Retrospectives: The Great Dollar Shortage Debate

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Abstract

The dollar shortage debate -- Paul Samuelson called it "the big open question of our time" -- dominated international macroeconomics in the 15 years following the end of World War II. There were two main views regarding its cause: financial frictions that limited capital flows to Western Europe (Kindleberger); and overvalued fixed exchange rates vs. the US dollar (Friedman). According to Kindleberger the dollar shortage was attenuated by two real factors that contributed to current account (CA) deficits: a large technological gap between the United States and Europe; and European impatience to improve living standards. Kindleberger believed that the CA deficit would prove chronic because of the persistence of the productivity gap, a view that was challenged by Bloomfield who argued that it would dissipate through income growth in Europe. We argue that Kindelberger's analytical framework is closely connected to the modern intertemporal approach to CA determination; and, also, that the international reserve function of the US dollar -- the Triffin dilemma -- did not play a role in the dollar shortage.

Keywords: Dollar shortage, balance of payments deficit, savings-investment, trade elasticities, technological gap, income convergence

JEL Classification: F14, F41, G15, N10, N20

This feature addresses the history of economic terms and ideas. The hope is to deepen the workaday dialogue of economists, while perhaps also casting new light on ongoing questions. If you have suggestions for future topics or authors, please contact Joseph Persky, University of Illinois at Chicago (jpersky@uic.edu.)

Introduction

The controversy over the existence of a global "dollar shortage" dominated discussions on international economics in the fifteen years following the end of World War II. During the 1940s, the rest of the world -- primarily Western Europe -- had capital account surpluses vis a vis the United States (dollars borrowed from the United States) that fell short of what was needed to finance their corresponding trade and current account (CA) deficits vs. the United States (the amount needed to pay for their net imports and the interest owed to their lenders). This shortfall -- defined as the dollar shortage by Charles Kindleberger -- was financed by using official dollar and gold reserves, that is, by running a balance of payments (BP) deficit.[1] The scarcity of reserves available to the countries other than the United States limited the size of feasible CA deficits that those countries could finance, and endangered reconstruction efforts, hindering the improvement of livings standards.[2] The IMF Articles of Agreement even included the "scarce currency" clause that allowed countries to take discriminatory actions in trade with the United States if they faced a dollar shortage.[3]

[1] There is some confusion regarding usage of the term balance of payments (BP) because it is often meant to refer to all the foreign accounts. The BP -- also called the reserve or official settlements account -- records central banks' reserve asset transactions with each other, namely transactions involving gold, foreign exchange reserves, bank deposits and SDRs. Nowadays, this account tends to be negligible, but under the Bretton Woods system of pegged exchange rates, it was a critically important account because official reserves were used to manage the exchange-rate peg.

[2] For instance, by the end of WWII the United States owned 70 percent of the global monetary gold stock (Eichengreen, 2007, 42).

[3] Under Article VII of the IMF's Articles Agreement, the "scarce currency" clause allowed the Fund to declare that a general scarcity of US dollars was developing, upon which members would be permitted and expected to discriminate against US goods in their trade policies. The clause was never implemented. See Horsefield (1969, 193).

The shortage debate started in earnest in the early 1940s and then ran through much of the 1950s, generating scores of articles and books, with many prominent economists and journalists weighing in. As early as 1943, *The Economist* published two articles titled "The Dollar Problem - I" and "The Dollar Problem - II" (*Economist*, 1943a; 1943b). The editors of that periodical called the dollar shortage "the world's financial problem number one" (1943b, 750). Fifteen years later in his textbook, *Economics: An Introductory Analysis*, Paul Samuelson called the dollar shortage "the big open question of our time" (1958, 707).

The debate centered on the key questions of what caused the dollar shortage and how large and persistent it was going to be. There were two distinct views concerning the causes, represented by Kindleberger and Milton Friedman, respectively. Kindleberger attributed the existence of the shortage to *real* factors, namely, to frictions in international financial markets that limited the flow of capital into Europe. He attributed its size to differences in cross country productivity – the income convergence process and the associated CA deficit. In his view, the dollar shortage varied with the CA deficit and the latter varied mostly as a function of the productivity gap between Europe and the United States. Friedman ignored financial frictions and the role of income convergence, choosing instead to focus exclusively on nominal rigidities. He believed that the dollar shortage was simply the CA deficit, whose cause was purely *nominal*, namely, overvalued currencies against the US dollar under the Bretton Woods system of pegged exchange rates that were leading to loss of trade competitiveness[4].

Kindleberger attributed the large size of European CA deficits to Europe's large productivity (technological) gap with the United States. He expected the deficit and the associated dollar shortage to be chronic because he predicted a slow pace of technological catch-up that would keep Europe long dependent on United States goods

[4] The global monetary setting in the post WW II period was the Bretton Woods system. It involved a system of fixed-but-adjustable exchange rates vs. the US dollar and a peg of the US dollar to gold; a multinational institution, the International Monetary Fund (IMF) whose main mission was to oversee the system of fixed exchange rates and provide *short-term* loans to countries experiencing non-structural balance of payments problems; and the use of capital controls to manage the pegged exchange rates. A notable exception to the last element was that of the United States, which, during the 1940s and 1950s, maintained free capital mobility with the rest of the world. This feature implies that the dollar shortage is not the standard case of disequilibrium resulting from fixing both the price (the exchange rate) and the quantity (the volume of capital flows).

for consumption and investment. Other participants were less pessimistic about the chronicity of the shortage. Most prominently, Arthur Bloomfield expected the European CA deficits to self-correct quicker than Kindleberger's prediction through the process of *income* growth in Europe.

Friedman held a completely different perspective on the dollar shortage -- one that emphasized nominal rigidities. As fixed exchange rate misalignments were endemic in the Bretton Woods system, he suggested that simply letting the exchange rate float freely would quickly eliminate the trade and BP imbalances. But this at best may have eliminated the part of the imbalance that was driven by nominal considerations (nominal price, wage and exchange rate stickiness), leaving the chronic, structural component emphasized by Kindleberger intact. Kindleberger was doubtful that nominal considerations played any role in the dollar shortage, especially its chronic part: low trade elasticities (as there were no good substitutes for vital US goods), made exchange rate adjustment ineffective in moving trade quantities. Moreover, short lived price stickiness made the effect of such adjustment short lived. In his view, nominal rigidities could not cause -or resolve- chronic imbalances since these were due to real factors.

In 1950, the US balance of payments swung into deficit, following a succession of annual surpluses during the previous decade. During the next decade, countries outside the United States experienced a large increase in their foreign exchange reserves, with their gold and dollar reserves rising from $15.1 billion in 1950 to $22.8 billion in 1956 (Klopstock, 1957, 10, Table 2). By the end of the 1950s, the US total external dollar liabilities equaled the US monetary gold stock, and the US share of the world's monetary gold had fallen to less than 50 percent, a situation that was viewed with alarm (Bordo, 1993, 56; Eichengreen, 2007, 15).

Part of the improvement came from a large and sustained increase in private capital flows from the United States to Western Europe that began in the early-1950s (IMF, 1955, 35, Table 9). Another part was attributed to the widespread devaluation of foreign currencies vs. the US dollar in September 1949 and the Marshall plan in which the US government provided dollar loans and grants to European countries (see below). As these two latter factors represented one-time events, Kindelberger viewed them as having only a temporary, short-term effect on the dollar shortage. As discussed below, it was not until the late-1950s, after he had observed the closing of the productivity gap

between the US and European economies, that he became less pessimistic about the chronicity of the dollar shortage. This signaled the end of the dollar shortage debate.

In the conclusion of the paper, we compare the post WWI shortage to those that have occurred in the last 15 years. We argue that some of the recent shortages, namely, the ones involving pegged exchange rates in certain lower-income countries, and which are manifested in persistent balance of payments deficits, are very much like the earlier dollar shortage. As in the earlier episode, the recent BP deficits arose mostly from the reluctance of countries with a current account surplus to finance the trade deficits of their trading partners because of repayment risk and other financial frictions. The US dollar's reserve function was not an important factor even when trade was denominated in dollars. But some other recent shortages that involve flexible-exchange-rate regimes and are manifested in deviations from covered interest rate parity (CIRP) are different from the earlier shortage. They relate to the function of the US dollar as the primary international reserve currency/safe asset, and reflect a liquidity problem. Moreover, they can be addressed through central bank currency swap agreements and are subject to the Triffin dilemma.

The Main Views in the Dollar Debate

The US Productivity Advantage and a Lack of Lending: Kindleberger

Kindleberger began his engagement in the debate about a dollar shortage with two 1943 papers written from distinct vantage points: one focused on the US balance of payments surplus and the other focused on the corresponding balance of payments deficits of US trading partners.[5] In "Planning for Foreign Investment," published in the March 1943 issue of the *American Economic Review (AER)* (1943a) Kindleberger argued that the basic cause of the dollar shortage was the perpetual proclivity of the United States to run current account surpluses and hoard the acquired gold rather than lend it long-term to foreign countries (350). Kindleberger wrote: "The world 'chronic shortage of dollars' ... is basically ascribable to the United States' failure to lend

[5] After receiving his Ph.D. from Columbia University in 1936, Kindleberger worked for several US government agencies, as well as the Federal Reserve Bank of New York, the Federal Reserve's Board of Governors, and the Bank of International Settlements, before joining MIT's department of economics in 1948.

abundantly, or rather more continuously" (350). Kindleberger contrasted the United States' situation in the 1930s and early-1940s with that of Britain in the nineteenth century. During the earlier period, Britain ran current account surpluses, but unlike the United States in the latter period, Britain kept "reinvesting her current account surplus" (350). Consequently, a sterling shortage did not emerge. The solution to the dollar shortage was for the United States to "lend abroad continuously until productivity in other countries has increased to the point where the demand for [US] ... goods is reduced in intensity" (1943a, 351). Not coincidentally, Kindleberger worked at the U.S. Department of State in a position in 1947 and 1948 and directed the governmental committee that put the Marshall Plan together and steered it through the US Congress (Mehrling, 2022, 83).

In "International Monetary Stabilization," published in the edited volume *Postwar Economic Problems* (1943b), Kindleberger argued that the primary driver of the shortage was that US trading partners were running their large current account deficits as a result of "the technical superiority of the United States in the production of many goods necessary to a high modern standard of living and to the natural desire in other countries to raise real incomes faster than the basic conditions of their economic productivity justify" (1943b, 379).

Could those current account imbalances correct themselves naturally through the process of growth in the rest of the world (and increased exports to the United States), or through exchange rate (or terms of trade) adjustments? Kindleberger, who maintained that a "chronic world dollar shortage" had existed since 1919, was skeptical of achieving an equilibrium with a balanced current account. In his book, *The Dollar Shortage* (1950), a comprehensive study of the dollar-shortage issue, he defined a dollar shortage as "a condition of persistent departure or of persistent tendency to depart from equilibrium in the balance of payments of the United States in the direction of a [current account] surplus in excess of net long-term capital outflows. Viewed from abroad, the dollar shortage is the tendency of the current accounts of foreign balances of payments to show larger deficits than are covered by long-term borrowing" (170). [6]

[6] In a biography of Kindleberger, Mehrling (2022, 94) reported that *The Dollar Shortage* was "the book that got him [Kindleberger] tenure" at MIT.

Kindleberger (1950) considered several possible methods for addressing the dollar shortage—but argued that none of them would fully address the issue. First, he was dismissive of the view that "the whole question of the dollar shortage comes down to the overevaluation [against the dollar] of foreign currencies and the undervaluation of the dollar, which could be rapidly set to rights by changing the exchange rate ... [so that] there is really no problem" (1950, 175). In this regard, he believed that trade volumes were inelastic with respect to exchange rate changes (1950, 175). Earlier, Kindleberger (1943b, 381) had written:

> It may be suggested that the United States has a comparatively low propensity to import and a low ratio of exports to national income, whereas the rest of the world has a relatively high elasticity of demand for United States exports of manufactured goods and a relatively high ratio of exports to income. If this be true, ..., additional dollars made available to foreigners by increased United States imports may lead to a greater increase in foreign expenditures for American products, leaving the world still short of dollars.

With these assumptions, neither growth in US imports nor exchange-rate adjustment (in this case, depreciation of foreign currencies against the dollar) would succeed in ending the shortage. According to Kindleberger, "the chronic shortage of dollars would remain [in the future], albeit at higher levels of real income throughout the world, and the United States would continue to pile up [current account] surpluses" (1950, 387).

Second, Kindleberger was not optimistic that monetary and fiscal policies could alleviate the dollar shortage. For this method to work, the United States would have to implement expansionary monetary and fiscal policies – to increase US imports – and the rest of the world have to implement contractionary policies – to reduce imports from the United States. However, Kindleberger argued that "the United States is under no compunction to inflate so that other countries may meet a random disturbance of equilibrium requiring a structural adjustment, such as postwar reconstruction or a technological improvement resulting in the loss of an export market" (1950, 195). As for the use of contractionary monetary and fiscal policies in foreign countries, Kindleberger stated that, because these policies would raise unemployment, they were "unlikely to meet with the approval of the people most directly concerned" (1950, 199).

Third, Kindleberger (1950) was also pessimistic about the possibility of using US tariff reduction to expand its imports. He argued that "the removal of the United States tariff [is] analogous to appreciation of the dollar," a policy which he had already

dismissed as ineffective (225). He further argued that a US tariff reduction would reduce US income so that imports would fall on balance (253).

In sum, Kindleberger believed that Europe would suffer a chronic dollar shortage, the roots of which reflected in financial frictions, productivity gaps, and its impatience to improve its living standards. The shortage would hinder its ability to purchase investment goods from the United States and, thus, hamper European growth.

Other Proponents of a Dollar Shortage

During the late-1940s and the 1950s, explanations of the dollar shortage were legion, many with similarities to Kindleberger's but with their own spin.[7] To give a sense of the breadth of views, we briefly describe those of three other prominent proponents of the dollar shortage: Sirs Roy Harrod, John Hicks, and Dennis Robertson.

Harrod (1947) had argued that the "allegation of a 'world dollar shortage' is surely one of the most brazen pieces of collective effrontery that has ever been uttered." Six years later, Harrod had become an advisor to the IMF and became convinced that the world economy did indeed suffer from a dollar shortage. Harrod (1953) agreed with Kindleberger on the importance of low elasticities of demand and supply in international trade (18) and more rapid productivity growth in the United States than in the rest of the world (30) as causes of the dollar shortage. He added two other factors: higher inflation in Europe than in the United States which diminished the competitiveness of European economies (35) and Europe's "worsened" terms of trade vis-à-vis the United States (21). Harrod was not optimistic about a solution to "the dollar crisis" (33).

John Hicks (1953), in "An Inaugural Lecture" at Oxford's All Souls College, referred to the "dollar problem" as "perhaps the fundamental economic problem confronting this [the U.K.] country" (121). Like, Kindleberger, Hicks emphasized that US productivity was growing rapidly, but he also emphasized the difference between productivity growth in import-competing industries and export industries. To hold their own in US markets, Hicks argued, other countries would have to lower the prices of their exports while enjoying only slightly reduced prices on their imports from the

[7] Some of the literature is reviewed in Yeager (1965, 458-63). Yeager (1965, 459) called the dollar-shortage discussion a "fad" under which the "billowing academic smoke strengthened belief in a real-world fire."

United States (132-33). Hicks did not believe that a devaluation of foreign currencies against the dollar would help. He considered the 1949 devaluation of sterling (see below) to have been a failure because domestic nominal wages rose following the devaluation, negating its effects on competitiveness: "wages chased after the rising prices [on UK imports], and the rise in wages made the devaluation largely ineffective" (133-34).

Dennis Robertson, in his 1954 book, *Britain in the World Economy*, agreed with Kindleberger that dollar shortage was due to the combination of the destruction of productive capacities in Europe due to WWII, the tendency of European countries to overspend, and the high rate of technological progress in the United States.

A Self-Correcting View of the Dollar Shortage: Bloomfield vs. Kindleberger

Arthur Bloomfield's engagement in the dollar-shortage debate began in 1947 through the publication of a textbook, *International Economics*, by Stephen Enke and Virgil Salera.[8] In their book, Enke and Salera pointed out an implication of Kindleberger's earlier argument that the US dollar tends to be chronically scarce because increased US imports will raise nominal incomes abroad, producing increased demands for U.S. products in excess of the initial increase in US imports. In criticizing Kindleberger's thesis, Enke and Salera expressed their gratitude to Bloomfield "for the basic ideas involved in the refutation of this [Kindleberger's] thesis" (1947, 600, fn. 2).

The criticism ran as follows. Recall that, ignoring the government budget deficit (or surplus), the current account balance is the difference between domestic saving and investment. Enke and Salera focused on Kindleberger's assumption -- that an increase in a foreign country's exports could *increase* its trade deficit if all of the additional income from exports went into buying imports -- required the country's marginal propensity to save to be zero or negative. However, so long as some fraction of income is leaked into domestic savings, a new dollar of exports would not be able to lift income by enough to call forth a full dollar of new imports. Enke and Salera (1947, 601) observed: "Unfortunately for the [Kindleberger] thesis, there is scarcely any case where the marginal propensity to save is not a positive quantity."

[8] See, also, Bloomfield (1949). Bloomfield received his Ph.D. at the University of Chicago in 1942. He worked at the Federal Reserve Bank of New York from 1941 to 1958, before joining the faculty at the University of Pennsylvania in 1958.

Kindleberger (1949) responded to what he called the "Bloomfield -- Enke and Salera" criticism in his paper "The Foreign-Trade Multiplier: The Propensity to Import and Balance-of-Payments Equilibrium." He wrote that the 1943 formulation of his thesis was incomplete and needed two additional assumptions to complete it (491, 494). First, foreign countries experiencing an increase in exports to the United States would need to have a high rate of induced domestic investment (more than offsetting the rise in saving associated with the rise in income). Second, the foreign countries would need to have a negative marginal propensity to save (492). On this second point, Kindleberger (494) argued: "I fail to find it strange that the savings function of a country may be negative under certain dynamic conditions.... it may be that countries ... live above their means for a time in response to an increase in income. This type of response, when capital is not available for borrowing from abroad, may lead to a severe loss of reserves of gold and foreign exchange."

The Fixed Exchange Rate Interpretation: Friedman

A different analysis of the dollar-shortage thesis in the late-1940s and the first half of the 1950s blamed it primarily on government economic controls, especially the fixed exchange rate regime. The claim was that the fixed exchange rate had set the US dollar weaker (undervalued) than it would have been in a floating market, and thus led to an ongoing US trade surplus.

In a 1953 paper, "Why the Dollar Shortage?," Milton Friedman wrote that "'dollar shortage' is a strictly meaningless phrase" about which "floods of nonsense" had been written (p. 202). Why had a global shortage of dollars arisen? Friedman argued: "its fundamental cause and cure are alike simple: the dollar shortage is a result of governmentally controlled and rigid exchange rates" (1953, 201). If the dollar shortage was a manifestation of fixed exchange rates, why, Friedman asked, "has it appeared in such virulent form only in recent years?" (1953, 202). The answer to this apparent paradox, Friedman argued, was that, under earlier fixed-exchange-rate systems, including the classical gold standard and the interwar gold exchange standard, domestic monetary policies were determined by external forces: monetary policies would adjust so that the *real* price of foreign exchange maintained equilibrium in a country's balance

of payments. Such adjustments became impossible once exchange rate policy became driven by domestic considerations (mostly unemployment).[9]

Friedman was not the first or only one to make this argument. For example, the prominent economic journalist Henry Hazlitt, in his 1947 monograph, *Will Dollars Save the World?*, argued: "[T]he chief responsibility [for the dollar shortage] must be placed upon government controls. Most of the governments of the world today, by forcing commodity prices below the levels that supply and demand would bring about, are creating artificial bottlenecks and shortages" (21). Hazlett continued: "But the gravest case of arbitrary fixing is the overvaluation that nearly all countries place on their own currencies. They will not accept the verdict of the open market as to what those currencies are really worth" (21). Thus, Hazlitt argued in favor of floating exchange rates (22) and more broadly: "There must be an end of price control, either for home-produced goods or imported goods, and an end of other regulations that prevent or unbalance trade and production" (32). Similarly, Princeton University professor Frank Graham argued, in a 1949 study, *The Cause and Cure of "Dollar Shortage*:*"* "The only real solution [to the dollar shortage] is the operation of the price mechanism in a free exchange market to equate national supply and demand in international trade" (9).

An Appraisal on the Basis of Modern Macroeconomic Theory

How do the views exposited above look through the lenses of modern macroeconomic theory? The workhorse of modern international macroeconomics is the intertemporal approach to CA determination under financial frictions (Obstfeld and Rogoff, 1996). Consider a real, small, open economy that faces imperfect international financial markets (say, an income-based borrowing constraint). Let technology be embodied in the capital stock, so that high multifactor productivity, TFP, goes hand in hand with a high capital stock. Furthermore, assume that this economy's initial capital stock/ TFP is low relative to that of the rest of the world. The theory implies that the

[9] On numerous issues having to do with the 1950s and 1960s academic debates on flexible versus fixed exchange rates, including the view that the Bretton Woods fixed-rate system would break down, Friedman was on the right side of the debate and Kindleberger was on the wrong side. See Dellas and Tavlas, 2018; Tavlas, 2025; and Nelson, 2026, Chapters 3, 7, and 9.

country will borrow in the international markets to finance investment and also to carry out consumption smoothing. There will be a *chronic* CA deficit during the income-TFP convergence process. The size and dynamics of the CA deficit will depend on the severity of the financial friction, the initial productivity gap with the rest of the world, and the country's "impatience." The CA deficit will be more persistent if the financial friction is more severe because the friction acts as a borrowing constraint, limiting the ability to import investment goods and slow down the rate of productivity growth and catching up. Large impatience will also increase the persistence of the CA as income gains during the transition will be disproportionately directed towards consumption, making the marginal propensity to save – MPS – low and, perhaps, negative. Note that an income based borrowing constraint will make the marginal propensity to invest – MPI -- income dependent as income gains relax the borrowing constraint on investment. Both of these features, namely a low MPS and a high MPI contribute to a low *income* sensitivity of the CA to income (recall the definition CA(Y) = S(Y) – I(S)). Kindelberger's views on the cause of the dollar shortage (financial frictions) and on the determinants of the size and persistence of the CA dynamics (productivity gap, impatience, a low MPS and a high MPI) fit remarkably well with the framework of the intertemporal approach.

Inclusion of price stickiness and an arbitrary exchange rate adds a nominal driver to CA movements. An *overvalued* currency allegedly exacerbates CA deficits. The contribution of the nominal factor depends on two elements: the degree of nominal price/wage stickiness and the size of the trade elasticities. A small degree of nominal price stickiness makes the effects of the peg on the real exchange rate and the CA short-lived. Similarly, low trade elasticity values make the effects of the peg through the real exchange rate small. The ability of the nominal factor to account for a significant fraction of the CA size and its persistence then rests on these two elements. Kindleberger plausibly argued that the exchange rate could not do so: trade elasticities were low because of the lack of good substitutes for US goods while the technological gap was large. Moreover, he considered that the effects of exchange rate changes on the CA would be transient.

The above competing points of view all have solid theoretical foundations. While we favor Kindleberger's, only empirical evidence or a macro model that would be used as a laboratory for carrying out an informed variance decomposition of the historical

CAs can help evaluate the relative empirical merit of the alternative theories. We leave this to future work.

Before concluding this section we would like to make two related points. The first concerns the theoretically correct definition of the dollar shortage. It is the difference (gap) between the amount of borrowing in the first best -- in our context when financial markets operate smoothly -- and in a distorted equilibrium (with borrowing constraints). Such gaps (wedges) are used in the literature to capture the effects of distortions and are ubiquitous in macroeconomics (see Chari *et al.*, 2007). Kindleberger's definition (the balance of payments deficit) is meaningful as it relates to, and varies with, the borrowing constraint of the country. It may not fully capture the true size of the shortage since it does not take into account the fact that a borrowing constraint also depresses the value of the current account deficit (in the extreme case where borrowing is not possible at all, the deficit is zero). That is, the balance of payments deficit tends to underestimate the true dollar shortage. But from a practical point of view, Kindleberger's definition provides a reasonable and useful measure because it is not model dependent and is also readily measurable.

The second point is that since financial frictions make the actual CA deficit fall short of its optimal -frictionless- size, exchange rate overvaluation mitigates the effect of the financial friction by supporting a larger deficit. Removing the overvaluation removes this mitigation effect. This is an important consideration in the context of the reconstruction of the European economies as imports of capital goods from the US played a critical role in the reconstruction-closing of the technological gap. This is a standard second-best result and implies that the overvalued exchange rate may have contributed to a faster pace of convergence to the US level.

The Resolution of the Dollar Shortage

As mentioned, starting in the early 1950s, the US economy began to exhibit balance-of-payments deficits, rather than surpluses. Conversely by the mid-1950s the European countries as a group moved to balance of payments surplus. What changed?

There were several developments in the late-1940s and into the 1950s which may have played a role. First, beginning in the early-1950s there was a large and sustained increase in private capital flows from the Unites States to Western Europe (IMF, 1955,

35, Table 9). Second the Marshall Plan (1948-52) transferred $13.3 billion in economic recovery programs (grants and loans) to Western European economies – about 3 percent of the national incomes of the recipient countries. The recipient countries were permitted to export to the United States, while restricting their imports from the United States (Meltzer, 1991, 58). The Marshall Plan allowed European counties to purchase capital goods and raw materials needed to start-up their industries, thus helping to relieve the dollar shortage (Kenen, 1994, 492). Second, in September and October 1949, the British pound sterling was devalued against the dollar by 30.5 percent, and thirty other countries followed the British move within two weeks with devaluations ranging from 8 percent (Italy) to 53 percent (Austria) (Eichengreen, 2007, 77). In Hazlitt's terms, more countries became willing to accept that their currency should have a lower value. Unlike the first two direct developments, though, it is not clear that the devaluations played a significant role in the alleviation of the dollar shortage problem (see, for instance, Hicks's view above).

As these changes in the foreign accounts were taking place, the dollar shortage debate continued through the 1950s on more-or-less the same terms. Proponents of the dollar-shortage thesis considered that the improvement in the balance-of-payments positions of Western European economies would be short lived. They argued that the chronic dollar shortage would re-emerge, once the temporary measures, including the Marshall Plan and discriminatory trade measures against the United States, were removed, and once the effects of the 1949 exchange-rate devaluations wore off. In 1957 alone, at least six books were published on the dollar shortage issue. Kindelberger (1958) reviewed four of those books – each of which supported the idea that a dollar shortage continued to exist.[10] The general theme running through the books was that the dollar shortage was due to high US productivity growth compared with productivity growth in other countries. After providing generally positive reviews of the books, Kindleberger asked: "How far have we come? Certainly a long way on the details: on the measurement of elasticities, on productivity in general (though not on the

[10] The books were *The World Dollar Problem*, by Donald MacDougall (1957), *Balances and Imbalances of Payments*, by Geoffrey Crowther (1957), *International Monetary Policy,* by William McConnell Scammell (1957), and *Britain's Postwar Dollar Shortage,* by Elliott Zupnick (1957). Apart from the four books reviewed by Kindleberger, other books were *International and Interregional Economics* by Seymour Harris (1957) and *Europe and the Money Muddle* by Robert Triffin (1957).

introduction of new goods), and on the general theory of balance-of-payments disequilibrium" (394).

But others like Raymond Mikesell (1958, 460) took the alternative view, stating: "Dollar shortage should be regarded as a myth; it is only a cloak used to cover up the fallacies of governmental policymakers." Mikesell argued that any shortage of dollars was a consequence of overvalued exchange rates against dollar and was used by foreign governments to justify discriminatory trade practices against US exports (for a fuller exposition, see Mikesell 1959). In response to Mikesell, Kindleberger (1958, 394-95) wrote: "I am still disposed to argue against Mikesell .... I imagine, too, that he ... would be prepared to bet ... that there was greater likelihood that a given future disequilibrium in the balance of payments of the United States would involve dollar shortage than dollar surfeit."

Kindleberger's view of a chronic dollar shortage derived mostly from his pessimism about the speed of elimination of this technological gap and the willingness of the United States to lend to Europe. But the productivity gap between the United States and European economies significantly diminished in the 1950s (see, for example, Solomon 1977, 21). Kindelberger noticed this development and revised his position on the future of dollar shortages. On June 30, 1959, he appeared before the US Congress Joint Economic Committee, and wrote in the statement accompanying his testimony: "A considerable part of the so-called dollar shortage seems to have been due to continuous innovation on the part of American industry. As foreign countries learned to imitate one product, a new technological gap was opened up in another. This technological gap is no longer so one-sidedly in favor of the United States" (956). This signaled the end of the dollar-shortage debate.

It is beyond the scope of the present paper to determine the relative contribution of the nominal factors emphasized by Friedman and the real factors emphasized by Kindleberger to the creation and resolution of the dollar shortage. But on the basis n of estimates of trade elasticities, the degree of nominal stickiness, the size of the productivity gap after WWII and the rapid increase in productivity in Europe -- that allowed her to produce locally many of the manufacturing goods that it used to import from the United States -- we are inclined to side with Kindleberger. By the late 1950s, the "dollar shortage" was taking on an altered meaning: instead of a problem caused by US current account surpluses of the 1930s and 1940s, it had become a problem of US

current account deficits in the 1950s. The famous "Triffin dilemma," spelled out by Robert Triffin (1960) in his book *Gold and the Dollar Crisis*, argued that because the US dollar was the international reserve currency, it was important for the US economy to run ongoing trade deficits—to make US dollars available to the rest of the world and prevent a "dollar shortage." But the increase in the global supply of US dollars may exceed the US holdings of gold that back these dollars, creating a confidence problem that undermines the credibility of the system of fixed exchange rates and threatens dollar's role as a reserve currency. In addition to such sustainability concerns, other domestic considerations such as the desire to keep inflation low may interfere with the US provision of a liquid reserve currency for the world. Excessive growth of the supply of dollar reserves is the reason for the collapse of the Bretton Woods system of fixed exchange rates. . For present purposes, suffice it to say that a Triffin-style "dollar shortage" that could arise from insufficiently large and persistent US trade deficits is not the same problem as the post-World War II "dollar shortage" that arises from large and persistent US trade surpluses.

Two Recent Episodes of Dollar Shortage

The recent episodes of what have been called "dollar shortages" have been of two distinct types. One type has afflicted advanced economies that operate floating exchange rates and possess sophisticated financial markets. It has been manifested in violations of what is called the "covered interest parity" condition. The basis for covered interest parity is the difference between two US dollar interest rates, the direct interest rate (say, on US Treasury bonds) and the dollar interest rate on a currency swap agreement, in which two parties swap principal and interest payments in two different currencies. Under smoothly functioning financial markets, arbitrage dictates that these two interest rates should be the same. However, beginning around 2007 and culminating during the 2010s, the covered interest parity condition for various currency pairs with the US dollar deviated significantly from zero. For example, the US dollar-Japanese yen covered interest parity basis exceeded 75 basis points in both 2011 and 2016, an extraordinary amount. This means that investors chose to obtain US dollars in the present, and carry them forward, rather than enter into a swap contract with the Japanese yen that promised to deliver the same amount of dollars in the future. By doing so, investors sacrificed 75 basis points of return.

A plausible reason for the existence of this differential is the anticipation of a dollar shortage in the future that might obstruct the delivery of the dollars promised. The shortage could be a reflection of heightened, anticipated demand for US dollars (say, because of maturing dollar liabilities by non-US banks) combined with strains in global interbank markets (such as constrained bank access to wholesale dollar funding because of regulatory constraints on bank balance sheets) that limited arbitrage. In response to these huge violations of arbitrage, policymakers throughout the world entered into swap agreements with the US Federal Reserve in order to allow non-US banks to *indirectly* access the Fed's *liquidity* facilities. The dollar shortage was mitigated by the US central bank's willingness to provide dollar liquidity globally. We view this type of dollar shortage as related to the Triffin dilemma: that is, it arises as a result of demand for the US dollar due to its international reserve function.

The other type of modern "dollar shortage" has afflicted emerging economies in a way that shares many of the key features characterizing the European countries during the original "dollar shortage" episode after World War II: namely, low productivity and the desire to catch up, combined with exchange rate targeting and capital controls. As Reinhart (2016) tells the story, a number of emerging markets had high export values during the bonanza in commodity prices in the early 2000s. Global commodity prices are often denominated in US dollars, so these countries built up substantial US dollar foreign exchange reserves. Some of them even pegged the foreign exchange value of their currency to the US dollar. But when the commodity boom ended after the Great Recession, countries that had fixed their exchange rates began to bleed reserves, often until the pegging arrangement was ended; and countries with flexible exchange rates saw a sharp decline in the value of their currency. These balance of payments deficits, like those of the early post-World War II period, had little to do with the reserve status of the currencies of the countries that had a trade surplus with these reserve hemorrhaging countries. They arose from credit constraints--namely, the reluctance of a creditor (a trade surplus country) to provide credit to what appears to be a risky debtor (a trade deficit country).

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