the United States were at higher levels than in Britain.

[21] See Morris and Little (1970, pp.61-63), Mendelsohn (1980, p.34). The share of American multinationals in the eurodollar market is not reported, but American firms took about two-thirds of total eurobonds issued from 1965 to 1974 (Mendelsohn, 1980, p.136).

tributed to closing the technology gap between the United States and Europe (Maddison, 1982, p.128, van der Wee, 1986, pp.211-213). The growth of FDI promoted patent-service payments and intrafirm trade, naturally denominated in the dollar.

As American multinationals became the largest customers in the eurofinance markets, the share of American banks expanded simultaneously. American banks extended their bank networks abroad in response to the demand for foreign business services from their domestic customers. The bank's pattern of multinationalization, namely "following the customers," stems from their experiences in the 1960s (Fielke, 1977, pp. 27-28).

3) The Demand for International Reserves by Developed Countries

Adjustment policy and parity changes substitute for each other. Since the IMF Agreement considered parity changes exceptional, the Bretton Woods System generally obliged member countries to adjust money supply to their balance of payments. On the analogy of the gold standard, international reserves should have behaved as barometers guiding macroeconomic policy.

From the standpoint that Keynesian discretionary policy was the opposite of the gold standard mechanism[22], the obligation to adjust became merely for appearance sake. In fact, however, the balance of payments worked as a constraint against continuous expansionary policy, for example in Japan and Britain, where "the balance-of-payment ceiling[23]" and the "stop-go," respectively, guided macroeconomic policies in the postwar years. Seen from the global perspective, on the other hand, the fact that the United States was reluctant to make adjustment, should have enabled other countries to accumulate dollar reserves and

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[22]Keynes called the gold standard, in his early writing of *A Tract on Monetary Reform*," a barbarous relic " and stressed that the " managed " currency system, or the " regulated non-metallic standard " are indispensable, in order to preserve the stability of a national economy (1971, pp. 136, 138, 152-154). Ouchi's (1973) concept of "state-monopolistic capitalism" is based on the same recognition of historical development, although he followed the Marxist tradition, using such a terminology as "the general crisis of capitalism."

[23]This expression was frequently used for the balance-of-payments constraint in Japan during the high-growth period. For more details, see Iwami (1992).

thus avoid otherwise necessary deflationary policies. Such questions as how international constraints worked, and how far adjustments were actually pursued, are to be examined below.

The above questions can be divided into two parts. First, what factors affect levels of international reserves; that is, how to estimate the so-called "demand for international reserves" function[24]. Second, what are the relationships between international reserves and money supply. Since prior experience and customs may influence both demand for international reserves and monetary policy, cross-sectional regressions are of questionable value. Table 4 shows the results of time-series regressions for seven major developed countries. Of the G-7 countries, Switzerland replaces Canada, because Canada gave up pegging from 1950 to 1962, on the one hand, and the Swiss franc was one of the strongest currencies in the 1960s, on the other hand. These seven countries together held 42%, and 53% of world exports in 1950 and 1970, respectively[25]. Their aggregate share of GNP should have been still larger. When their economies were expanding, without doubt they pulled the world economy into a period of growth.

In accordance with a substantial literature addressing the first part of the question, Table 4A includes Import (im), variability of exports (Vex) as well as nominal GNP for independent variables. The greater the GNP, the more would be the demand for international reserves. Moreover, as in Table 3, the sign for im would be plus. Still problematical is how to estimate the variability of exports, but the sign of Vex is expected to be plus[26].

Among the variables in Table 4A, those with high statistical significance and the right signs are gnp for Britain, France, Italy, and Japan; lim for the United States and Germany; and Vex for Britain and Japan. Compared with Table 3, the results of lim are generally not so good, probably because the growth of lr is more closely correlated with the growth of gnp. That the rise in reserves corresponded more closely to GNP,

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[24]See Grubel (1971), Frenkel (1974) for the demand function of international reserves.

[25]Calculated from IMF, IFS 1987.

[26]It is clear that greater variability in trade, or in the balance of payments, increases the demand for reserves, but modelling the variability is not self-evident. Deviations from the averages are usually shown in absolute values as in Table 3 and 4. The greater Vex implies also that exports for the corresponding year are above the average, and therefore the increase in reserves could be an automatic result of the surplus in the balance of trade.

and partly to imports, suggests at least that the growing amount of reserves reduced barriers to economic growth.

In examining whether or not the level of reserves was a factor contributing to economic growth, of more interest is the correlation between reserves and money supply, which leads to the second question: how obediently each country followed the "rules of the game." If a country could expand its money supply without regard to the amount of reserves, the latter would no longer be a brake on economic growth.

Nevertheless, it is important to note the possibility of an endogenous relationship between r and M. When r is large enough, the money supply would grow through official intervention in the foreign-exchange markets; in this case, the sign for r in relation to M is plus. On the other hand, if the money supply grows, it influences the balance of payments negatively, and hence reduces international reserves; in this case, the sign for r would be minus. Table 4B reports the results of the second-stage least-square with lr, estimated from equations in Table 4A. In order to see exact correlations, the values for both lr and lm are detrended.

The most interesting result from equations (8) to (14) is that the coefficients of lr are all plus, with the exception of the United States. In other words, the United States alone did not adjust its money supply to the level of international reserves, but rather expanded the money supply as reserves declined, whereas other countries obeyed the "rules of the game." Indeed, it is better to exclude France from the remaining six countries, because its t-statistics are exceptionally small. Above all, the finding that the monetary response of the United States and other countries to the change in reserves is asymmetrical, is very suggestive in understanding the actual function of the Bretton Woods System.

One of the successful balance-of-payments adjustments was illustrated by Japan's experience from 1954 to 1962 (de Vries, 1987, pp. 39ff). The same policy was applied in Britain, where currency crises occurred repeatedly, with the result of a final devaluation in 1967[27]. Of the coefficients for lr, Japan's is the largest, followed by Britain's, thereby corresponding to the above facts. That the French lr is statistically insignificant, reminds us that this country often resorted to currency devaluations.

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[27]Surrey (1982, p. 529, 536) attributes the slow growth of British labor productivity to discouraged investment under this stop-go policy. But growth performance depends on many factors other than macroeconomic policy. The best counter-example is Japan, which, even with a similar preference for adjustments, experienced rapid growth. For the Japanese experience, see Iwami (1992).

While Japan, on the one hand, and France, on the other, illustrate the two extremes, what factors determined the policy choice to adjust or to devalue? Generally speaking, adjustment policy was more feasible, not only because of the initial implications of the IMF Agreement, but also because devaluation was politically unpopular at home. The United States could not pursue deflationary policy owing to political considerations, but domestic pressure not to deflate was strong in other countries as well. McKinnon stressed that American balance-of-payment deficits were automatically sterilized, because countries in surplus employed their dollar liquid assets in the United States (1979, p. 266). However, his argument should not be generalized to mean that the gold exchange standard contained an inflationary bias, because the key-currency country has an option to reduce the money supply through open-market operations, if the preference is actually to halt inflation. The critical point is the policy stance of the key-currency country. Reviewing historical experience in this respect is the main focus of the next section.

4. The Adjustment Policies of the Key-Currency Country

The "dollar crisis" took place as foreign monetary authorities began to convert their liquid dollar assets into gold. In 1965, President de Gaule proposed returning the international monetary system to the gold standard. The American gold coverage ratio (gold reserves over liabilities owed to foreign monetary authorities) dropped below unity in the mid 1960s (Figure 1), which was held to be the beginning of the "dollar crisis." Triffin generalized this instability as inherent in the "gold exchange standard." The American gold coverage ratio stood at 100%-90% in the mid-1960s, a relatively high level when compared historically. In contrast, it was 47% at the end of 1970, and 22% in 1971, the year when the goldwindow was closed. In 1913, for example, the British ratio of gold to liabilities owed to foreign authorities was only 38%[28]. Since private holders of sterling could convert their liquid assets into gold, the actual gold coverage ratio would have been much lower. In May 1931, the Macmillan Committee estimated British external gross liabilities at 407 million

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[28] Calculated from Lindert (1969, Table 1, 2)

pounds, and net liabilities at 254 million pounds. With 25 million pounds of gold available for abroad[29], the gold coverage ratio was 6.1% on a gross basis and 9.8% on a net basis. The American gold coverage ratio in 1971 was much higher than the British ratio in 1931, and until the end of 1970, higher than the British ratio in 1913. Despite higher gold coverage for the dollar than was shown for sterling in the above historical records, confidence in the dollar fell almost continuously in the late 1960s. Why ?

One could argue that it was not the level itself but the decreasing trend in the gold coverage ratio that caused the "dollar crisis." This point is related to another factor affecting the credibility of a currency: that is, the commitment of the key-currency country to stabilizing its currency with an adequate macroeconomic policy toward the external balance. In this respect, the policy stance of the key-currency country has changed in the course of history. Even if we accept some of Triffin's presuppositions as valid, the credibility of a currency depends undoubtedly on the macroeconomic performance of that country. This is the point that explains the success and breakdown of the Bretton Woods system, and that separates us from Triffin.

1) The "Rules of the Game" under the Gold Standard

The reason credibility in the pound sterling did not deteriorate, despite the low level of gold coverage, is simply that Britain followed the "rules of the game." In particular, this country took deflationary measures when gold flowed out. The policy authority, the Bank of England was concerned, for the most part, about the convertibility of the pound sterling.

There has been debate whether the conventional interpretation of monetary policy under the gold standard actually holds or not. Recently, the two papers by Dutton (1984) and by Pippenger (1984) examined with sophisticated econometric models, whether the behavior of the Bank was influenced by factors other than gold convertibility, such as the domestic economic situation, or the duty to stockholders to maintain enough income. Their arguments are still inconclusive, however[30].

Table 5A shows the results of regression analyses using the money supply (approximately M3, defined as

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[29] The above figures are from Dam (1982, p.67).

[30] See the discussion on both papers, in Bordo, Schwartz (eds, 1984, pp. 227-232).

bank deposits plus currencies in circulation) as the dependent variable, and the lagged-money supply, specie held by the Bank of England (gold and silver before World War I and gold alone thereafter), and the nominal GNP as independent variables. These results are computed from both original data and detrended values. If the Bank of England obeyed the "rules of the game": that is, the Bank did not sterilize specie movements, the signs of the $\underline{ls}$ are positive. Although $\underline{ls}$ would have changed under both external, and internal drains, it is not crucial to distinguish between the two. Indeed, the signs for $\underline{ls}$ ($\underline{dls}$) are right in terms of the "rules of the game" in all equations, but the t-statistics for equations (3) and (7) are not large enough. Even these relatively simple regression models with data estimated by Sheppard (1971)[31], would suggest that the Bank of England responded to the gold outflow more automatically before World War I than in the interwar years. The results from the data series by Capie and Webber (1985), on the other hand, do not report such clear differences between the two periods. In view of the smaller coefficients of determinant for the interwar period, however, monetary policy appeared to have undergone some changes from the traditional rule.

Since there could be a simultaneousness between the variables $\underline{s}$ and $\underline{m}$, Table 5B shows the results of the two-stage least square methods with lagged specie, market interest rate, and imports as instruments for the pre-World War I period; lagged specie and imports for the postwar years, respectively. Even with these estimates, the sign of the $\underline{dls}$ is plus in equation (9) with large t-statistics, whereas in equation (10),(11) and (12), the signs of the $\underline{dls}$ are also positive, but with smaller t-statistics. The difference in coefficients of determinant for equations (9) and (11) would suggest that the relationship between $\underline{dls}$ and $\underline{dlm}$ weakened in the interwar years.

One shortcoming of the previous econometric analyses is that they treat long- and mid-term data equally. It is therefore impossible to distinguish critical periods, when the outflow of gold was abnormal, from normal periods. In 1890 and 1907, for example, the Bank of England raised the Bank Rate frequently in attempts

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[31]According to Capie and Webber (1985, pp.41-42), the data by Sheppard (1971) have shortcomings in underestimating deposits at banks not publishing balance sheets, in particular during 1880-1891. Table 5 took the data of the period after 1890. Capie and Webber admitted that "Sheppard's series is much more reliable after the First World War".

to stem the gold drain, even enlisting the help of the Banque de France[32]. In these instances, the relation-ship between gold reserves and monetary policy is quite clear.

While numerous explanations attempted to establish how the British balance of payments was stabilized under the classical gold-standard, it is evident that the rise in the Bank Rate finally restored the balance of payments, and hence terminated the large scale drain of gold reserves. The reasons are, first, that the market rate in London had a great impact on international capital movements, and second, the change in interest rates influenced British inventory investments, in particular, in imported goods, which naturally affected the balance-of-trade deficits[33].

As long as Britain had the power to replenish gold reserves by raising the Bank Rate, the credibility of the gold standard remained firm. Even after World War I, the general view was that the best way to stabilize a national economy was by restoring the gold standard as soon as possible. The Cunliffe Report of 1918, which formalized the automatic adjustment mechanism of the balance of payments, proposed an early return to the gold standard. Nevertheless, British monetary policy deviated from "automatic" responses. To reduce interest costs on the national debt accumulated during the War, and in consideration of the political pressures from both trade unions and less competitive industries, the Bank became reluctant to raise the Bank Rate. The rather obscure results for the interwar years in Table 5 are not inconsistent with Eichengreen, Watson, and Grossman (1985), which illustrate not only deviation from the conventional "rules of the game", but also the Bank's more prompt response to a gold outflow than to an inflow, suggesting that the maintenance of gold convertibility still was considered of primary importance.

The rise in the Bank rate, however, did not attract short-term capital and hence gold as effectively as in the prewar years. While the decline in the current-account surplus necessitated "borrowing short, and lending long", the "deposit-compelling power" of London waned, as a portion of long-term capital issues shifted to New York. Moreover, the greater share of Treasury Bills (TB) in the London discount market weakened the interest rate effect on foreign exchange rates (Brown, 1940, pp.554-555, 652-654). Volatility in the French franc before its stabilization, and active speculation on the New York Stock Exchange constituted other instabilities to induce gold outflow from Britain.

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[32] For the Baring Crisis, see Pressnell(1968, p.192ff).

[33] Triffin (1964, pp.5-6) stressed these points as well.

2) The External and Internal Balances under the " Managed Currency " System

Following the lessons of the Great Depression, governments of the developed countries shifted their policy objectives to stable aggregate demand, in other words, to providing higher levels of employment through the use of discretionary macroeconomic policies. How successful the New Deal as a Keynsian policy was, is still problematic, but the Employment Act of 1946 at least constituted a turning point, in the sense that the government proclaimed it an obligation to intervene in the private economy if necessary, to prevent a depression after the War. Meanwhile, the United States maintained the gold-convertibility of the dollar to foreign monetary authorities, while the gold standard was terminated internally. In this respect, the American government had a dilemma similar to that of the British in the interwar years[34]: both to pursue a discretionary macroeconomic policy and to maintain gold-convertibility. But the Employment Act of 1946 suggests that American economic policy after World War II focused more strongly on maintaining the internal balance rather than the external one.

Gordon (1980, pp.132-133) mentioned that, in the postwar years, macroeconomic discussions tended to assume that the American economy were closed. This attitude seems to be reflected in the actual policy employed. As long as the rest of the world was suffering from a "dollar shortage," the United States could ignore the external balance. From 1958 onwards, however, when European countries resumed convertibility of their currencies and American gold reserves decreased greatly, the government began to pay attention to the gold outflow caused by balance-of-payments deficits. Until 1958, gold flowed out for only a few years, and amounts were small and the outflow did not continue for long. But from 1958 until the gold window was closed, gold flowed out continuously, with the exception of 1969 (Table 1).

Of interest is whether American macroeconomic policies responded properly to the gold outflow, and in this sense, whether or not there was any change after 1958. I constructed regression models for the post-World War II period with $\underline{h}$ (monetary base) and $\underline{m}$ (M1) as dependent variables. In addition to gold reserves ($\underline{g}$), nominal GNP, and lagged $\underline{h}$ and $\underline{m}$, the unemployment rate ($\underline{U}$) is included as an indepen-

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[34]The British Gold Standard Act of 1925 permitted not only foreign monetary authorities, but also private nonresidents to export gold from Britain. Therefore, the external imbalance was a greater problem for Britain than for the United States after World War II.

dent variable, in order to consider policy preference towards employment. The results are reported separately for the entire period and for the periods before and after 1958. The meaning of the plus and minus signs is the same as in Table 5. As for the unemployment rate, if the government prefers to maintain a high employment level, its policy stance should be expansionary (the rise in $\underline{h}$ and $\underline{m}$) with a large $\underline{U}$. The coefficient sign of $\underline{U}$ ought to be, therefore, plus for both $\underline{h}$ and $\underline{m}$.

The results of the ordinary least square method for the period 1950 -- 1971 (equations (1), and (3) in Table 6) yield coefficients of $\underline{g}$ opposite to our suppositions in both cases. The signs for $\underline{U}$ suggest, on the other hand, the influence of employment policy, and the t-statistics show enough statistical significance. Therefore, equations (1) and (3) of Table 6 indicate at least that: 1) American monetary policy was not generally influenced by external gold drains; 2) violation of the "rules of the game" implies that the primary policy objective was to restrain the high unemployment rate.

However, we have to reconsider whether $\underline{h}$ and $\underline{m}$, on the one hand, and $\underline{g}$, on the other, are interrelated. While the level of gold reserves would affect the money supply, a rise in $\underline{h}$ and $\underline{m}$ would generally reduce balance-of-payment surpluses (or increase balance-of-payment deficits) and induce gold movements. In the latter case, the correlation of $\underline{h}$, $\underline{m}$ and $\underline{g}$ is negative. Thus, I applied two-stage least square regressions with estimated $\underline{g}$ ("$\underline{g}$"), using such instruments as $\underline{rwg}$ (gold held by the rest of the world) and $\underline{rwim}$ (imports of the rest of the world). The results are reported in equations (2),(4),(6),(8),(10), and (12). All of these equations report negative signs for " $\underline{g}$," although there are more equations with small t-statistics than were reported by the ordinary least square method. Briefly, even two-stage least square regressions do not alter the above conclusions.

The $\underline{U}$ could have been influenced by monetary policy as well; a rise in $\underline{h}$ and $\underline{m}$ increase employment, and thus reduce the unemployment rate. But it is not easy to find proper instrumental variables for $\underline{U}$, and since the object of this paper is not to prove that the unemployment rate would have been the most important policy target, the results of Table 6 are, for the present, satisfactory.

The next interesting question is whether the policy of "benign neglect" would not have been unique in the period after World War II, but merely a reflection of the U.S. economic structure where dependence on foreign economic transactions is exceptionally small, at least compared with Britain. Table 7A is constructed in a similar way to Table 5A. This Table reports that detrended monetary gold is positively correlated with

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the detrended <u>M1</u> between the Wars, at enough statistical significance. Compared with equations (7) and (8) for the British interwar period in Table 5A, the coefficients for monetary gold are larger, suggesting that the U.S. money supply responded more sensitively to gold movements than did Britain's. In consideration of the possible simultaneousness between the money supply and the monetary gold stock, Table 7B shows the result of regressions with an instrument variable. Despite smaller coefficients of determinant, the signs of g are consistent with Table 7A. We can therefore assume that the U.S. generally observed the "rules of the game" during the period between 1920 and 1939.

Of importance is the finding that monetary policy after World War II does not seem to respond in a way that would maintain the external balance. In particular, a critical factor in the breakdown of the Bretton Woods System was that the U.S. money supply kept on growing even after 1958, despite the continuous outflow of gold. This policy stance reduced confidence in the dollar. According to Solomon (1982, p. 27), the large scale of the gold outflow in 1958 led to a deflationary policy in the following year. In 1960, M1 decreased and the federal fiscal balance showed a surplus. Nevertheless, during the period after 1958, M1 decreased only in 1960 , and a federal fiscal surplus was reported only in 1960 and 1969[35].

Most economists agree that Vietnam War expenditures, along with the "Great Society Program," resulted in inflationary tendencies in the American economy. Recent argument holds that the inflation of the late 1960s stemmed from an unemployment rate target set at too low a level (For example, Mishkin, 1989, pp. 586-587). In contrast to the arguments of policy failure, Table 6 implies that there existed an expansionary bias in American macroeconomic policy through the mid-1960s[36], which was a source of potential instability in the international monetary system. As long as the United States held enough gold reserves and the rest of the world was suffering from "dollar shortage," this policy stance did not generate any problem. But when European currencies recovered convertibility, it signaled a turning point for the American government to make a change in policy, because it symbolized the end of the "dollar shortage" and enabled currency

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[35] The Johnson administration finally imposed a tax increase in June 1968. Political resistance to the tax increase had been powerful, because of the unpopularity of the Vietnam War (Solomon, pp.101-103). For the statistics of M1 and the federal fiscal balance, see *Historical Statistics of the United States, Federal Reserve Bulletin, Survey of Current Business.*

[36]See also Darby (1983) for a similar opinion.

dealers to speculate against the dollar.

Reviewing the differences in the policy stances of the key countries, especially those before and after World War II, led to skepticism about the statement that the "dollar crisis" is the result of an inherent defect in the *gold exchange standard*[37]. An accommodating policy towards the internal balance is sometimes inconsistent with the fixed exchange-rate system. In particular, when the key-currency country prefers an expansionary policy, liquidity shortages soon disappear, but confidence in the key currency declines. The classical gold standard could function relatively smoothly because of less focus on internal considerations, although a natural side effect was greater fluctuations in the domestic economy.

5. Conclusions

The Bretton Woods System was based on gold convertibility, and in this sense, it had common characteristics with the gold standards in place before and after World War I. Despite their common features, it is worth investigating the differences that existed among them.

The conclusions of this paper are as follows. First, one shortcoming of the "Triffin Dilemma" is its neglect of the fact that the credibility of a key currency largely depends on the macroeconomic policy stance of the country concerned. The liquidity dilemma did not exist under the international monetary system before 1914, on the one hand, and the dollar crisis gained momentum under the Bretton Woods System, on the other hand, because Britain aimed primarily at the maintenance of gold convertibility in the former case, while the United States did not pursue an appropriate deflationary policy, when necessary, in the latter case. This difference is the outcome of a significant historical change that has forced governments to focus more on their domestic economic situations, such as employment levels. To emphasize instabilities inherent in the gold exchange standard, leads to a neglect of this historical change.

Second, the "Triffin Dilemma" presupposes stable velocity for international liquidity in the mid- and long-term, and that balance-of-payments deficits of the key-currency country are the only source of international liquidity. The ratio of total world official reserves to imports declined almost continuously up to the end of the 1960s. This decline is, however, a result of the almost constant level of gold reserves, while dollar

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[37]Dam (1982, pp.64-65) maintains the same opinion, from a different aspect.

reserves maintained remarkably stable velocity, in terms of world trade. The supply of dollar reserves surely contributed to the growth of world trade, and Triffin's argument holds in this sense. The other presupposition, that American balance-of-payment deficits are the sole source of world liquidity, lost ground as international financial transactions developed in the eurodollar market. Nonetheless, the eurodollar market could not solve the credibility problem of the dollar, which depends primarily on American macroeconomic policy.

Third, this paper gives some important answers to the question of how the Bretton Woods System promoted postwar economic growth. It is doubtful that devaluation of the dollar would have reduced American deficits. The fixed exchange-rate system itself turns out to be, in the long run, the unstable factor in the international monetary system. Under the postwar system, where resistance to changing the parity rates was formidable both internationally and domestically, the developed countries generally obeyed the "rules of the game" in adjusting internal money supply to the amount of international reserves. The postwar monetary system had, in this sense, common characteristics with the gold standard. However, the United States was the exception, and its neglect of the "rules of the game" relaxed other countries' balance-of-payments constraints and enabled them to pursue expansionary macroeconomic policies. This interpretation of the global growth framework is not necessarily unique. The merit of this paper, if any, is to examine it empirically.

Lastly, what role did gold play under the Bretton Woods System ? If the position of the dollar as the key-currency has not been undermined substantially since the close of the goldwindow, then what function did gold perform, and what were the factors that guaranteed confidence in dollar under the old system ? At least until the late 1960s, gold convertibility was important in maintaining the credibility of the key currency, based as it is in psychological terms on tradition, experience and so forth. The argument that had the demonetization of gold taken place earlier, the basis of the Bretton Woods System would have been more stable (Floyd, 1985, p.131) is not correct, because it neglects the psychological aspects of what constitutes credibility. However, attitudes towards credibility have been transformed gradually through the experience of the two oil shocks and the long period of floating exchange rates.

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Table 1. U.S. Balance of Payments (1958-1973) billion dollars

Year	trade bal.	goods and serv.	Government Account			Private long-term Capital (net)			
			military aids	pub. aids	pub. capit.	total	FDI	Portfolio	Others
1958	3.46	2.36	-3.14	-1.62	-0.97	-5.73	-1.08	-1.25	-0.06
1959	1.15	0.31	-2.81	-1.63	-0.35	-4.79	-1.13	-0.22	-0.05
1960	4.89	4.07	-1.70	-1.67	-1.10	-4.47	-1.53	-0.38	-0.19
1961	5.57	5.56	-1.47	-1.8	-0.91	-4.24	-1.53	-0.44	-0.22
1962	4.52	5.07	-1.54	-1.92	-1.09	-4.55	-1.52	-0.84	-0.25
1963	5.22	5.93	-1.56	-1.92	-1.66	-5.14	-1.98	-0.82	-0.57
1964	6.80	8.53	-1.34	-1.89	-1.68	-4.91	-2.33	-0.76	-1.42
1965	4.95	7.14	-1.64	-1.81	-1.61	-5.06	-3.41	-1.11	-0.05
1966	3.82	4.55	-1.89	-1.91	-1.54	-5.34	-3.54	0.19	0.57
1967	3.80	4.38	-2.04	-1.81	-2.42	-6.27	-2.81	-0.29	1.97
1968	0.64	1.62	-2.55	-1.71	-2.27	-6.53	-2.56	2.85	0.91
1969	0.61	1.02	-2.61	-1.65	-2.20	-6.46	-2.36	1.58	0.73
1970	2.60	2.97	-2.71	-1.74	-1.59	-6.04	-3.25	1.11	0.70
1971	2.26	-0.21	-3.55	-2.04	-1.88	-7.47	-4.91	1.18	-0.65
1972	6.42	-5.93	-4.49	-2.17	-1.57	-8.23	-3.15	3.89	-0.81
1973	0.96	4.18	-2.81	-1.94	-2.64	-7.39	-2.31	3.30	-0.81

Year	sub total	private short-term capital(net)	changes in gold reserves
1958	-2.39	-0.22	2.28
1959	-1.40	1.12	1.08
1960	-2.10	-1.13	1.70
1961	-2.19	-0.30	0.86
1962	-2.61	-0.44	0.89
1963	-3.37	-0.19	0.46
1964	-4.51	-0.48	0.13
1965	-4.57	1.03	1.67
1966	-2.78	2.27	0.57
1967	-1.13	0.14	1.17
1968	1.20	3.47	1.17
1969	-0.05	8.12	-0.97
1970	-1.44	-6.97	0.79
1971	-4.38	-10.14	0.87
1972	-0.07	1.93	0.55
1973	0.78	-1.90	----

Note: For gold reserves, the minus sign means net inflow, the plus means net outflow.

Source: Survey of Current Business, Oct. 1972, June 1975.

Table 2. The Composition of World Reserves (billion dollars)

year	gold	of which US	of which UK	foreign exchange	of which dollar	of which pound	total	of which (%) dollar	pound	gold
1913	4.85	1.29	0.16	1.13	na	0.46	7.11	na	6.5	68.2
1928	9.76	3.75	0.75	3.25	1.0*	1.5*	13.01	8.5	11.5	75.0
1938	25.95	14.59	2.88	1.80	0.5	1.3	27.75	1.8	4.1	93.5
1948	32.75	24.4	1.60	13.9	2.90	10.77	46.65	6.2	23.1	70.2
1958	38.07	20.58	2.85	16.55	8.48	6.77	54.62	15.5	12.4	69.7
1968	38.94	10.89	1.47	32.00	17.34	9.68	77.42	22.4	12.5	50.3
1973	43.13	11.65	0.89	122.65	66.81	7.83	183.85	36.3	4.3	23.5
1978	45.31	12.11	0.96	278.46	156.84	3.53	352.53	44.5	1.0	12.9
1988	44.40	12.32	0.89	662.89	296.02	24.1	772.40	38.3	3.1	5.7

Note: Gold coin in circulation is not included. In 1913, the total includes silver (1.13 billion dollars). From 1978 on, gold is calculated as 1 o.z. = 35 SDR. * 1927. Hirata (1988, Table 2-5).

Source: 1913, Lindert,(1969,Table 1). From 1928 to 1958, Triffin,(1960, Table 14). Thereafter, IMF, International Financial Statistics. (IFS)

Table 3. World Trade and International Reserves (Annual Data)

Dependent Variables

Indep. Variables	lr			lg		
	(1)	(2)	(3)	(4)	(5)	(6)
	1950--1973	1950--1973	1958--1973	1950--1973	1950--1973	1958--1973
	N=24	N=24	N=16	N=24	N=24	N=16
C	-0.552	-2.281	-4.086	0.636	0.017	0.831
	(-1.778)	(-3.218)	(-1.892)	(1.417)	(-0.013)	(0.620)
$lr(-1)$	1.096	0.775	0.618			
	(7.130)	(4.266)	(1.987)			
$lg(-1)$				0.801	0.907	0.672
				(5.565)	(3.454)	(2.679)
lim	0.042	0.813	1.282	0.018	0.083	0.085
	(0.542)	(2.714)	(1.779)	(0.832)	(0.613)	(0.527)
Vim	-0.042	-1.087	-1.601	0.098	0.003	0.448
	(-0.140)	(-2.293)	(-1.578)	(0.673)	(0.014)	(1.196)
lf			-0.283			-0.040
			(-1.545)			(-0.826)
T		-0.046			-0.006	
		(-2.643)			(0.489)	
Adj.R^2	0.965	0.973	0.959	0.826	0.819	0.444
SER	0.067	0.066	0.073	0.029	0.030	0.029
DW	1.281	1.416	1.296	1.828	1.930	2.498
h	2.677	3.137		0.594		

Dependent Variable ld

Indep. Variables	(7)	(8)	(9)
	1950-1973	1950-1973	1958-1973
	N=24	N=24	N=16
C	-1.725	-6.078	-11.189
	(-2.420)	(-3.366)	(-2.121)
lr(-1)			
lg(-1)			
ld(-1)	0.594	0.603	0.413
	(3.219)	(3.697)	(1.371)
lim	0.595	1.758	2.863
	(2.576)	(3.544)	(2.163)
Vim	-1.237	-3.447	-4.275
	(-1.612)	(-3.150)	(-1.837)
lf			-0.611
			(-1.752)
T		-0.087	
		(-2.572)	
Adj.R²	0.942	0.954	0.914
SER	0.174	0.154	0.181
DW	1.272	1.491	1.354
h	4.171	2.367	

Note: t-statistics in parentheses. All variables measured in billion U.S. dollars. lr ; log of world total reserves. lg ; log of world gold reserves. ld ; log of world dollar reserves. lim ; log of world imports. Vim ; variability of world imports defined as follows. Vim = |lim(t) - { lim(t-2) + lim(t-1) + lim(t)} / 3| . lf ; log of international finance, which corresponds to euro-bond issues plus eurocurrency deposits. Figures for eurocur-

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rency are available only from 1964 onwards. Those figures from 1958 through 1963 are estimated from the average growth rate between 1964-1972. T; time-trend.

Source: world reserves and imports, IMF, International Financial Statistics, 1972 Supplement. Eurobond issues, Mendelsohn(1980, Table 31.). Eurocurrency deposits, Pecchioli(1983, Table IV).

Table 4A Demand for International Reserves by Developed Countries

(1950(51)-1970, Annual Data)

Dependent Variable lr

Country	Independent Variables							
	C	lim	Vex	lgnp	Adj.R²	SER	DW	N
(1)U S	9.979	0.993	0.019	-1.567	0.999	0.01	0.791	21
	(12.18)	(76.47)	(0.84)	(-12.06)				
(2)Britain	-3.665	-0.219	0.104	1.134	0.995	0.24	0.774	21
	(-3.13)	(-0.33)	(1.87)	(1.78)				
(3)France	-29.485	-5.515	3.018	8.664	0.845	0.834	0.688	21
	(-4.72)	(-2.16)	(1.45)	(3.35)				
(4)Germany	4.964	2.458	-3.492	-1.854	0.939	0.200	2.367	20
	(2.43)	(3.37)	(-7.47)	(-2.26)				
(5)Italy	-7.376	-0.574	1.079	1.902	0.889	0.764	0.364	21
	(-3.42)	(-0.92)	(1.09)	(2.75)				
(6)Swit-zerland	-11.704	2.117	2.212	3.277	0.733	1.591	0.664	21
	(-1.01)	(0.35)	(0.15)	(0.49)				
(7)Japan	0.817	-0.389	0.682	0.855	0.881	0.167	1.296	20
	(1.71)	(-1.01)	(1.76)	(2.93)				

Note: t-statistics in parentheses. lr ; log of international reserves. lim ; log of imports. lgnp ; log of nominal GNP. Vex ; variability of exports defined as follows. $Vex = |lex(t)-\{lex(t-2)+lex(t-1)+lex(t)\}/3|$.

Source: IMF, IFS. 1972 Supplement.

Table 4B   International Reserves and Money Supply

of Developed Countries, (1950(51)-1970, Annual Data)

Dependent Variable dlm

Independent Variables

Country		C	dlr		R²	SER	DW	N
(8)US		0.004	-0.015		0.396	0.034	0.621	21
		(0.55)	(-3.53)					
(9)Britain		-0.009	1.040		0.996	0.120	0.651	21
		(-0.35)	(66.58)					
(10)France		-0.004	0.014		0.006	0.075	0.389	21
		(-0.25)	(0.33)					
(11)Germany		-0.003	0.489		0.643	0.223	0.520	20
		(-0.05)	(5.69)					
(12)Italy		-0.002	0.984		0.957	0.110	1.186	21
		(-1.10)	(20.59)					
(13)Switzerland		-0.002	0.136		0.976	0.043	1.588	21
		(-1.10)	(27.72)					
(14)Japan		0.007	1.745		0.913	0.203	0.885	20
		(0.15)	(13.75)					

Note: t-statistics in parentheses. Independent variables (dlr) are detre-
nded estimates from the equations in Table 4A. dlm : detrended log of money
supply (M1:currency in circulation plus demand deposits).

Trend: defined as log(y) = C + x*t.

Source: the same as Table 4A.

Table 5A British Money Supply before and after World War I

(Calculated from Annual Data)

Dependent Variable <u>lm</u>

Independent Variables	(1)	(2)	(3)	(4)
	1890-1914 N=26		1920-1939 N=22	
<u>C</u>	0.220	0.013	0.621	0.104
	(1.258)	(0.077)	(0.603)	(0.150)
<u>ls</u>	0.091	0.056	0.059	0.074
	(2.406)	(1.997)	(1.317)	(2.483)
<u>lm(-1)</u>	0.619	0.554	0.718	0.636
	(7.177)	(4.481)	(3.380)	(5.660)
<u>lgnp</u>	0.278	0.379	0.158	0.286
	(3.786)	(3.549)	(1.289)	(3.673)
<u>Adj.R²</u>	0.986	0.987	0.779	0.881
<u>SER</u>	0.019	0.018	0.043	0.034
<u>DW</u>	1.521	1.527	2.196	1.506
<u>h</u>	1.360	1.553	-5.397	1.363

Note: t-statistics in parentheses. <u>lm</u> ; log of money supply, <u>ls</u> ; log of specie held by the Bank of England, <u>lgnp</u> ; log of nominal GNP. Money supply of (1),(3),(5),(7) from Sheppard(1971), whereas those of (2),(4),(6), (8) from Capie and Webber(1985). Equations (1),(2),(3),(4) are calculated from original data. Other (5),(6),(7),(8) are from detrended values.

Dependent Variable dlm

Independent Variables	(5) 1890–1914	(6) N=26		(7) 1920–1939	(8) N=22
C	0.008	0.001		-0.000	0.004
	(2.048)	(0.413)		(-0.052)	(0.693)
dls	0.099	0.057		0.006	0.055
	(2.563)	(2.003)		(0.257)	(2.159)
dlm(-1)	0.607	0.567		-0.093	0.085
	(6.278)	(4.264)		(-0.623)	(0.601)
dlgnp	0.287	0.390		0.427	0.325
	(2.600)	(3.348)		(6.526)	(4.764)
Adj.R²	0.815	0.736		0.710	0.622
SER	0.020	0.018		0.023	0.026
DW	1.406	1.552		1.909	1.826
h	1.741	1.554		0.299	0.545

Trend; defined as $\log(y) = C + x*t$, for the period 1890–1913. For the period 1919–1939, $\log(y) = C + x1*t + x2*d1 + x3*d2$, where d1 is 0 for both 1919–1923 and 1934–1939, 1 for 1924–1933; d2 is 0 up to 1933, 1 after 1934. Source: s from Sheppard(1971), GNP from Feinstein(1972).

Table 5B British Money Supply (with Instrument Variables)

Dependent Variable dlm

Independent Variables	(9)	(10)	(11)	(12)
	1890-1913 N=26		1920-1939 N=22	
C	0.006	-0.007	0.006	0.008
	(0.900)	(-1.065)	(0.278)	(0.500)
dls	0.251	0.054	0.391	0.359
	(3.872)	(0.890)	(1.570)	(1.795)
R²	0.392	0.043	0.031	0.201
SER	0.036	0.034	0.096	0.077
DW	0.661	0.439	1.741	1.659

Note: t-statistics in parentheses. dls ; detrended log of estimated s with dls(-1), mr, dlim as instrument variables for 1890-1913 and with dls(-1) and dlim for 1920-1939. mr ; market rate on high-class bills. dlim ; detrended log of imports. The correlation coefficients between dls and dls(-1), between dls and mr, between dls and dlim are 0.784,-0.616,-0.684, respectively for 1890-1913; those between dls and dls(-1), between dls and dlim are 0.270, 0.334, respectively for 1920-1939.

Source: mr from Sheppard(1971), im from Feinstein(1972).

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Table 6　U.S. Money Supply after World War II

Dependent　Variables

Independent Variables	dlh		dlm	
	(1950-1971, N=22)		(1950-1971, N=22)	
	(1)	(2)	(3)	(4)
C	-0.111	-0.081	-0.069	-0.070
	(-2.762)	(-1.422)	(-2.512)	(-2.398)
dlh(-1)	0.380	0.461		
	(2.421)	(2.164)		
dlm(-1)			0.569	0.550
			(3.383)	(2.296)
dlg	-0.249		-0.188	
	(-3.492)		(-3.260)	
"dlg"		-0.010		-0.174
		(-0.048)		(-1.257)
dlgnp	1.606	1.498	0.735	0.766
	(4.084)	(2.912)	(2.718)	(1.991)
U	0.022	0.016	0.014	0.014
	(2.813)	(1.409)	(2.644)	(2.580)
Adj.R^2	0.938	0.897	0.909	0.908
SER	0.021	0.027	0.015	0.015
DW	0.861	0.478	2.122	0.595
h	3.947		-0.466	

	dlh				dlm	
	(1950-1957, N=8)		(1958-1971, N=14)		(1950-1957, N=8)	
	(5)	(6)	(7)	(8)	(9)	(10)
C	0.021	0.015	-0.036	-0.288	-0.117	-0.124
	(0.417)	(0.285)	(-0.368)	(-0.507)	(-1.713)	(-1.778)
dlh(-1)	0.238	0.252	0.764	0.789		
	(2.154)	(2.110)	(1.406)	(0.454		
dlm(-1)					0.688	0.668
					(3.244)	(3.097)
dlg	-0.277		-0.228		-0.152	
	(-6.174)		(-1.360)		(-2.675)	
"dlg"		-0.264		-1.753		-0.138
		(-4.582)		(-0.603		(-2.285)
dlgnp	0.728	0.758	0.865	0.241	0.960	1.013
	(2.212)	(2.201)	(0.688)	(0.058	(2.115)	(2.186)
U	-0.003	-0.002	0.010	0.059	0.023	0.025
	(-0.335)	(-0.223)	(0.547)	(0.544	(1.732)	(1.798)
Adj.R²	0.964	0.964	0.936	0.562	0.810	0.806
SER	0.008	0.009	0.024	0.077	0.011	0.012
DW	2.151	1.849	0.936	2.039	3.289	3.227
h	-0.225				-2.278	

Dependent Variables   <u>dlm</u>

	(1958-1971, N=14)	
Independent Variables	(11)	(12)
<u>C</u>	-0.093	-0.082
	(-1.654)	(-1.306)
<u>dlh(-1)</u>		
<u>dlm(-1)</u>	0.378	0.734
	(0.769)	(0.964)
<u>dlg</u>	-0.214	
	(-1.257)	
<u>"dlg"</u>		-0.406
		(-1.163)
<u>dlgnp</u>	0.985	0.429
	(1.346)	(0.368)
<u>U</u>	0.018	0.017
	(1.822)	(1.577)
<u>Adj.R²</u>	0.882	0.867
<u>SER</u>	0.019	0.020
<u>DW</u>	1.813	1.690
<u>h</u>		

Note: t-statistics in parentheses. <u>dlh</u> ; detrended log of monetary base. <u>dlm</u> ; detrended log of M1. <u>dlg</u> ; detrended log of gold reserves. Additional instruments to estimate <u>dlg</u> : <u>dlrwg</u> ; detrended log of world gold reserves outside the U.S., <u>dlrwim</u> ; detrended log of world imports outside the U.S. The correlation coefficients between <u>lg</u> and <u>lrwg</u> , between <u>lg</u> and <u>lrwim</u> are -0.923, -0.962, respectively for 1949-1971. <u>U</u> ; unemployment rate in %.
Source: <u>Survey of Current Business, Federal Reserve Bulletin, Historical Statistics of the U.S., IFS</u>.

Table 7A U.S. Money Supply between the Wars

Dependent Variable <u>dlm</u>

Independent Variables	(1) 1920-1939 N=20	(2) 1920-1929 N=10	(3) 1930-1939 N=10
<u>C</u>	0.003	-0.001	0.004
	(0.485)	(-0.275)	(0.399)
<u>dlg</u>	0.145	0.136	0.140
	(5.755)	(5.226)	(2.901)
<u>dlm(-1)</u>	0.258	0.448	0.225
	(4.078)	(4.726)	(2.190)
<u>dlgnp</u>	0.515	0.518	0.530
	(11.541)	(9.240)	(6.514)
<u>Adj.R²</u>	0.937	0.927	0.930
<u>SER</u>	0.023	0.013	0.033
<u>DW</u>	2.403	2.831	2.462
<u>h</u>	-0.940	-1.377	-0.772

Note: t-statistics in parentheses. <u>dlm</u> ; detrended log of M1, <u>dlg</u> ; detrended log of monetary gold, <u>dlgnp</u> ; detrended log of nominal GNP. Each trend is estimated with a dummy variable (0: up to 1929, 1: after 1930). Source: <u>Historical Statistics of the United States</u>.

**Table 7B U.S. Money Supply between the Wars (with Instrument Variables)**

Dependent Variable dlm

	(4)	(5)	(6)
Independent Variables	1920-1939 N=20	1920-1929 N=10	1930-1939 N=10
C	0.001 (0.059)	-0.003 (-0.218)	0.000 (0.000)
dlg	0.335 (3.227)	0.105 (1.167)	0.331 (2.481)
R^2	0.324	0.126	0.425
SER	0.082	0.049	0.101
DW	0.844	1.257	0.675

Note: t-statistics in parentheses. dlg ; detrended log of monetary gold estimated with dlg(t-1) ,mr and dlgnp as instrument variables. mr ; discount rate on prime commercial paper (4 to 6 months). The correlation coefficients between dlg and dlg(t-1), between dlg and mr, between dlg and dlgnp are 0.750, -0.250 and 0.255, respectively.

Source: The same as Table 7A.

Figure 1. The Growth of World Reserves (1948-1973, year end, billion dollars)
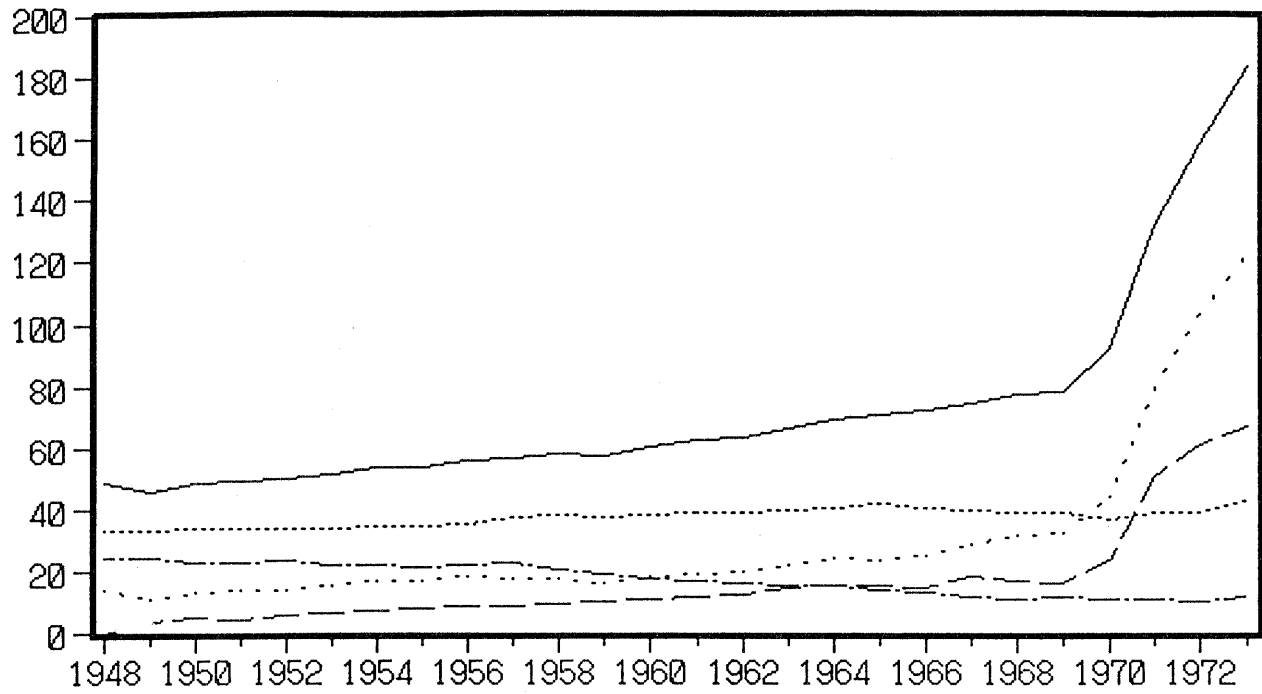
— total reserves ····· gold reserves ··· forex reserves — — dollar reserves
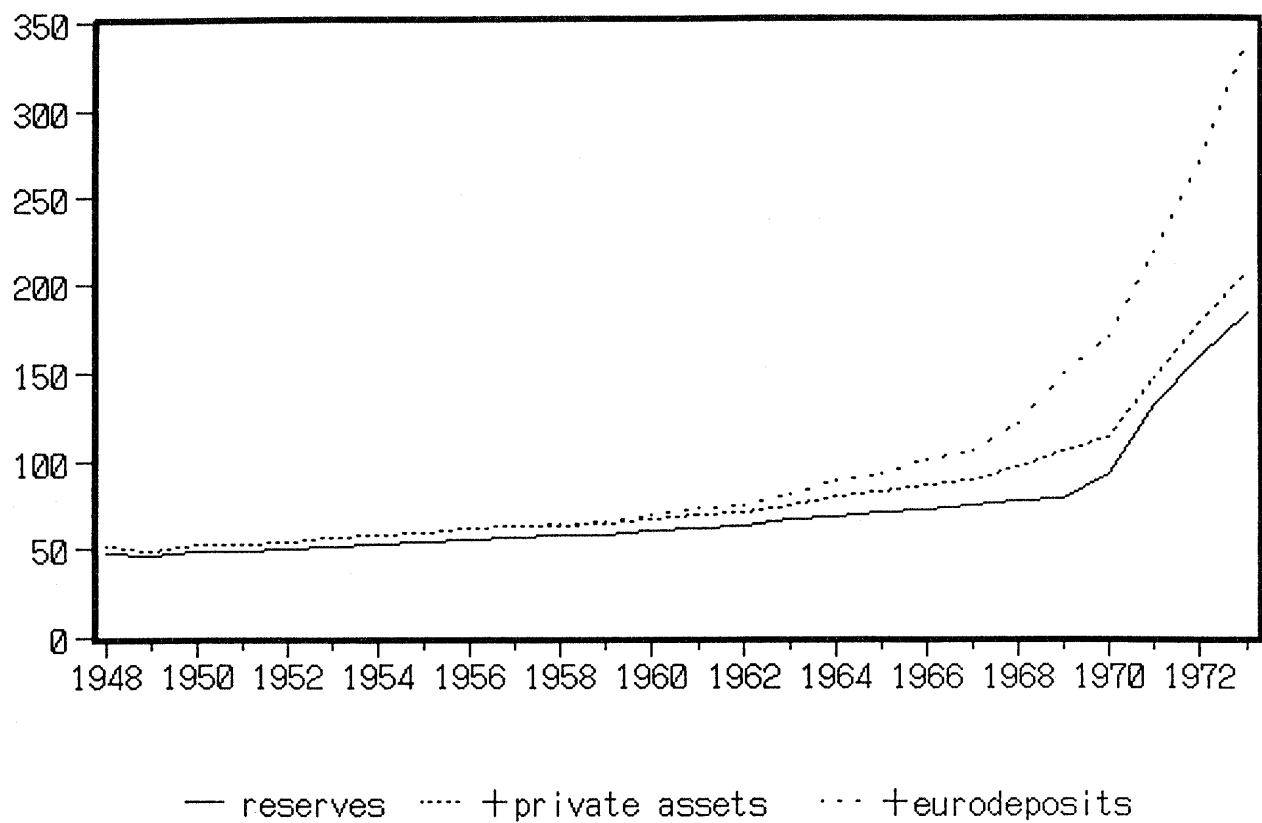— · — U.S.gold reserves

Source: IMF, *International Financial Statistics.*

Figure 2. The Composition of World Reserves outside the United States

— gold ····· foreign exchange ··· dollar reserves

Source: IMF, *International Financial Statistics.*

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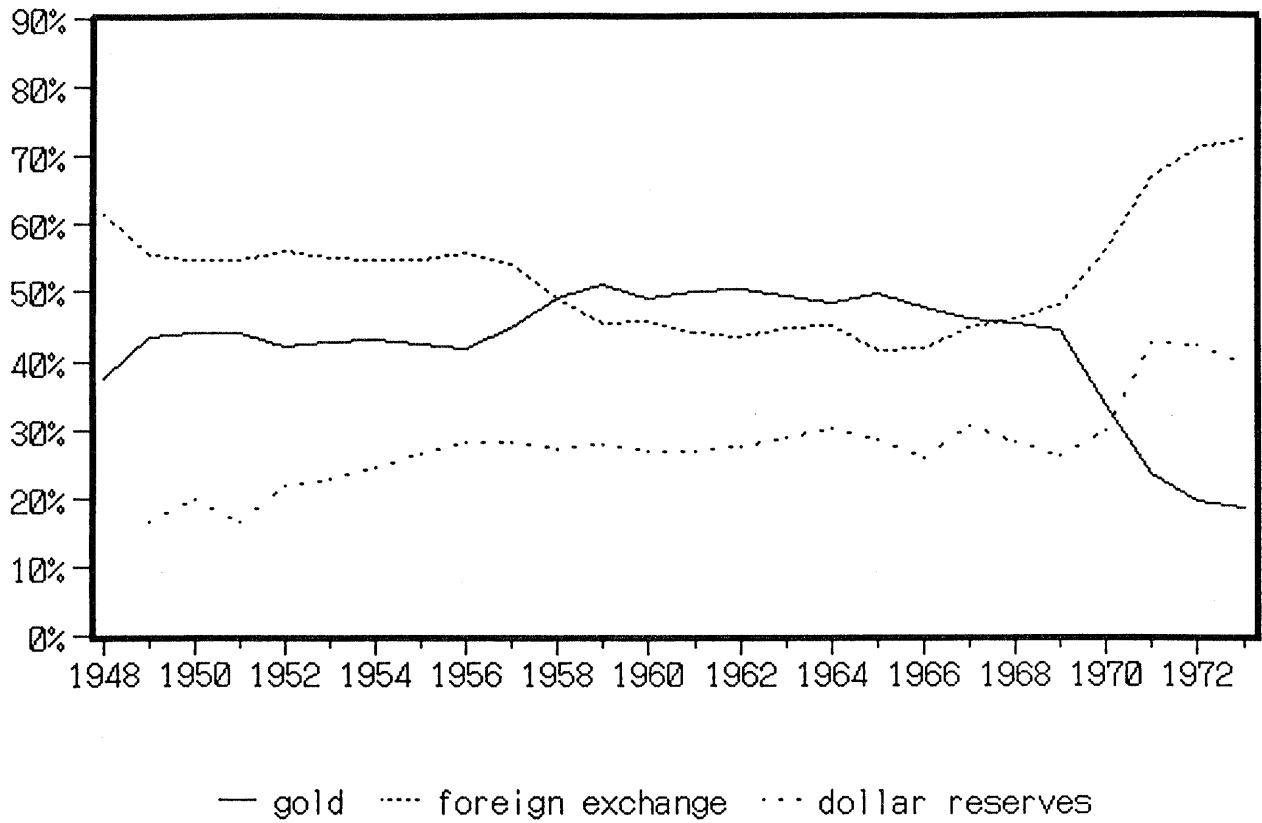
Figure 3. World Liquidity (1948-1973, year end, billion dollars)

— reserves ····· +private assets ··· +eurodeposits

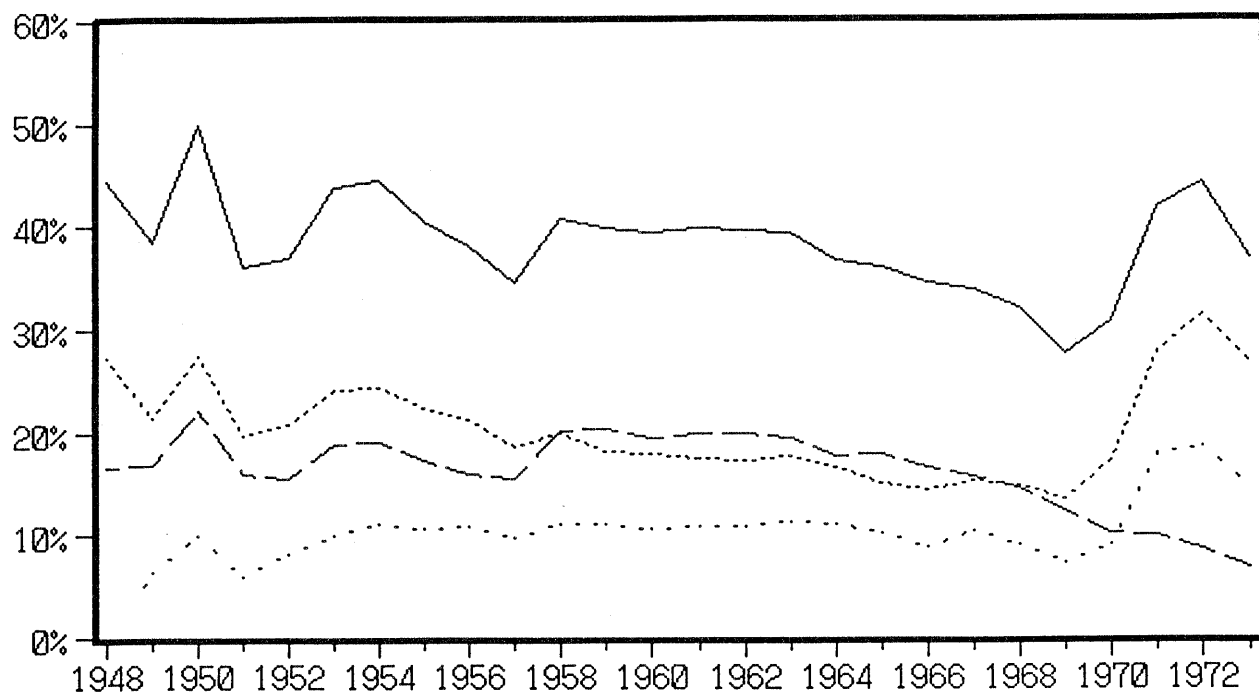Source: IMF, *International Financial Statistics*.

Figure 4. The World Reserve-Import Ratio (1948-1973, year end)
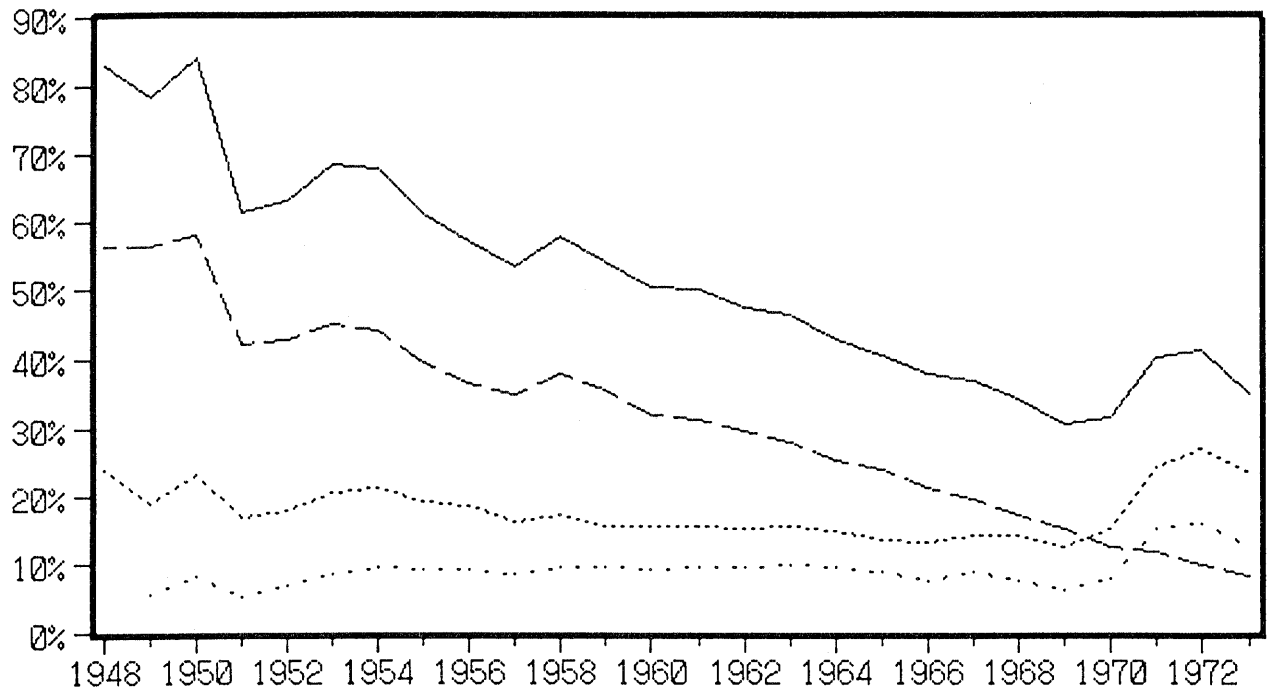
— reserves/import ⋯⋯ forex/import ⋯ dollar/import — — gold/import

Source:IMF, *International Financial Statistics.*

Figure 5. Reserve-Import Ratio outside the United States (1948-1973, year end)

— reserves/import   ···· forex/import   ··· dollar/import   − − gold/import

Source: IMF, *International Financial Statistics*.