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The Great Dollar Shortage Debate: A Modern Perspective

Harris Dellas
The Karl Brunner Institute
University of Surrey
Federal Reserve Bank of St. Louis
and
George S. Tavlas*
Bank of Greece
Hoover Institution, Stanford University

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HOOVER INSTITUTION
434 GALVEZ MALL
STANFORD UNIVERSITY
STANFORD, CA 94305-6010
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The dollar shortage debate -- Paul Samuelson called it "the big open question of our time" -- dominated international macroeconomics in the fifteen years following the end of World War II. We revisit it through the lenses of modern theory, namely, the intertemporal approach to the current account with financial frictions. We argue that its key elements, exemplified by the views of its main protagonist, Charles Kindleberger, have a remarkably modern flavor. Kindleberger identified the dollar shortage with the balance of payments deficit, a theoretically deficient but practically relevant and useful measure. He made early use of the permanent income/intertemporal approach to the current account and linked the persistence of trade imbalances to the income elasticities of savings and investment as well as to the persistence of U.S. technological superiority. The main shortcoming of the debate was the focus on the behavior of the current account rather than on the capital account as the chief reason of the dollar shortage. We also argue that currency shortages in general, whether past or present, arise from financial frictions and can occur under different international monetary systems and financial systems.

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1. 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. Most of the world outside the United States supposedly suffered from a persistent tendency to spend more than it earned or borrowed at long term from the United States, leading to a chronic shortage of dollar and gold reserves needed to conduct international trade (Yeager, 1965, 458). Scores of articles and books were written about the issue. Congressional hearings attempted to determine whether there really was a dollar shortage. The IMF Articles of Agreement included the "scarce currency" clause that allowed countries to take discriminatory actions in trade with the United States if they faced a dollar shortage.[1] In his textbook, *Economics: An Introductory Analysis*, Paul Samuelson called the dollar shortage "the big open question of our time" (1958, 707).[2] Other prominent economists agreed. Both John Hicks and Dennis Robertson authored studies dissecting the causes of the dollar shortage. One writer of best-selling British introductory economics books published an article titled "The Dollar Siege," in which she likened the effects of the dollar shortage to "a three-headed monster."[3] In 1950, Charles Kindleberger authored a book titled, *The Dollar Shortage*, in which he predicted that the dollar shortage would be a permanent problem; the book earned him tenure at MIT. In 1947, Roy Harrod strongly disagreed. He wrote that the "dollar famine" was "one of the most absurd phases ever coined," adding that the "allegation of a 'world dollar shortage' is surely one of the most brazen pieces of collective effrontery that has ever been uttered" (Harrod, 1947, 42-43). Six years later Harrod had undergone an epiphany; he published a study that affirmed the existence of a dollar shortage and he sought to diagnose its causes (Harrod, 1953).

Several prominent economists took issue with the idea that a dollar shortage existed. Frank Graham and Milton Friedman argued that the dollar shortage reflected the failure of governments to allow the price of the dollar to fluctuate freely in foreign exchange

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

[2] This view is also reflected in modern textbooks. For example, Krugman and Obstfeld (2003, 550) characterized the first decade of the Bretton Woods system as "the period of 'dollar shortage'."

[3] The writer was Honor Croome. The three heads were "absolute physical poverty," "intractable obstacles" to international trade, and "dynamic disequilibrium" of the global economy (Croome, 1950, 26).

markets; Friedman (1953, 201) predicted that the shortage would "evaporate overnight" if the price of the dollar was determined by market forces. Both Henry Hazlitt (1947) and Raymond Mikesell (1958) called the dollar shortage "a myth."

We cast a modern light on the debate by using the lenses of the intertemporal approach to the current account (Obstfeld and Rogoff, 1996). We scrutinize the views of its main protagonists and ask whether their identification of the problem, diagnosis of its causes, and prognosis of its resolution are in line with modern theory. We identify the major elements overlooked and errors contained in the theoretical frameworks employed, evaluate their consequences, and pass judgment on the winners of the debate.

We then try to provide a more general framework for thinking about dollar (dominant currency) shortages. Such shortages re-emerged as a global concern following the 2008-09 global financial crisis. They have primarily taken two distinct forms. One is quite similar to that of the earlier episode described above. It has afflicted emerging economies that aspire to close the gap with more affluent countries, target the exchange rate, and employ capital controls. It has manifested itself in balance of payments deficits and the operation of parallel exchange markets with large premia (Reinhart, 2016). All these features characterized the European countries during the earlier episode. The other form is new as it has affected advanced economies, including European countries and Japan, with sophisticated financial markets and floating exchange rates. It has manifested itself in sizeable deviations from covered dollar interest rate parities (Sindreu, 2018).

We argue that seemingly distinct episodes of dollar shortages that afflict different countries and markets, and manifest themselves in different prices and quantities, all encapsulate the same phenomenon of a liquidity shortage created by frictions in the international financial markets. They are a common outcome of the workings of incomplete, global financial markets that are buffeted by large policy and other shocks rather than of pathological behavior. As such, they can be mitigated through liquidity provision by the U.S. authorities, but at the usual policy, moral hazard cost.

The remainder of the paper is structured as follows. Section 2 describes the economic circumstances that triggered the original debate about a dollar shortage. Sections 3 and 4 present the arguments of some of the main protagonists who took part

in the debate. The discussion pivots around the works of Kindleberger, who was the most active and longest-serving participant in the dollar-shortage debate. Section 5 deploys the modern theory of current account determination under financial frictions to revisit that debate, discusses recent manifestations of dollar shortages, and suggests a unifying framework for identifying their causes. Section 6 concludes.

2. Economic Background to the Debate

In 1943, *The Economist* published two successive articles on what the editors of that magazine identified as the preeminent economic problem facing the global financial community – at that time and in the foreseeable future. The articles were titled "The Dollar Problem – I" and "The Dollar Problem – II."[4] Basing the articles on a report issued that year by the U.S. Department of Commerce on the U.S. balance of payments during the interwar period, the editors concluded that "the supply of dollars was highly erratic, and also that it had a tendency to be inadequate" during the period 1919-39 (*The Economist*, 1943b, 750).[5] The editors reported the following data to support their view: "The average deficit in the supply of dollars in the decade 1930-39 was $ 507 million a year out of a total [global] demand of $ 4,095 million" (*The Economist*, 1943b, 751). At the same time, the United States was accumulating monetary gold reserves: "In the five years 1935-39, the [U.S.] gold inflow was $ 8,813 million; in the same years the recorded inflow of foreign-owned long-term and short-term capital [to the U.S.] was $ 4,097 million" (*The Economist*, 1943b, 750). The editors called the dollar shortage "the world's financial problem number one" (*The Economist*, 1943b, 750). The editors worried that, in the coming years, the dollar problem would only "be intensified" because of the reconstruction and development programs that would be required to rebuild Europe at the end of the war.

In brief, the dollar-shortage problem comprised two inter-related issues. First, apart from gold, the supply of which was inelastic, the dollar was the predominant reserve asset used by central banks in the 1930s and 1940s, but the supply of dollars internationally was not keeping pace with demand. Second, the United States was at

[4] The articles were published in the November 27 and December 4 issues, respectively, of *The Economist*.
[5] The report by the U.S. Department of Commerce was titled *The United States in the World Economy*; it was published under the authorship of Hal B. Lary (1943). The notion of a global dollar shortage was broached by *The Economist* in its December 7, 1940 issue: "You cannot use dollars to meet a shortage of dollars" (quoted from Kindleberger, 1950a, 4, fn. 7).

the same time accumulating a rising share of the global gold monetary stock. The U.S. share of the global monetary gold stock rose from 39 percent in 1934 to 52 percent in the late 1930s.[6] At the end of the World War II, the United States held two-thirds of the world's monetary gold (Bordo, 1993). The gold and dollar reserves of the war-ravaged European countries were depleted. Europe ran large current-account deficits during and after the war, reflecting the demand for essential imports and the reduced capacity of the region's export industries (Bordo, 1993, 38-39).[7] The main problem facing these countries was to acquire dollar reserves to finance purchases of needed imports from the United States. Consequently, many European countries were forced to ration foreign exchange after the war to restrain spending on non-essential imports (Irwin, 2019, 67).

In the late-1940s and early-1950s, three developments helped alleviate the scarcity of dollars, at least temporarily. First, 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).[8] The Marshall Plan allowed European counties to purchase capital goods and raw materials needed to start up their industries, thus helping to directly relieve the dollar shortage (Kenen, 1994, 492). Second, in September 1949, the pound sterling was devalued against the dollar by 30.5 percent.[9] A wave of other devaluations of European currencies followed.[10] Third, beginning in the early-1950s, large and sustained private capital flows to Western European countries and Japan dwarfed the trade deficits of those countries and led to `large increases in their dollar holdings (IMF, 1955, 35, Table 9). These developments helped European countries as a group move to balance of payments surplus by the mid-1950s, despite a continuing trade deficit, a movement that was important for the eventual (in December 1958) decision to restore convertibility on current account

[6] The former figure is from Eichengreen (1990, Chap. 10, 243, Table 10.1). The latter figure is from the IMF (1951); it is an average figure for 1938 and 1939.

[7] The situation worsened in the years after the end of World War II. Solomon (1977, 14) reported: "In the two years 1946-1947, the rest of the world used about $ 6 billion of its gold and dollar holdings to finance its deficit with the United States."

[8] According to Solomon (1977, 16), the Marshall plan encouraged countries receiving assistance to pursue balance-of-payments surpluses and rebuild their depleted reserves.

[9] Although a devaluation was expected, Yeager (1965, 382) reported: "It's sharpness ... came as a surprise."

[10] The sizes of the devaluations ranged from 8 percent (Italy) to 53 percent (Austria). See Eichengreen (2007a, 77).

transactions of their currencies.[11] Nevertheless, proponents of the dollar-shortage thesis considered that their effects would be temporary. These economists regarded the dollar shortage to be a chronic problem. The chronic dollar shortage would re-emerge, they believed, 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.

3. The Debate: Participants

In the second half of the 1940s, a large number of studies appeared on the issue of a dollar shortage, with several of the studies featuring the term or its variant in their titles. These included "A Dollar Shortage After 1952?" by Alzada Comstock (1948), "Dollar Scarcity: Some Remarks Inspired by Lord Keynes' Last Article" by Seymour Harris (1947), "The Dollar Shortage in Theory and Fact" by Howard Ellis (1948), "Disinflation, Discrimination and the Dollar Shortage" by Albert O. Hirschman (1948), *The Dollar Crisis: Causes and Cure* (1949) by Thomas Balogh (1949), and *The Cause and Cure of Dollar Shortage* (1949) by Frank Graham. The large majority of studies affirmed the idea that the global economy suffered from a dollar shortage.

The debate on the dollar shortage centered on the causes of the current account deficits of the rest of world with the United States and their persistence, in particular, on whether the deficits -- and the dollar shortages -- would be resolved on their own through standard, equilibrium-establishing forces (such as terms of trade adjustment or economic convergence), or, whether they required appropriate governmental action. To convey the flavor of the debates, we begin with a discussion of the views of two of the initial protagonists in the debate – Charles Kindleberger and Arthur Bloomfield.

3.1 Kindleberger vs. Bloomfield

Kindleberger was the first U.S. economist to write about a chronic dollar shortage, having done so in two 1943 papers: "Planning for Foreign Investment," published in the March 1943 issue of the *American Economic Review, AER*, (1943a) and "International Monetary Stabilization," published in *Postwar Economic Problems*,

[11] However, as Bordo (1993, 41) pointed-out, the currencies of Western European countries "were virtually [if not, officially] convertible by 1955."

(1943b), a book edited by Seymour Harris.[12] Both papers provided an assessment of the dollar shortage, but from distinct vantage points.

In the *AEA* paper, Kindleberger, identified the dollar shortage with the U.S. balance of payments surplus. Its basic cause, he argued, was the perpetual proclivity of the United States to run trade current account surpluses combined with inadequate long-term lending by the United States to foreign countries (1943a, 350). Kindleberger wrote: "The world 'chronic shortage of dollars' ... is basically ascribable to the United States' failure to lend abundantly, or rather more continuously" (1943a, 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" (1943a, 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 [U.S.] ... goods is reduced in intensity" (1943a, 351).

In his treatment of the dollar shortage in "International Monetary Stabilization," Kindleberger switched focus from the balance of payments to the current account. He argued that the primary driver of the shortage was the behavior of the United States' trading partners – notably, their large current account deficits. Those deficits arose from "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 (terms of trade) adjustments? Kindleberger, who maintained

[12] After receiving his Ph.D. from Columbia University in 1936, Kindleberger worked for several U.S. 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. During the implementation stage of the Marshall Plan in 1947 and 1948, Kindleberger worked at the U.S. Department of State in a position in which he directed the committee that put the Marshall Plan together and steered it through the U.S. Congress (Mehrling, 2022, 83). He formally retired from full-time teaching at MIT in 1976 but remained active in economic research after his formal retirement. At the time of publication of the 1943 articles, Kindleberger worked for the U.S. government in the Office of Strategic Services.

that a "chronic world dollar shortage" existed since 1919, was skeptical of achieving an equilibrium with a balanced current account because of the values of the income and price trade elasticities. He wrote

> 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 (1943b, 381).

Under such a configuration of elasticities, neither growth in U.S. imports nor exchange-rate adjustment (depreciation of foreign currencies against the dollar) would succeed in ending the shortage. Kindleberger wrote: "depreciation will be slow in raising the value of [the foreign country's] exports and may increase the over-all value of [the foreign country's] imports in terms of [its] currency." Moreover, if wage rates and the costs of other imports in the foreign country were tied to changes in the cost of living, an "expansion in the total value of exports may not occur at all" since the rise in nominal wages and other costs would fully offset any cost reductions that had been achieved through a nominal exchange-rate depreciation. He argued that "exchange depreciation is a very clumsy devise and may prove ineffective because of progressive inflation at home" (1943b, 388). Kindleberger concluded that, in the future, "the chronic shortage of dollars would remain, albeit at higher levels of real income throughout the world, and the United States would continue to pile up [current account] surpluses" (1943b, 387).

Bloomfield's engagement in the dollar-shortage debate began in 1947 with the publication of the textbook, *International Economics*, by Stephen Enke and Virgil Salera , and focused on Kindleberger's claim that the dollar shortage was a chronic phenomenon due to the values of the price and income elasticities of imports in the U.S. and the rest of the world.[13] In their book, Enke and Salera pointed to a *non sequitur* in Kindleberger's argument that the dollar tends to be chronically scarce because increased U.S. imports will raise nominal incomes abroad, producing increased

[13] 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. Bloomfield retired from full-time teaching at the University of Pennsylvania in 1980.

demands for U.S. products in excess of the initial increase in U.S. imports. In criticizing Kindleberger's thesis, Enke and Salera expressed their gratitude to Bloomfield "for the basic ideas involved in the refutation of this [*i.e.,* Kindleberger's] thesis" (1947, 600, fn. 2).[14]

The criticism relied on the relationship between the current account and national savings and investment. [15] Their claim was that Kindleberger's assumption that an increase in a foreign country's exports could call forth a larger increase in its imports required for its validity that the country's marginal propensity to save is zero. However, so long as some fraction of income is leaked into domestic savings, a new dollar of exports will 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."

Kindleberger defended his thesis that a rise in a country's imports may be larger than the increase in exports which prompted it. In a paper, "The Foreign-Trade Multiplier: The Propensity to Import and Balance-of-Payments Equilibrium," published in the March 1949 issue of the *AER*, addressed what he called the "Bloomfield-Enke and Salera" criticism. Kindleberger wrote that the 1943 formulation of his thesis was incomplete. Two additional assumptions were needed to complete it (1949a, 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 (1949a, 492). Kindleberger (1949a, 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."

[14] Bloomfield had provided a memorandum to Enke and Salera critiquing Kindleberger's conception of a dollar shortage. This point was made in Bloomfield (1949).

[15] Recall that, ignoring the government budget deficit (surplus), CA = S - I.

In response to Kindleberger's paper, Bloomfield (1949, 971) wrote: "The real issue involved is not whether Kindleberger's particular point is theoretically valid, for if fortified by the appropriate assumptions it would be, but whether or not those assumptions are the most realistic ones to make." Bloomfield argued that Kindleberger had dealt with "special cases, not the general one, and that consequently he is greatly exaggerating the importance in the real world of the sequence he outlines" (1949, 971). Specifically, Bloomfield believed that it was "unrealistic" to assume that the marginal propensity to invest in foreign countries as a whole "is characteristically in excess of the marginal propensity to save so as to create an underlying tendency for increases in aggregate American imports to bring about greater increases in [U.S.] aggregate exports" (1949, 972-73). Bloomfield also noted that, under Kindleberger's special assumptions, it would follow that a *decline* in U.S. imports "should provoke a greater decrease in [foreign countries'] exports and thereby tend to bring about a dollar 'surplus'" (1949, 973-74).

Consequently, Bloomfield questioned the relevance of the concept of a "chronic dollar shortage." He argued that, in Kindleberger's attempt to provide "a theoretical explanation for the alleged tendency toward a chronic world shortage of dollars," Kindleberger had mistakenly framed his discussion of the dollar shortage by focusing on the current account of the balance of payments. "May I suggest only that before talking of *chronic* dollar shortages one might do well to examine much more closely the concept of 'dollar shortage' itself. In this connection Kindleberger might want to reconsider his own bald definition of a dollar shortage as the existence of a surplus in the American balance of payments on current account" (italics in original, 1949, 974).

In a rejoinder, published in the September 1949 issue of the *AER*, Kindleberger treated Bloomfield's acknowledgement that "special cases" could exist, under which a rise in a foreign country's exports elicits a larger increase in its imports, as a concession:

> I am disposed to accept Dr. Bloomfield's plea of *non mea culpa* in the matter of the Bloomfield-Enke-Salera contention that it is impossible for a country to overcompensate in response to an increase in its exports and end up with an import surplus. I trust he will make satisfactory settlement with Messrs. Enke and Salera whom he has tossed to the wolves (1949b, 975).

As for Bloomfield's argument that, under Kindleberger's thesis, symmetry dictates that a decline in U.S. imports should tend to bring about a dollar surplus, Kindleberger was combative:

> a presumption that all propositions are symmetrical cannot be accepted. I know of no authority for this bizarre bit of reasoning. Asymmetry at one level, moreover, may be symmetry at another level. If in the short run a country may spend more than its increase in earnings, there is no reason that it should save more when its earnings decrease, although this result is possible. It may be, moreover, that an explanation of the dollar shortage of some considerable generality may be found - if not alone in the tendency of certain other countries to overcompensate with respect to increases in exports - in this, in a tendency to undercompensate with respect to decreases (1949b, 975).

3.2. Kindleberger's 1950 thesis

Kindleberger's book, *The Dollar Shortage* (1950) was a comprehensive study of the dollar-shortage issue.[16] Acknowledging Bloomfield's point that the balance-of-payments implications of dollar provision needed to include both the current account and the capital account, Kindleberger 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" (Kindleberger, 1950a, 170). While this definition omits short term capital flows from the capital account, it corresponds well to a balance of payments deficit when such flows are negligible in size, as they were during the late-1940s/early-1950s.

Kindleberger considered four possible palliatives to the dollar shortage.

Exchange-rate adjustment. Kindleberger acknowledged that some economists expressed 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" (1950a, 175). In light of his belief that trade volumes are

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

inelastic with respect to exchange rate changes, he was dismissive of this argument (1950a, 175).

Monetary and fiscal policies. Kindleberger was not optimistic that those policies could be effective. To alleviate the dollar shortage, the United States would have to implement expansionary monetary and fiscal policies – to increase that country's imports – and the rest of the world have to implement contractionary policies – to reduce its 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" (1950a, 195). As for 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" (1950a, 199).

Trade policy. Kindleberger was pessimistic about the possibility of using tariff reduction in the United States to expand that country's 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 (1950a, 225). He further argued that a tariff reduction in the United States would reduce that country's income so that imports would fall on balance (1950a, 253).

International lending. Finally, Kindleberger was also pessimistic about the possibility of international lending by the United States as a solution to the dollar shortage: "The difficulty ... lies in the fact that repayment of loans thus incurred is necessarily problematic. The increased productivity made possible by borrowing is already committed to meeting the [structural] disequilibrium. It cannot be used at the same time to pay interest and to repay principal" (1950a, 251).

In sum, *The Dollar Shortage* provided a pessimistic vision about global economic prospects. The rest of the world suffered a permanent dollar shortage, which would hinder to its ability to purchase investment goods from the United States and hamper its growth. To make matters worse, Kindleberger did not believe there could be an effective policy response to the dollar shortage.

Bloomfield reviewed *The Dollar Shortage* for the *Review of Economics and Statistics* in 1952.[17] He began by noting that the dollar-shortage debate had been dominating discussions on international economics: "An almost bewildering variety of views has been expressed, in governmental, professional, and journalistic circles alike, regarding the definition and content of this phenomenon, its measurement, causes, degrees of permanence and cure." (1952, 189). Bloomfield found Kindleberger's presentation of the relationship between the balance of payments and the supply of dollars to be "more obscure to me than his earlier views on the matter" (1952, 190). Bloomfield expressed the view that Kindleberger's dollar-shortage thesis was unconvincing:

> The style and organization of the book leave much to be desired. There is a disturbingly large number of digressions, sometimes interesting but often quite irrelevant, from the main stream of the argument; the style is frequently elliptical; and there is a certain looseness in the definition and application of terms and concepts. All these conspire to make it rather difficult to follow the author's reasoning at many critical points in his argument (1952, 190).

3.3. Other proponents of the dollar shortage

During the late-1940s and the 1950s, explanations of the dollar shortage were legion.[18] We briefly describe the views of three prominent proponents of the dollar shortage: Sirs Roy Harrod, John Hicks, and Dennis Robertson.

Harrod. As mentioned, in 1947 Roy Harrod had been sharply critical of the notion that there could be such a thing as a global dollar shortage. During the years 1952 and 1953, however, Harrod had become an advisor to the IMF during which time he became convinced that the world economy did indeed suffer from a dollar shortage. In a 1953 study "Imbalance of International Payments," Harrod wrote: "Of all the particular imbalances in the international payments pattern, that between the dollar and other currencies is the greatest .... there is, so to speak, a latent deficit consisting of the value of all the goods and services which the citizens of various countries would wish to buy

[17] The professional relationship between Bloomfield and Kindleberger appears to have been an uneasy one. In 1950, Bloomfield published a book on the causes and effects of U.S. capital flows during the period 1934 to 1939 (Bloomfield, 1950). Kindleberger reviewed the book for *Political Science Quarterly*. Kindleberger called the book a "disappointment" and a "missed ... opportunity" (1950b, 616).

[18] 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."

from the United States at their existing prices, if only they were not prevented by discriminatory import restrictions from doing so" (1953, 5-6).

Harrod attributed the global shortage of dollars to the following factors: (1) low elasticities of demand and supply in international trade (Harrod, 1953, 18); (2) more rapid productivity growth in the United States than in the rest of the world (1953, 30); (3) higher inflation in Europe than in the United States which diminished the competitiveness of European economies (1953, 35); and (4) Europe's "worsened" terms of trade vis-à-vis the United States (1953, 21). Harrod was not optimistic about a solution to "the dollar crisis" (1953, 33). He believed that Europe would have to live with "direct discriminatory restriction of dollar imports" while, at the same time, pursuing non-inflationary policies (1953, 35).

Hicks. In his 1953 "An Inaugural Lecture" at Oxford's All Souls College, John Hicks referred to the "dollar problem" as "perhaps the fundamental economic problem confronting this [the U.K.] country" (1953, 121). Hicks argued that U.S. productivity was growing more rapidly in import competing industries than that in the country's export industries. To hold their own in U.S. markets, other countries would have to lower the prices of their exports while enjoying only slightly reduced prices on their imports from the United States (1953, 132-33). Hicks did not believe that a devaluation of foreign currencies against the dollar would be helpful. He considered the 1949 devaluation of sterling 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 U.K. imports], and the rise in wages made the devaluation largely ineffective" (1953, 133-34). He did not discuss policy responses that might alleviate the dollar shortage.[19]

Robertson. In his 1954 book, *Britain in the World Economy*, Dennis Robertson provided several reasons for the dollar shortage: (1) the higher rates of accumulation of capital goods and technological progress in the United States than in the rest of the world; (2) the tendency of countries other than the United States to overspend, leading to inflation and currencies that were over-valued in those countries; (3) the destructive effects of World War II on the productive capacities of European and Asian economies,

[19] Hicks concluded his discussion of the dollar shortage with: "But this is no occasion for policy recommendations" (1953, 135).

and (4) strong labor unions which prevented European economies from competing effectively with U.S. traded goods (1954, 53-56). Regarding the high rates of accumulation and technical progress, Robertson argued that the United States was continuously introducing new methods and processes, preventing other countries from catching up (1954, 56-59). In these circumstances, he argued in favor of discriminatory trade practices against U.S. products.

3.4. Critics of the dollar shortage

Apart from Bloomfield, critics of the dollar-shortage thesis in the late-1940s and the first half of the 1950s were scarce. We discuss the views of three critics: Henry Hazlitt, Frank Graham and Milton Friedman.

Hazlitt.[20] In his 1947 monograph, *Will Dollars Save the World?*, Hazlitt called the notion of a dollar shortage, among other things, a "myth" (1947, 20) and "absurd" (1947, 21). Hazlitt argued: "the 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" (1947, 21). He 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" (1947, 21).

Two sets of policies, Hazlitt maintained, would end the dollar shortage. The first was to allow importers and exporters to buy and sell foreign exchange at the rates that demand and supply warranted (1947, 22).[21] Second, constraints on international trade needed to be eliminated. Hazlitt argued: "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" (1947, 32).

[20] Hazlitt (1894-1993) was an economics journalist. From 1934 to 1946 he was the principal editorial writer for finance and economics for the *New York Times.* From 1946 to 1966 he wrote a signed column, "Business Tides" for *Newsweek* magazine. When he left *Newsweek*, his weekly column was replaced by alternating columns by Milton Friedman, Paul Samuelson, and Henry Wallich. See Nelson (2020, vol. 2, chap. 12). Among Hazlitt's books on economics was the popular *Economics in One Lesson* (1946).

[21] Hazlitt's support of flexible exchange rates applied only to fiat currencies. His preferred exchange rate system was the gold standard under which gold flows equilibrated the demand and supply of national currencies (Hazlitt, 1947, 24).

Graham.[22] In a 1949 study, *The Cause and Cure of "Dollar Shortage,"* Frank Graham argued: "However the matter is put the upshot has been a chronic excess of American commodity exports over imports, and that 'shortage' of dollars which, in otherwise not unrespectable quarters has been 'explained' in terms of intractable inelasticities of international demand, of an overweening American productivity, or of some mysterious forces operating, it would seem, in complete disregard of well-established economic laws" (1949, 4-5). "The only real solution [to the dollar shortage]," Graham (1949, 9) argued, "is the operation of the price mechanism in a free exchange market to equate national supply and demand in international trade."

Friedman. 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 (1953, 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. Friedman argued, however, that:

> It is clear that few nations are now willing to allow their internal monetary policies to be dominated by external forces. The emergence of full employment as a predominant goal of domestic policy spelled the end to a system in which the changes in the real price of foreign exchange required to equate demand and supply were brought about by automatic changes in internal prices. With rigid nominal exchange rates, foreign exchange shortages were inevitable - though only the particular rates chosen and the particular internal price levels explain why it was a dollar shortage rather than a pound shortage (1953, 203).

4. The End of the Debate

[22] Graham (1880-1949) received his Ph.D. from Harvard University in 1921. He taught at Princeton University from 1921 until his retirement from teaching in 1945.

In 1950, the U.S. balance of payments swung into deficit, following a succession of annual surpluses during the previous decade.[23] The 1950 outcome reflected the currency devaluations of 1949, a rise in U.S. demand for imports of raw materials as a result of the break-out of Korean hostilities, and a marked increase in private capital outflows from the United States.[24] Apart from a small balance-of-payments surplus in 1957, the U.S. balance of payments would remain in deficit in each year during the decade of the 1950s. The resulting rise in foreign exchange reserves held outside the United States diminished the severity of any "dollar shortage." [25] By the end of the decade, total external dollar liabilities equaled the U.S. monetary gold stock; the U.S. share of the world's monetary gold had fallen to less than 50 percent, a situation that was viewed with alarm (Triffin, 1960; Bordo, 1993, 56; Eichengreen, 2007b, 15).

Throughout the 1950s, the debate about a dollar shortage continued. In 1957 alone, at least six books were published on the issue. As usual, Kindleberger was a chief protagonist in the debate. In a 1958 article, he reviewed four of those books – each of which supported the idea that a dollar shortage continued to exist (Kindleberger, 1958).[26] The general theme running through the books was that the dollar shortage was due to high U.S. 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 introduction of new goods), and on the general theory of balance-of-payments disequilibrium" (1958, 394).

In his review, Kindleberger criticized the idea that the dollar shortage was a "myth." As mentioned, that characterization had been made by Henry Hazlitt in 1947 in his critique of the dollar shortage. In 1958, that depiction was repeated by Raymond Mikesell in a paper "Quantitative Import Restrictions and United States Foreign Trade

[23] The U.S. net payments position recorded a deficit of $ 3.6 billion in 1950 (Federal Reserve Bank of St. Louis *Review*, 1961, 3, Table 2).

[24] Private capital outflows rose to $ 1.26 billion in 1950, from $ .55 billion in 1949 (Federal Reserve Bank of St. Louis *Review*, 1961, 3, Table 4).

[25] The gold and dollar reserves of countries outside the United States rose from $ 15.1 billion in 1950 to $ 22.8 billion in 1956 (Klopstock, 1957, 10, Table 2).

[26] 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).

Policy."[27] Mikesell (1958, 460) stated: "Dollar shortage should be regarded as a myth; it is only a cloak used to cover up the fallacies of governmental policymakers." Mikesell expressed the view that any shortage of dollars was a consequence of overvalued exchange rates against dollar and was used by governments to justify discriminatory trade practices against U.S. exports (1958, 460).[28] 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." As for his own view, Kindleberger stated: "I am persuaded that the disequilibrium [the dollar shortage] is systematic" (1958, 395).

As the 1950s came to a close, Mikesell would again address the matter of the dollar shortage in "Dollar Shortage: A Modern Myth," published in the *JPE* in 1959. Mikesell affirmed that "the dollar-shortage tradition has become so deeply imbedded and so widely accepted over the last two decades that the international monetary developments of the last eight years [the swing of the U.S. balance of payments to deficits] have not shaken the faith in dollar shortage as an enduring and fundamental source of international maladjustment" (1959, 307). He stated: "Perhaps the lack of a satisfactory definition of dollar shortage has helped to make its existence a widely accepted and rarely questioned article of faith" (1959, 309). Noting that gold and dollar holdings of foreign countries as a group (excluding the Soviet bloc) had risen by $ 16 billion between September 1949 and September 1958, Mikesell concluded as follows:

> Politically, the doctrine of dollar shortage provides a respectable sanction for all sorts of protectionist devices and a convenient whipping boy for conditions more often traceable to government policy-makers. The myth that there is an all-pervasive and enduring humor known as dollar shortage will be long in dying, even after economists stop trying to dignify it by scientific explanations (1959, 309).

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[27] Mikesell taught at the University of Oregon. At the 1944 Bretton Woods conference, Mikesell devised the original formula used to determine quotas, and thus voting power, for IMF members. He entered the dollar-shortage debate with a 1951 review (published in the *JPE*) of Kindleberger's 1950 book on the dollar shortage published in 1951 in the *Journal of Political Economy* (*JPE*). In that review, Mikesell called the dollar shortage "a highly controversial concept" but he did not express a view whether such a shortage existed (1951, 542).

[28] Mikesell's paper accompanied his December 1957 testimony before the Congressional Subcommittee on Foreign Trade Policy. In his testimony, Mikesell stated: "I do not think we have a dollar shortage ... so long as the world's supply of not only dollars but of other international payments media has been expanding in line with the total growth of trade and the needs of countries for increased reserves" (Subcommittee Hearings, 1958, 264-65).

At the end of the decade, Kindleberger would close the debate. On June 30, 1959, he appeared before the U.S. Congress Joint Economic Committee. He began by observing: "The accumulation of gold and dollars [in terms of exchange reserves of foreign countries] has been piling up year and year since 1950." Two main factors had contributed to this situation: (1) U.S. consumers "have looked abroad for more products" (Kindleberger, 1959, 951); and (2) foreign countries had closed "the technological gap" with the United States (Kindleberger, 1959, 952). In referring to the closing of the "technological gap," regarding the thesis that the dollar shortage was due to U.S. technical superiority, Kindleberger stated: "But I am also impressed by the fact that the technological gap which we had over Europe, which explained a good deal of our earlier success in exporting, a gap ... , seems to have petered out" (Kindleberger, 1959, 951-2). Finally, in his written statement accompanying his testimony to the Committee, Kindleberger wrote: "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" (Kindleberger, 1959, 956).

5. Revisiting the Debate

5.1 Assessment

Before revisiting this debate through the lenses of modern macroeconomic theory, it is useful to summarize its main points.

Definition: According to proponents of the dollar-shortage thesis, such as Kindleberger, the dollar shortage referred to the large and persistent (secular) balance of payment surpluses run by the United States, the supplier of the main reserve currency.

Causes: A large balance of payments deficit on the part of the U.S. trading partners means a large gap between their current account deficits and capital account surpluses. The debate completely ignored the capital account surplus part of the gap and focused exclusively on the current account (trade balance) deficit part. The current account (trade balance) deficits were attributed to the desire of those countries to improve their living standards quickly: raise consumption in the present and also create the conditions

for higher consumption in the future. In the short run, consumption can be raised by importing consumption goods; in the long run consumption can be raised by importing investment goods. The amounts of those imported goods that exceed the country's export revenue must be purchased on credit – otherwise, current consumption cannot be increased. The natural provider of consumption goods was the United States, which not only produced those goods more cheaply than other countries due to the technological superiority it enjoyed in manufacturing, but it could also supply them on credit due to its abundance of its financial wealth. The dependence on U.S. exports was persistent because there were no good substitutes for U.S. exportables.

Ramifications: The dollar shortage was consequential because it limited the quantity of U.S. exportables that could be purchased. As a result, it stood in the way of achieving higher consumption in both the present and in the future (by limiting the import of essential investment goods); and it had deleterious effects on international trade in goods and assets because it encouraged and justified protectionism (tariffs, capital controls, rationing). Even those who did not believe in the existence of a dollar shortage were concerned about the tenor of the ongoing debate because it offered cover to protectionism.

The participants in the debate disagreed over its causes and resolution. They can be placed into three main groups. Let us call the groups the Kindleberger, Bloomfield, and Friedman groups, respectively. The first two groups shared the view that the current account imbalance was primarily due to the persistent technological advantage that the United States enjoyed in manufacturing. Their main disagreement concerned the secularity of the current account imbalance.

The Kindleberger group viewed the dollar shortage as chronic -- that is, as something that could not be corrected either on its own through the process of income growth in the rest of the world, or through appropriate policy actions (such as an exchange rate devaluation, or changes to fiscal and monetary policies). The Bloomfield group was less pessimistic; it believed that the imbalances would self-correct over time through the effects of income growth on domestic savings and investment. The different assessments of the two groups owed to different assumptions about the values of the marginal propensities to save and invest out of income. Let us write the current account as CA = S – I (savings minus investment), and consider an increase in income, Y (say,

arising from an increase in exports, the main case discussed in the debate). Kindleberger's view was that dCA/dY = dS/dY – dI/dY was negative, so that income growth would lead to widening current account deficits. Bloomfield found such a scenario implausible, arguing that dS/dY – dI/dY had to be positive. If dCA/dY>0, the current account imbalance would become self-correcting as income grew. Neither side provided any theoretical reasons or empirical evidence to support its presumed set of parameters.

The Friedman group viewed the current account deficits as a by-product of bad government policy, in particular, the pursuit of fixed exchange rate regimes and price and capital controls that led to overvalued currencies vis-a-vis the dollar. It argued that the deficits would be eliminated, and any dollar shortage would cease to exist, if exchange rates were allowed to float freely.[29]

5.2.The debate through the lenses of modern macroeconomic theory

Suppose a present-day international macroeconomist was presented with the arguments discussed in the previous sections. Would the *concept* of dollar shortage be viewed as meaningful? Would the *diagnosis* of the causes of current account imbalances and the *prognosis* of its secularity be found to be tenable on the basis of modern theory? Could the present-day international macroeconomist offer a different perspective? Would that economist see any connections between older and more recent instances of dollar shortages? Would that economist expect dollar shortages to be a recurrent feature of the international monetary system in the future?

The canonical model of international macroeconomics, the intertemporal approach to the current account, views *secular* account imbalances as a natural byproduct of the process of income convergence across countries. Countries with a low level of capital relative to its steady state value are expected to be net borrowers, that is, to run trade and current account deficits. The funds borrowed are used for domestic investment purposes, which enhances the productive capacity of the economy and allows the repayment of the accumulated external debt in the future. They are also used for current consumption purposes (intertemporal consumption smoothing). The size of the current account deficit and its persistence depend mainly on the level and dynamics of a

[29] On Friedman's view on this issue, see Nelson (2024, chap. 1, 98-99).

country's income gap relative to the advanced economies. If there are no borrowing constraints, the amount of borrowing -- the current account deficit -- is optimal and the concept of dollar shortage is meaningless (the country gets the desired amount of dollars), and this is the case irrespective of the path of trade imbalances.

The concept of dollar shortage acquires a precise, formal meaning with the introduction of frictions in financial markets. A shortage corresponds to the difference (gap) between the amount of borrowing when financial markets operate smoothly and the amount of borrowing when they do not. Such gaps (wedges) are used in the literature to capture the effects of distortions and are ubiquitous in macroeconomics (see Chari et al., 2007). Note that according to the modern definition, the amount of dollar shortage is at a maximum when the borrowing constraint becomes extremely tight, that is, when a country cannot borrow at all (the current account deficit is zero). Hence, unlike the presumption in the earlier debate that a large current account deficit signifies (leads to) a large dollar shortage, the modern definition views a large current account deficit as evidence of a small – and possibly, no -- shortage.

Notwithstanding the theoretically-proper measure of a dollar shortage, Kindleberger's definition (the balance of payments deficit) is meaningful under fixed exchange rates 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 possibility of the existence of a borrowing constraint that 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.

Interestingly, Kindleberger seems to have been aware of the role of financial frictions in limiting the supply of loans by the United States as can be inferred from his statement that the world 'chronic shortage of dollars' is basically ascribable to the United States' failure to lend abundantly. But after making this point in his first 1943 paper, he switched focus from the capital account to the current account in his second 1943 paper. He did not provide reasons for this switch. Perhaps he presumed the existence of an unamendable upper bound on U.S. lending and chose to focus his

attention on what he viewed as the more amenable foreign account, the non-U.S. current account deficits, and asked whether they could be contained (on their own or through policy) to levels below this upper bound. This issue became the focal point of the debate. The failure to study the capital account seems puzzling in light of the main U.S. government international economic policy initiative at the time, namely the Marshall Plan, which clearly represented an attempt to alleviate Europe's borrowing constraints (capital account difficulties). Kindleberger's practical concern that a persistent balance of payments deficit would eventually exhaust a country's foreign reserves and gold, thus endangering its capacity to purchase vital investment goods, does not favor focusing on one rather than the other foreign account.

How did these large and persistent trade imbalances arise? Kindleberger's analysis identified two factors. The first was "the fact that other countries want to increase their standard of living faster than the facts of their economic productivity justify" (1943b, 380). We interpret this statement to mean that current production levels in those countries could not support a high level of current consumption as well a high level of investment required to support high economic growth and high future consumption. This generated high demand for foreign consumption and investment goods that had to be partly financed on credit given the limited domestic level of production. One can detect here an early application of the permanent income hypothesis/intertemporal approach to current account determination, which views secular current account imbalances as the means for achieving consumption smoothing and cross-country income convergence.

The second factor had to do with the postulated properties of the demands for imports. The foreign demand exhibited high income and low-price elasticities, while the U.S. demand exhibited low income and price elasticities. According to Kindleberger (1943b, 379), and in common with other participants in the debate (such as Bloomfield, Robertson and Samuelson), these properties derived from the continuing technological superiority of the U.S. in manufacturing. The United States could produce a variety of producers' and consumers' goods with a price and quality advantage so great as to be almost absolute. Kindleberger stated (1943b, 380): "under these conditions, the law of comparative advantage can establish equilibrium in international trade only with great

difficulty, especially since technological advance is being made in the United States at a rapid pace".

The claim that cross country differences in the cost of production (or, productivity) in a *particular* sector could matter for a country's current account position seems startling. In standard trade theory (such as in the Ricardian model) trade in goods -- which is based on comparative advantage -- and trade in assets (international borrowing) -- are disconnected. That is, comparative advantage has little to do with trade imbalances. Kindleberger was aware of this circumstance (see above quote about comparative advantage). We believe that his position that continuing U.S. technological superiority was the source of the large and persistent trade imbalances was based on absolute rather than comparative advantage.

Before offering support for this claim, let us first establish that continuing technological superiority can indeed lead to chronic trade imbalances. We have already noted that the intertemporal approach to current account determination predicts the existence of secular trade imbalances associated with the income convergence process in the world (the closing of the gap with richer countries). The imbalances are large and persistent when the income gaps are large and persistent. According to theory, the main determinant of income gaps is the gap in aggregate productivity. Readers familiar with the Ricardian trade model will immediately recognize that a country's aggregate productivity reflects its level of technology and represents its *aggregate absolute advantage*.

Did Kindleberger have this in mind when he attributed secular imbalances to secular technology differences in the world? We believe he did. We base this assertion on two statements he made. First, he argued that while the United States absolute advantage in many goods was large, "…the advantages of other countries over the United States in the production of other industrial goods are relatively narrow..." (1943a, 379-80). This pattern translates into a large aggregate absolute advantage of the U.S. vis-a-vis the rest of the world[30] and the existence of a large income gap to be closed through trade imbalances during the convergence process. And second, he suggested that the United States "…lend abroad continuously until productivity in other countries has increased

[30] This is under the plausible assumption thar productivity is similar in non-traded sectors, a common assumption in the extant Balassa-Samuelson literature.

to the point where the demand for [U.S.] ... goods is reduced in intensity" as a solution to the current account deficit (1943a, 351). This statement clearly refers to absolute advantage-income convergence.

On the basis of this interpretation, one can see that Kindleberger's pessimistic prognosis regarding the chronic nature of the current account imbalances must have reflected a view that the technological gap between the U.S. and the rest of the world would not shrink fast enough over time, or equivalently, that the process of cross-country income convergence would be very slow. His use of the term "continuing technological superiority" confirms this interpretation.

Let us now turn to the Kindleberger-Bloomfield debate. Kindleberger initially based his claim about the persistence of the current account on what he considered to be realistic values of the demand elasticities for exports. He was forced by Bloomfield (and others) to transit from the elasticities approach to the intertemporal approach to current account determination, which had the additional benefit that there was no need to rely on – unavailable -- empirical estimates of such elasticities and which are notoriously difficult to reliably compute in general equilibrium. The focus shifted to the alternative, intertemporal version of the current account definition (savings minus investment) rather than a trade-based version that focuses on exports and imports.

In this debate, economic theory favors the Kindleberger side under the proviso that one takes into account the key role played by frictions in international financial markets (which Kindleberger seems to have been aware of, even if his analysis did not acknowledge it explicitly). The canonical model without financial frictions implies that during the process of convergence to the higher income equilibrium, an increase in income has a positive effect on savings, with the size of the marginal prosperity to save depending on the income gap. And that it has no direct effect on investment: the marginal prosperity to invest (MPI) in a small open economy is zero as investment depends only on the real interest rate. Introducing financial frictions -- borrowing constraints -- makes investment depend on the amount of own funds (income). That is, $MPI > 0$ and the size of the effect depends on the severity of the financial friction. It is actually conceivable that dI/dY is not only positive, but also greater than unity, as investment augments the amount of capital which can serve as collateral and thus

enables more borrowing. Thus, Kindleberger's view that an increase in income could plausibly lead to a current account deterioration has solid theoretical foundations.

The third group's, (Friedman's) contribution to the debate was rather narrow and limited. This group did not address the fundamentals of the dollar shortage (cross country income gaps in a world with financial frictions). It preoccupied itself with how a simple policy, namely, the adoption of flexible exchange rates and the abolition of capital controls could help reduce the trade deficits, encourage a private capital inflow, and eliminate the dollar shortage. While this may be true in principle (depending on the values of trade elasticities, Kindleberger and Robertson believed that large devaluations, or in general flexible exchange rate adjustment, were either ineffective or politically infeasible to implement), it throws the baby out with the bath water. As argued above, current account deficits (even secular ones) can serve a useful economic purpose. Eliminating them through exchange rate policy that makes imports expensive and reduces their quantity can hurt rather than help the process of consumption smoothing and income convergence. The main culprit of a dollar shortage during the debate was world income disparities coupled with financial frictions, not the exchange rate regime in place.

Epilogue: The chronic dollar shortage ceased to exist by the late 1950s. Kindleberger fully acknowledged this development and attributed it to the technological catching up of the U.S. by Europe. His initial prognosis for a long-lived shortage proved erroneous not because his theoretical framework was faulty but rather because he simply misjudged the speed of the income convergence process in the world economy (the exceptionality of the U.S. economy).

5.3 Dollar shortages in our times

The thesis that financial frictions are a necessary condition for a dollar shortage receives further support from recent episodes of dollar shortages that afflicted advanced economies that operated floating exchange rates and possessed sophisticated financial markets.[31] These episodes regard the behavior of the U.S. dollar parity conditions, such

[31] Dollar shortages of the "original" type also emerged following the recent financial crisis. Reinhart (2016) argues that they concerned emerging economies that shared the key features characterizing the European countries during the original episode: namely, the desire to catch up, exchange rate targeting

as Covered Interest Parity (CIP). The U.S. dollar plays a crucial role in the international financial system, being the dominant currency in foreign exchange markets and cross-currency swaps, and also being extensively used in borrowing and lending activity by non-U.S. banks.

Beginning in 2007 and culminating during the 2010s, the CIP basis for various currency pairs with the U.S. dollar deviated significantly from zero. Recall that the CIP basis is the difference between two U.S. dollar interest rates, the direct and the swap-implied. Under smoothly functioning financial markets, arbitrage dictates that these two rates should be the same. If that were not the case, for instance, if borrowing dollars through the foreign exchange swap market was more expensive than direct funding in the dollar money market, then it would appear possible to make risk-free profits.

The U.S. dollar-Japanese yen CIP basis exceeded 75 basis points in both 2011 and 2016, an extraordinary amount. This means that investors chose to obtain dollars now and carry them forward, rather than enter into a swap contract that promised to deliver the same amount of dollars in the future. And by doing so, they sacrificed 75 basis points of return.

The 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 and anticipated demand for U.S. dollars (say, because of maturing dollar liabilities by non-US banks) combined with strains in global interbank markets (emerging concerns about counterparty risk and 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 U.S. Federal Reserve in order to allow non-U.S. banks indirect access to the Fed's liquidity facilities. This is an example of how a dollar shortage caused by financial frictions and regulations

and capital controls. As in the original episode, they manifested themselves in deteriorating balance of payments for these countries. Using Factiva, Reinhart (2016) provided a search of news articles from 2000 to 2016 in which the terms "dollar shortage," "black market," or "parallel markets" for foreign exchange appeared. We have updated her data (also using Factiva), through 2024. The number of news articles with the terms in the title rose from an average of less than 500 during 2000 through 2008, to an average of 1,400 during 2009-11. After easing to 800 in 2012, the number has been above 1,000 each year from 2013 through 2024.

were mitigated by the U.S. central bank's willingness to provide dollar liquidity globally. While the causes are different, the Fed's intervention served exactly the same purpose as the Marshal Plan in the aftermath of World War II.

Hence, what a shortage concerns and how it manifests itself can vary. In the earlier episode, as well in recent times in less developed countries, the shortage is identified from the balance of payments deficit. In the recent episode in advanced economies, it is identified from the size of the violation of CIP. In general, which quantity/price variables encapsulate the shortage depends on the characteristics of the prevailing international monetary and financial system. In a world with flexible exchange rate regimes and sophisticated financial markets, violation of *covered* U.S. dollar parities is a likely indicator of a shortage. In a world with fixed parities and capital controls, the balance of payments positions of US partners is the prevalent indicator of a shortage.[32]

It should be noted that while dollar shortage may always be present due to the existence of frictions in financial markets (by the definition of the dollar gap-wedge) they may go "unnoticed" when these frictions are small. It is typically during periods characterized by significant frictions that they become large and thus consequential.

What is the outlook for the future? It seems that the current format of certain financial contracts -- such as foreign exchange swaps -- implies that dollar (or, any other major international currency) shortages will remain a feature of global finance. Introducing collateral requirements in swaps might help eliminate the CIP basis but, given the scarcity of collateral, it would not eliminate the underlying financial frictions and would simply change the quantity/price indicator of the shortage. Note also that in common with all types of financial policies, commitment to liquidity provision by the Federal Reserve may help reduce the *actual* shortage at any point in time but at the expense of encouraging behavior in the financial markets that creates future shortage scenarios.

6. Conclusions

[32] Note that while the latter indicator captures *current* dollar shortages, the former captures expectations about *future* shortages. As a matter of fact, the term structure of the CIP basis is a precise indicator of the time path of future shortages.

Dominant currency (dollar) shortages have been a feature of the world economy throughout the past hundred years. We have offered a template for studying them that is based on the premise that their causes and severity derive from the existence and severity of financial frictions.

We have used the well known and consequential dollar shortage bracketing World War II -- the allegedly biggest problem of that time according to Samuelson -- and the associated debate as the background for developing this template. While the debate's main protagonist, Kindleberger, correctly identified its true cause as the unwillingness of the U.S. to lend abundantly, he and the rest of the participants did not make anything out of this circumstance, and chose instead to debate a subsidiary issue of great practical importance, namely, the determinants and persistence of current account imbalances. Nevertheless, and notwithstanding Kindleberger's misfocus, his analysis of the current account was remarkably close to that of the modern intertemporal approach to current account determination with financial frictions.

The elimination of foreign account imbalances through superior economic growth and convergence eliminated the need for persistent borrowing and consequently the borrowing-shortage nexus in *advanced economies*. But as the recent experience has shown, flexible exchange rates and sophisticated financial markets are not a panacea for other types of dollar shortages: even countries with a foreign current account surplus (the case of Japan) may suffer dollar shortages due to issues other than trade imbalances. We expect this to remain an issue in the future despite the adoption of policies to address it.

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