working paper 12 32

Bretton Woods, Swap Lines, and the Federal Reserve's Return to Intervention

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FEDERAL RESERVE BANK OF CLEVELAND

Working Paper 12-32 November 2012

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This paper describes the United States' first line of defense against shortcomings in the Bretton Woods system, which threatened the system's continuation as early as 1960. The exposition describes the Federal Reserve's use of swap lines both to provide cover for central banks' unwanted dollar exposures, thereby forestalling claims on the U.S. gold stock, and to supply dollar liquidity to countries facing temporary balance-of-payments deficits, thereby bolstering confidence in their parities. As suggested by the expansion and growing use of the swap lines, the operations failed to distinguish between temporary and fundamental disequilibrium forces. In substituting temporary for fundamental adjustments, the lines ultimately proved inadequate.

Keywords: Bretton Woods, intervention, swap lines, monetary policy.

JEL classification: F3, N1, N2.

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Bretton Woods, Swap Lines, and the Federal Reserve's Return to Intervention

The designers of the Bretton Woods system envisioned a cooperative international monetary arrangement that would foster financial stability and prevent a return to the beggar-thy-neighbor policies of the early 1930s. Under the agreement, the United States pegged the dollar to gold, pledging to buy and sell the metal freely at $35 per ounce. Other nations pegged their currencies to the dollar, promising to keep their exchange rates within a 1 percent band around that central rate by intervening in dollars. When faced with transitory balance-of-payments problems, countries with insufficient reserves could borrow from the International Monetary Fund (IMF), instead of quickly instituting deflationary macroeconomic policies. If faced with a more "fundamental disequilibrium," countries could adjust their parities.

Although the Bretton Woods system began operations in 1946, it did not become fully functional until after 1958, when the currencies of the key industrialized countries became convertible for current-account transactions.[1] By this time, however, the amount of outstanding U.S. dollar liabilities was fast approaching the value of the U.S. gold stock, implying that the United States might not be able to fulfill its pledge to convert dollars to gold. On 20 October 1960, the price of gold in the London market reached $40 per ounce—indicating that confidence in the Bretton Woods system was starting to wane.

In 1961, the United States began operations in the foreign-exchange market to protect the U.S. gold stock and to shore-up confidence in the dollar. The Federal Reserve, acting through a network of swap lines, formed the country's first line of defense. The swap operations often provided foreign central banks with cover for temporary, unwanted dollar exposures, thereby limiting the conversion of dollars into gold. Similarly, swaps offered deficit countries financing

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[1] The IMF *Articles of Agreement* allow restrictions on financial flows.

for short-term, reversible balance-of-payments deficits, thereby supporting their parities. The short-term nature of the swap mechanisms, however, suggested that the United States either did not recognize the fundamental natures of the problems confronting the Bretton Woods system, or expected foreign countries to make the necessary adjustments.

This paper explains the Federal Reserve's swap operations during the Bretton Woods era.[2] The analysis is based on a unique data set consisting of all U.S. foreign-exchange operations between 1961 and 1973 and on Federal Reserve documents.[3] The exposition starts by describing Triffin's paradox—a fundamental problem of gold-exchange standards—and by illustrating how cross-rate adjustment problems and U.S. inflation aggravated the situation. The paper then explains the U.S. decision to intervene. U.S. intervention attempted to provide liquidity and confidence to the Bretton Woods system without interfering with—and, therefore, addressing shortcoming in—the more fundamental adjustment process. Using the Federal Reserve's swap line with the Swiss National Bank, the paper illustrates how swaps provided cover against unwanted dollar reserves. Using the Federal Reserve's swap lines against the Bank of England, the narrative describes how swap lines provided temporary liquidity to deficit countries. It also touches on alternative uses of swaps and on the Federal Reserve's sterilization of such operations before explaining how the collapse of Bretton Woods created problems for the repayment of outstanding swaps. Throughout, the paper shows how swap operations successfully bought time for more fundamental adjustment, which then never came about. In this sense, the operations were ultimately a failure.

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[2] For an overview of Bretton Woods see: Meltzer (1991), Bordo (1993), and James (1996). Previous discussions of U.S. interventions during the period included Coombs (1976), Pauls (1990), Hetzel (1996) and Bordo et al. (2011).

[3] Bordo et al. (2011) provide a detailed history of U.S. foreign-exchange operations during the Bretton Woods era. We compiled our data from the Desk Report [1962 – 1973].

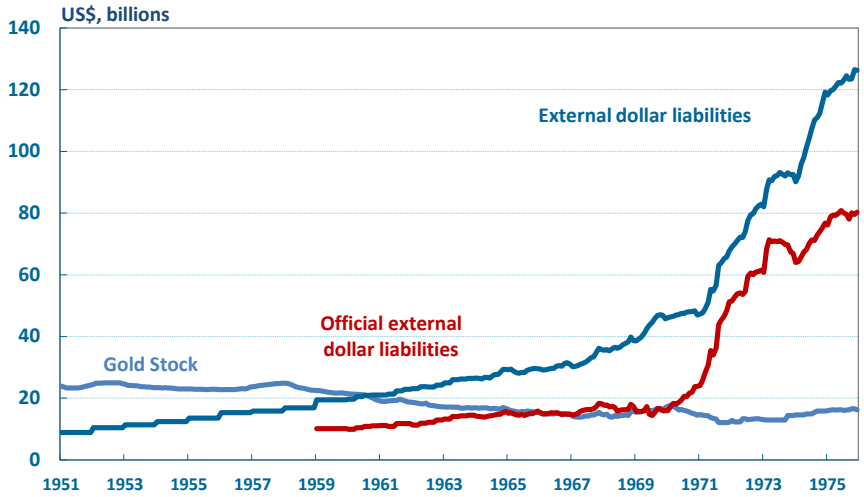
1. Triffin's Paradox

After the Second World War, the stock of gold and its global distribution could not adequately support the expanding volume of international trade and investment. The framers of Bretton Woods had set the official gold price at its pre-war value, but subsequent inflation drove the real price too low to induce a sufficient gold supply (Bordo 1993, James 1996, Meltzer 1991). The United States subsequently provided the needed liquidity by running persistent balance-of-payments deficits. Triffin (1957, 1960) recognized the paradox that this situation created: The very act of providing dollar liquidity threatened the viability of the Bretton Woods system, because once the stock of outstanding dollar liabilities exceeded the U.S. gold stock—and this was inevitable—the official dollar price of gold would lose credibility.[4] Central banks would then have a strong incentive to run on the U.S. gold stock, if they had not already done so. By 1960, outstanding dollar liabilities exceeded the U.S. gold stock (figure 1). Yet, without adequate liquidity, the system could not function.

Two other factors aggravated Triffin's paradox: First, financial flows out of devaluation-prone deficit countries—initially, for example, the United Kingdom and later France—plowed even more unwanted dollar reserves into surplus countries, notably Germany and Switzerland. This happened because traders shifted from weak currencies to dollars and from dollars to strong currencies. These flows did not expand the U.S. balance-of-payments deficit, but they, nevertheless, placed the U.S. gold stock at risk. Foreign central banks managed the dollar-gold composition of their reserves—sometimes backed by legal requirements—and divested themselves of "excess" dollars for U.S. Treasury gold to eliminate their exposure to exchange-rate risk. Another factor adding to the problem that Triffin described was inflation in the United

[4] Triffin (1960) recommended creating a source of non-dollar international reserves through the IMF. The IMF first issued Special Drawing Rights in January 1970, but the issuance came too late.

Figure 1: U.S. Monetary Gold Stock and External Liabilities



Source: Banking and Monetary Statistics 1941-1970. Washington D.C. Board of Governors of the Federal Reserve System. September 1976 Table 14.1, 15.1

States. After 1965, an accelerating U.S. inflation rate pumped even more dollars into surplus countries. With the closing of the U.S. gold window in August 1971, foreign governments had either to accept an inflation rate similar to that in the United States or allow their currencies to float against the dollar. By early 1973, they generally had chosen the latter remedy.

The Eisenhower and, initially, the Kennedy administrations did not seem to attribute the worsening U.S. balance-of-payments position to a fundamental flaw in Bretton Woods. Between 1957 and 1962, they attributed the adverse development largely to transitory factors stemming from U.S. military and economic aid commitments, recent cyclical developments, and the reemergence of Western Europe and Japan as global competitors. They undertook a series of policy initiatives—sometimes in conjunction with the international community, and sometimes in conjunction with the Federal Reserve—hopefully to hasten adjustment in the U.S. balance of payments and to improve the operations of the international financial system. These measures seemed to view the U.S. balance-of-payments problem as transitory.

Even as the unsustainable nature of the U.S. balance-of-payments position became increasingly apparent, U.S. policy makers were unwilling to make the appropriate policy adjustments in the 1960s. A fundamental balance-of-payments deficit required the United States to undertake a real dollar depreciation. One way of accomplishing this was through a nominal devaluation—a hike in the official gold price—but this was unthinkable at the time. It would impose wealth loses on central banks and individuals holding open positions in dollars, threaten the dollar's reserve currency status, and ultimately undermine the entire Bretton Woods currency grid. Moreover, a dollar devaluation against gold would have no effect on the U.S. competitive position unless surplus countries revalued their currencies against the dollar. Alternatively, the United States could achieve a real dollar depreciation through deflation, but administration and Federal Reserve policy makers, who believed that U.S. economic activity remained below its potential in the early 1960s, were unwilling to dampen U.S. aggregate demand to such ends. Instead, U.S. policy makers reacted in a manner suggesting that they expected foreign countries to accommodate their own currencies' real appreciations either by accepting higher inflation or by undertaking nominal revaluations. Consistent with this interpretation, the United States adopted a number of measures that did little more than by time; of these, exchange-market intervention became the most enduring.

2. Treasury Intervention

In March 1961, the U.S. Treasury's Exchange Stabilization Fund (ESF), with the Federal Reserve Bank of New York acting as its agent, began to intervene in the foreign-exchange market for the first time since World War II. The Treasury's operations consisted primarily of forward sales of German marks, Swiss francs, Dutch guilder, and Italian lira and aimed at

reducing the forward premia on these currencies against the dollar.[5] Forward premia served as barometers of market confidence in the dollar, and provided a strong incentive for financial flows when they exceeded levels consistent with existing interest-rate differentials.

Both the Treasury and the Federal Reserve viewed the interventions in 1961 and early 1962 as unmitigated successes (FOMC *Minutes*, 9 September 1961, p. 44), but a lack of resources severely limited the ability of the U.S. Treasury to mount another broad dollar defense. By late 1962, the ESF had a paltry $100 million worth of European currencies and only about $20 million to $25 million available for acquiring additional foreign exchange. To increase the funds available for such operations, the Treasury encouraged the Federal Reserve's participation in foreign-exchange operations. On 13 February 1962, after a lengthy debate about its authority for such actions, the FOMC authorized intervention in the foreign-exchange market.[6] By participating with the Treasury, the Federal Reserve hoped to reassert its dormant influence in this area (FOMC *Minutes*, 6 March 1962, p. 72).

As many FOMC participants understood, intervention operations needed to tread a narrow and uncertain path between offsetting temporary and reversible market disruptions and interfering with more fundamental market adjustments. Intervention ideally might prevent a sudden, reversible loss of gold, but if it delayed or somehow prevented a necessary policy change, the demand for gold would only grow, confidence in the official gold price would deteriorate, and the ultimate adjustment could prove more disruptive than in the absence of intervention (FOMC *Minutes*, 13 September 1961, p. 55). Moreover, prolonged interventions could undermine the willingness of private traders to make a market in foreign exchange (FOMC

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[5] The Treasury also undertook some limited spot transactions, and engaged in some gold swaps (see Bordo et al. 2011).

[6] On the debate about the Federal Reserve's legal authority for intervention, see Todd (1992) and Bordo et al. (2011).

Minutes, 5 December 1961, p. 60).[7] For these reasons, the FOMC favored operations aimed at safeguarding the value of the dollar and protecting U.S. gold reserves only from temporary market disturbances. They set up a mechanism for intervention—swaps—to reflect this approach. As time would tell, however, distinguishing between transitory and fundamental disequilibrium forces proved extremely difficult.

3. Swap Lines

From 1962 until the closing of the U.S. gold window in August 1971, the Federal Reserve relied on swap transactions as its key mechanism for temporarily defending the U.S. gold stock.[8] The Federal Reserve structured the *Reciprocal Currency Arrangements*—the official name for the swap lines—in a manner that emphasized the temporary nature of the operations and the Federal Reserve's intension to avoid interfering with more fundamental balance-of-payments adjustments. In addition, swaps lines had the another benefit: They did not force the Federal Reserve to acquire a broad portfolio of foreign exchange by selling dollars in the market or to dollar-laden central banks at a time when the dollar faced downward pressures.

In a typical swaps transaction, the Federal Reserve would sell U.S. dollars spot to a foreign central bank for that bank's currency and immediately sell that foreign currency back to the same central bank at a set future date and exchange rate. The repayment would terminate the drawing, but not the credit line. Central banks, in almost all cases, annually negotiated on a bilateral basis overall limits for their swap lines. Drawings initially had a term of three months, but could be renewed once, if both parties agreed. Ideally, banks were not to seek a second renewal, nor were they to continuously draw on a line for more than a year. Swap lines were

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[7] For some interesting parallels with developing countries and emerging market economies today, see Calanes-Kriljenko (2003, 2004) and Calanes-Kriljenko, et al (2003).

[8] The Treasury also maintained swap lines, typically on an *ad hoc* basis and often with developing countries to provide those countries with temporary loans. The Treasury's first swap line was with Mexico in 1936.

reciprocal, meaning the either party to the arrangement could initiate a drawing. Hence, the Federal Reserve's swap lines quickly became important means through which foreign central banks could acquire financing for temporary balance-of-payments deficits.

Swap drawings incurred no exchange risk, because both the spot and forward legs of the transaction occurred at the same exchange rate. The bank that drew on the line to intervene, however, was exposed to exchange risk since it did not know the precise price of obtaining foreign exchange to retire its swap drawing. The likelihood that the debtor bank would face a sizable loss (or default), however, was miniscule. As long as the par value remained credible, the central bank that drew on the line tended to profit from the operation. The bank initiating the drawing sold the foreign exchange against its own currency when the latter was trading below par and bought the foreign exchange to repay the swap when its currency had appreciated (Bodner 1970, p.1). Moreover, to protect the debtor central bank should the creditor central bank revalue its currency during the term of a swap, the lines included "revaluation clauses" that allowed the borrowing central bank to obtain sufficient foreign exchange from the creditor to repay its obligation at the exchange rate prevailing just prior to the revaluation. Because swaps were relatively safe, central banks did not apply conditions, such as the adoption of macroeconomic policies or the application for an IMF loan, to their use.[9]

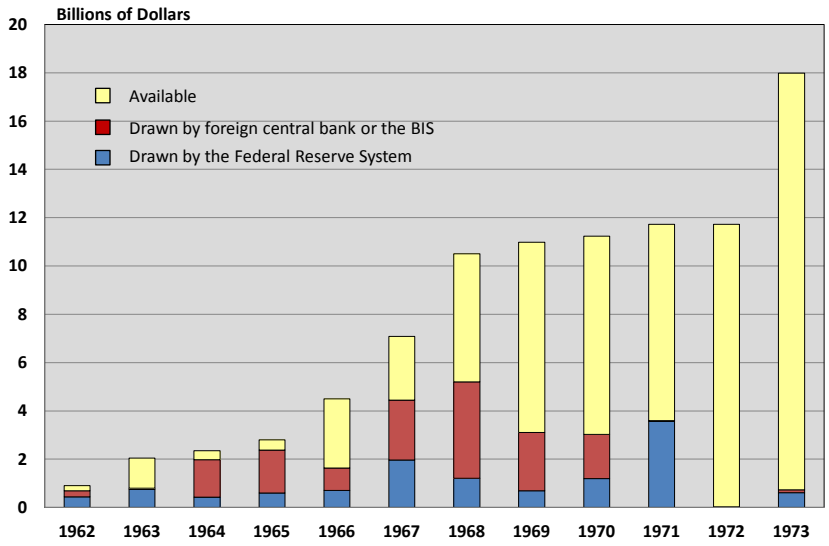
In all cases, the central bank initiating a swap also paid interest on its borrowings. The creditor central bank invested the foreign currency that it acquired from the debtor central bank for the term of the swap in a time deposit or in some other interest-earning asset. (The debtor would do likewise with any unused balances.) During the Bretton Woods era, the interest rates that the creditor and borrower received were both equal to the going rate on three-month

[9] As Bordo et al. (2010) explain, conditionality in the late 1970s, encourage the Federal Reserve to acquire a large portfolio of German marks and Japanese yen in the early 1980s and to end the use of swaps for intervention.

Treasury bills. If necessary, debtor central bank could effectively pay interest by adjusting the spot and forward exchange rates on the swap.

In March 1962, the Federal Reserve established its first swap line with the Bank of France. By the end of that year, the Federal Reserve had set up lines with eight key European central banks—Austria, Belgium, England, France, Germany, Italy, the Netherlands, and Switzerland—and with the Bank of Canada. Altogether, the lines provided up to $900 million equivalent in foreign exchange (see figure 2). The network continued to grow, and it evolved from a small, very short-term credit facility in 1962 to a large, intermediate-term facility by the closing of the U.S. gold window in August 1971. By then, the swap network totaled $11.2

Figure 2: Federal Reserve Swap Lines: 1962 –1973



Source: Federal Reserve System

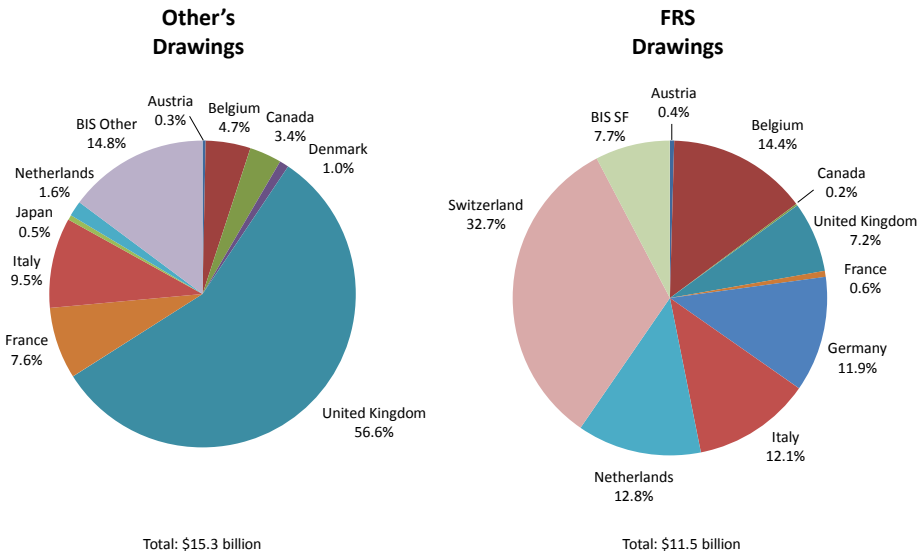
billion equivalent in foreign exchange and involved 14 central banks, having picked up the central banks of Denmark, Japan, Mexico, Norway, and Sweden over the intervening years. In addition, the term of a typical swap drawing increased from the original 3 months to 6 months. The expansion of the swap lines was a natural consequence of both the mounting threat to the

U.S. gold stock and the growing volume of international transactions, but the increasing length of swap drawings and the frequent tendency to renew them suggested that the underlying disequilibrium was more of a fundamental than a temporary nature.

Protecting the Gold Stock—the Swiss-Franc Example

Between 1962 and the closing of the U.S. gold window in 1971, the Federal Reserve borrowed $11.5 billion worth of foreign exchange through its swap lines (see figure 3). The Federal Reserve usually used these funds to provide foreign central banks with cover for their unwanted dollar balances. By far, the Federal Reserve's largest cover operations took place with

Figure 3: Composition of Swap Drawings 1962 –1971



Source: Federal Reserve System

the Swiss National Bank (SNB). Between 1962 and 1971, the Federal Reserve drew nearly $4.7 billion worth Swiss francs from swap lines with the Swiss National Bank and with the Bank for International Settlement (BIS) (Task Force *Paper #9*, 1990, p.11).[10] These operations offer a

[10] The System established a Swiss franc swap line with the BIS in 1962 to supplement its line with the Swiss National Bank, which faced statutory limits on loans to non-Swiss banks.

good example of the mechanics, the benefits, and the problems of the swap operations as a means for providing cover for unwanted dollars.

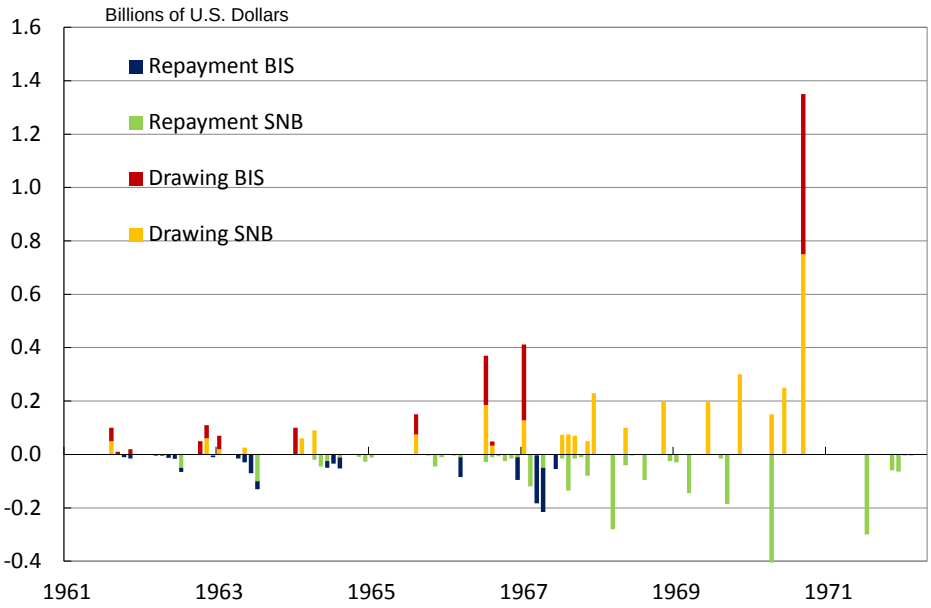
In mid-1962, persistent speculative inflows lifted the Swiss franc—a key safe-haven currency—to the upper limits of its parity range against the dollar. Forced to intervene, the SNB acquired U.S. dollars in excess of its informal limits. Charles Coombs, the special manager of the Federal Open Market Committee (FOMC) for foreign-exchange operations, feared that "Unless we can … mop up a sizable proportion of the dollars recently taken in by the Swiss National Bank we face the prospect of very large gold losses *which might easily trigger off an avalanche of demand from other quarters*." (FOMC *Minutes*, 10 July 1962, pp. 52-53; emphasis added).[11] In response, the Federal Reserve opened the two aforementioned Swiss franc swap lines, each for $100 million, and immediately drew $50 million worth of Swiss francs from each line to provide cover to the SNB (see figures 4 and 5).

The cover operation worked as follows: The swap drawing from the SNB gave the Federal Reserve $50 million equivalent Swiss francs and gave the SNB $50 million.[12] The Federal Reserve next used its Swiss francs to buy dollars from the SNB. This left the SNB with exactly the same amount of dollars as it held before the swap, but now the 3-month forward leg of the swap—selling dollars back to the Federal Reserve at a know exchange rate—covered the newly acquired dollars against exchange risk. Ideally, in three months the upward pressure on the Swiss franc would terminate.

[11] The FOMC, the Federal Reserve's monetary-policy authority, has responsibility for the Federal Reserve's foreign-exchange operations.

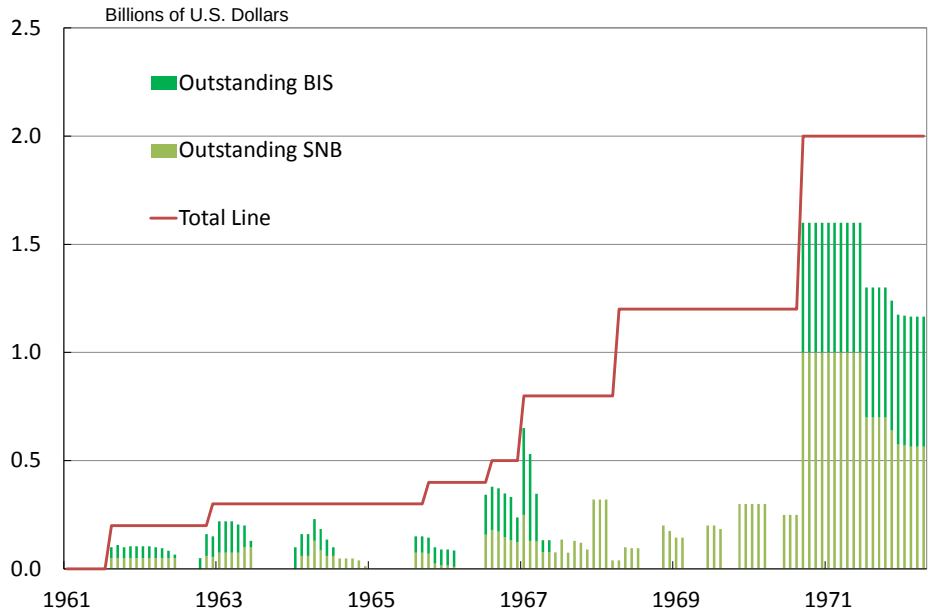
[12] This explanation ignores the $50 million equivalent Swiss francs obtained from the BIS. That amount was used to buy dollars outright from the SNB.

Figure 4: Federal Reserve Swap Operations in Swiss Francs



Source: Federal Reserve Board

Figure 5: Federal Reserve Swaps Outstanding in Swiss Francs



Source: Federal Reserve Board

Facing a short, three-month maturity date, the Federal Reserve quickly looked for opportunities to acquire Swiss francs to repay the swap. A window of opportunity presented

itself from late summer until the Cuban missile crisis in mid-October 1962, during which time upward pressures on the Swiss franc subsided. The Federal Reserve, however, could not acquire enough Swiss francs to pay off all of its outstanding obligations, because, despite the relative market calm, the Swiss franc often traded above its par value, and the FOMC prohibited the Federal Reserve Bank of New York's Foreign Exchange Desk from buying foreign exchange at exchange rates above par. Acquiring a currency above its par value might push it higher—a relatively small problem—but the action exposed the Federal Reserve to a valuation loss should the swap rate be at or below par—a substantial risk. Losses on its foreign-exchange operations might expose the Federal Reserve to accusations of mismanagement.

The Federal Reserve's second funding option was to buy the necessary Swiss francs directly from the SNB, but with dollars still trickling into Switzerland, the SNB was reluctant to sell Swiss francs to the desk and to acquire still more uncovered dollars in the bargain. On 2 October 1962, Coombs asked the FOMC to renew for an additional three months all outstanding Swiss franc swap lines with the SNB and the BIS. This seemingly innocuous roll-over, however, pointed to the fundamental and persistent problem with the swap network. How much time was necessary to distinguish between a temporary and a fundamental disequilibrium? When should the U.S. Treasury settle in gold?

In early 1963, a second window of opportunity opened, and the Federal Reserve managed to liquidate $80 million worth of its now $105 million equivalent Swiss franc obligation by buying Swiss francs in the market, from the U.S. Treasury, and from the SNB.[13] The Federal Reserve, however, also took a new tack. On 28 May 1963, the FOMC authorized the desk to swap $13 million worth of British pounds from its portfolio for Swiss francs with the BIS.

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[13] The Federal Reserve made additional net drawings of $5 million worth of Swiss francs on the BIS line in late 1962.

Despite the limits on swap maturities and rollovers, the Federal Reserve did not repay this drawing until the end of 1964—well over one year. Using this, so-called, third-party swap to extinguish the bilateral swap, however, did not discharge the Federal Reserve's short position, but merely changed the currency composition of that position and extended the maturity of the Federal Reserve's liability.

By mid 1963, rising Swiss money market rates attracted renewed dollar inflows, and following the assassination of President Kennedy in November of that year, the Swiss franc again reached the top of the parity band. The situation led to new rounds of intervention, with the Federal Reserve providing additional cover to the SNB. By early 1964, the Federal Reserve owed the SNB $75 million worth of Swiss francs and owed the BIS $145 million worth of Swiss francs.

Once again the Swiss franc traded above par, and the Federal Reserve could not acquire sufficient Swiss francs to repay its outstanding commitments. Consequently, in May 1964, the parties involved agreed on a series of measures to reduce the Federal Reserve's outstanding debt. The Treasury issued $70 million worth of Swiss-franc-denominated Roosa bonds to the BIS and sold the proceeds outright to the Federal Reserve, which repaid an equivalent amount of Swiss-franc debt to the BIS. Through this transaction, the BIS substituted long-term for short-term dollar-denominated debt on its books.

This transaction also illustrates the relationship that developed between the Federal Reserve and the Treasury with respect to intervention. While both agencies often operated in tandem, generally the Federal Reserve's swap lines represented the first line of defense. The Treasury, with its clearer legislative mandate for intervention, promised to backstop the Federal Reserve if it could not easily and quickly extricate itself from a swap operation. It typically did

so by selling foreign-currency-denominated certificates of indebtedness and later Roosa bonds. The Treasury would then maintain the foreign-exchange exposure.

In June 1964, the Bank of Italy swapped $100 million equivalent Italian lire for Swiss francs with SNB and sold the Swiss francs thus acquired to the Federal Reserve for dollars to bolster Italian reserves. The Federal Reserve retired its outstanding commitments to the SNB, but to do so, the SNB had substituted lira-denominated assets for dollar-denominated assets on its books. In late June, the Federal Reserve paid down its Swiss franc debt to the BIS with francs that it obtained via the U.S. Treasury from gold sales to the SNB.

In late 1964 and early 1965, funds again poured into Switzerland, and the Federal Reserve again drew on its Swiss franc swap lines to offer cover. This time, however, the situation quickly reversed and the swap lines operated as the FOMC initially intended. By spring, Swiss commercial banks began placing funds abroad, and the SNB eventually began selling dollars in support of the Swiss franc for the first time since 1962. Under these circumstances, the Federal Reserve was able to acquire Swiss francs in the market, from the SNB, and through transactions with other central banks to cover its outstanding obligations by mid-year. The Federal Reserve's swap line reverted to standby status although the Federal Reserve still had a Swiss franc obligation with the BIS stemming from a German mark cross swap. In 1966, funds again moved out of Switzerland and into the Eurodollar market, and the SNB sold dollars to moderate the franc's decline. To replenish its dollar reserves, the SNB sold Swiss francs to the U.S. Treasury and to the Federal Reserve. In addition, the SNB sold gold to the U.S. Treasury.

Operations to provide cover, both to the SNB and other central banks, persisted until the closing of the gold window in August 1971. The Federal Reserve frequently encountered

problems in unwinding its position similar to those experienced with Swiss franc swaps and resorted to similar fixes. All in all, however, the Federal Reserve's swap lines often succeeded in preventing countries from converting temporary inflows of unwanted dollar reserves into Treasury gold. Between 1962 and the end of 1969, Federal Reserve swap drawings totaled nearly $7 billion equivalent.[14] In general, reversals in flows into foreign countries—as described in the Swiss franc example—enabled the Federal Reserve to repay approximately three-fourths of its swap drawings. Repayments out of gold sales amounted to only $186 million. The issuance of U.S. Treasury bonds denominated in foreign currencies and U.S. drawings on the IMF financed the remainder. From the end of 1969 through 12 August 1971, the Federal Reserve drew $4.5 billion in foreign currencies through the swap lines. Suggestive of the deteriorating position of the dollar, the Treasury had to finance most of the repayments through the sale of reserve assets.

Temporary Liquidity—U.K. Pound Experience

The Federal Reserve's swap lines were reciprocal, meaning that foreign central banks could initiate drawings when they needed a temporary increase in their dollar liquidity. During the Bretton Woods era, providing liquidity became an important function of the swap lines. Between 1962 and 1971, nine foreign central banks initiated drawings totaling $15.3 billion (see figure 3). The United Kingdom accounted for more than one-half of these drawings. The Federal Reserve's swap operations with the Bank of England illustrate two key problems that the liquidity-provision aspect of swaps created during Bretton Woods: First, the dollar liquidity that swap drawings provided to the United Kingdom typically ended up as potential dollar claims against the U.S. gold stock on other central banks' balance sheets. Second, persistent swap

[14] The data in this paragraph come from Solomon (13 August 1971, pp. 3-4). We do not have comparable data for the entire 1962 through 1971 period.

drawings –and similar credits—allowed U.K. monetary authorities to avoid resolving a fundamental balance-of-payments disequilibrium, and arguably made the adjustment process more difficult.

In the 1960s, the U.K. pound was the second most widely held reserve currency, but observers questioned the viability of its par value because the United Kingdom's competitive position had deteriorated since the war's end and because the United Kingdom's reserve position seemed low relative to the country's growing balance-of-payments position (see Cairncross and Eichengreen, 2003). By 1963, the value of outstanding claims on pounds exceeded the United Kingdom's foreign exchange reserves (Bordo et al. 2010, p.192). These weak fundamentals lead to a series of speculative attacks, starting in January 1963 and culminating in the pound's devaluation on 18 November 1967.[15] Even after the devaluation, the pound remained vulnerable to speculative sales.

The pound's persistent weakness threatened the U.S. dollar for two closely related reasons: First, as noted above, speculative financial flows out of U.K. pounds and into strong European currencies, like the Swiss franc and German mark, moved through U.S. dollars. These flows increased the amount of unwanted dollar balances in European central banks and raised the prospects that these banks would convert the surfeit into U.S. gold. Second, U.S. policy makers feared that sustained speculative runs could force a pound devaluation, which many other countries might quickly follow. Pressure would then shift to the viability of the dollar's official gold price and critically undermine Bretton Woods. As went the pound, so would go the dollar.

Speculative pressures against the pound intensified in January 1963 after French President Charles de Gaulle rejected the United Kingdom's bid to join the European Common

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[15] In fact, the U.K. pound experienced several crises between 1945 and 1962, when the Federal Reserve began intervening (see Cairncross and Eichengreen 2003).

Market. The United Kingdom quickly negotiated $250 million in short-term credits with various European central banks in February, but did not publically announce them until April 1963. On 19 May 1963, the Federal Reserve announced a ten-fold increase in the swap line with the Bank of England from its initial $50 million to $500 million (*Bulletin*, September 1963, p.1220). Often during Bretton Woods, the announcement of available credits proved as effective as their actual use because their existence raised the potential cost of speculating on a currency's devaluation. Suggesting as much, the Bank of England did not draw on the $500 million swap line with the Federal Reserve during this crisis phase.[16] For this same reason—increasing the potential cost of a speculative attack—the amount of credit available through the various swap lines usually greatly exceeded the amount that central banks needed, as revealed in figure 2.

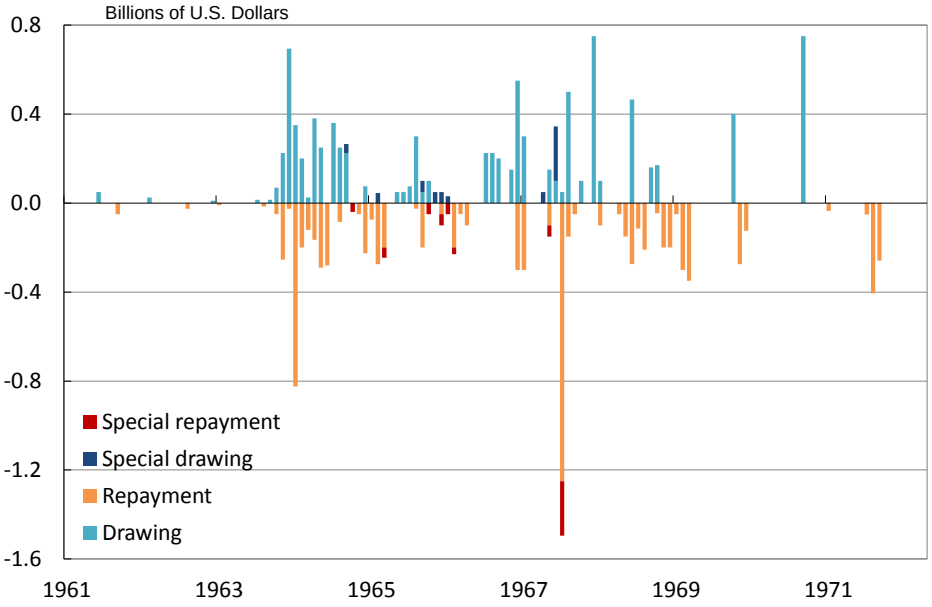
The pressures on the pound subsided in late 1963 but did not completely abate until the summer of 1964. Then, interest-rate differentials favored the movement of funds into U.K. pounds. In response, the Federal Reserve undertook $54.2 million worth of swap transactions *with the market*, buying pounds spot against dollars and simultaneously selling them forward. These transactions looked to discourage financial flows into pounds by increasing the forward discount on U.K. pounds. While such transactions had the obvious advantage of leaving the Federal Reserve's position covered, they carried an unforeseen cost. The forward leg of these swaps—pound sales—would come due when the pound was under serious downward pressure. At the time of their initiation, however, policy makers interpreted the situation as temporary—not fundamental.

By late summer 1964, the pound's prospects began to reverse. The United Kingdom negotiated a $1 billion standby credit with the IMF and $500 million in multi-currency swap

[16] The Federal Reserve had drawn $25 million on the $50 million swap line in January 1963 and repaid it in May 1963. Buying pounds to repay this swap drawing helped support the pound. In addition, the U.S. Treasury purchased $8.4 million worth of pounds in March 1963.

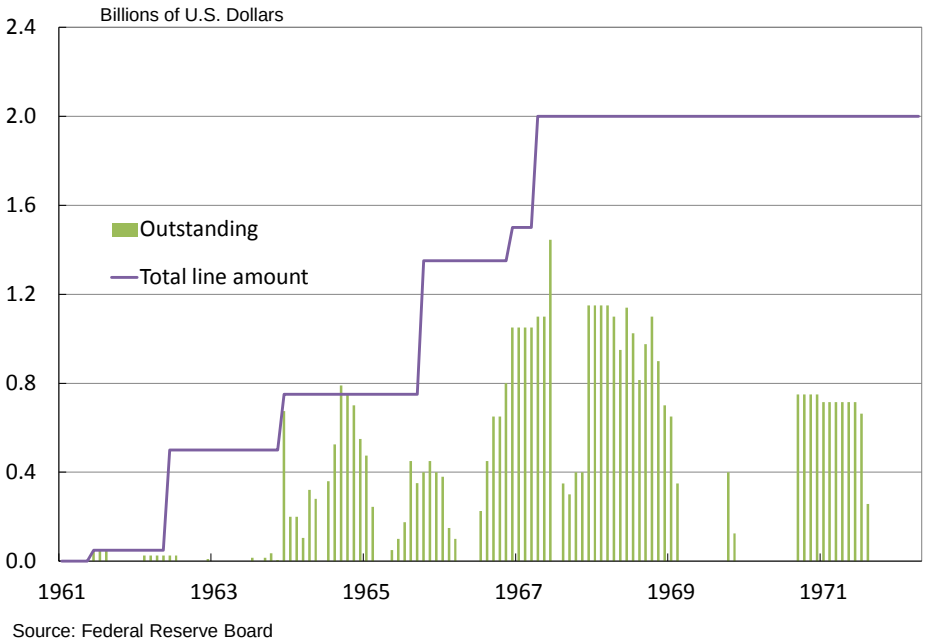
lines with several European central banks and the Bank of Canada. These credits were sorely needed after Britain elected a Labour Party government in October 1964. With the pound under intense pressure, the United Kingdom drew heavily on its various swap lines, including its swap facility with the Federal Reserve (figure 6). These credits were quickly exhausted and in late November 1964, the United Kingdom sought another $3 billion short-term international credit package, which included a $250 million increase in the Federal Reserve's swap line with the Bank of England (figure 7). This brought the swap line to $750 million. The Bank of England immediately drew down $695 million.

Figure 6: Federal Reserve Swap Operations in U.K. Pounds



Source: Federal Reserve Board

Figure 7: Federal Reserve Swaps Outstanding in U.K. Pounds



Source: Federal Reserve Board

After mid-1964, the nature of the Bank of England's swap operations became inconsistent with the supposed temporary nature of the lines. The Bank of England continued to draw almost continuously between June 1964 and August 1965, and it would continue to draw heavily on the line—though less frequently—through 1969. After October 1964, these drawing increased substantially and, as figure 6 indicates, the Bank of England began quickly borrowing and repaying large amounts within the same month. The Bank was operating on both sides of the foreign-exchange market within a short time frame in its efforts to defend the pound and repay its obligations. On balance the outstanding amount grew, reaching nearly $790 million in August 1965—a large potential claim on the U.S. gold stock.

While drawing on its swap lines and other international credits, the United Kingdom failed to address its fundamental balance-of- payments problems and, therefore, failed to instill confidence in the pound (Coombs 1976, p.12). In May 1965, with its reserves and credit lines

nearly exhausted, the United Kingdom drew $1.4 billion in credits from the IMF and Switzerland and repaid its outstanding obligations. Many of its credit lines then terminated. By June, however, the Bank of England was again drawing on its swap line with the Federal Reserve, and by August 1965, the Bank of England had drawn down the entire $750 million swap line. On 31 August 1965, the Federal Reserve and the Treasury extended the Bank of England a special one-day $140 million swap-style credit that allowed the Bank of England to temporarily pump up the nation's coffers on the day when the Bank published the nation's official reserves. The United States would repeat these one-day operations.

In September 1965, the United Kingdom received a new credit line, but France now refused to participate. The United States agreed to buy up to $400 million worth of pounds outright in the foreign-exchange market provided that the Bank of England promised to purchase the pounds from the Federal Reserve at their initial exchange rate if the United Kingdom devalued the pound.[17] The enlarged operations and a fortuitous improvement in the U.K. balance of payments checked the 1965 currency crisis.

When the United Kingdom's credit lines came up for renewal March 1966, foreign central banks had lost faith in the country's willingness to make fundamental adjustments. By then, sterling area governments were looking to convert their reserve balances out of pounds. Creditors to the United Kingdom offered financing for the conversion of these balances, but not for the covering further balance-of-payments deficits. Moreover, they limited their loans to the amount of credits that the United Kingdom still held with the IMF.

In February 1966, the pound again fell below par, prompting renewed defense operations. To signal confidence in the British intervention efforts, the United States made huge—$144.7

[17] At the time, the Federal Reserve usually conducted its market interventions through the brokers market using a commercial bank as its agent. Otherwise, the Federal Reserve remained anonymous. Now, the Federal Reserve bought directly from commercial banks, and the market knew that the Federal Reserve was intervening.

million equivalent—spot purchases of pounds in June and July. At the same time, however, the United States had to deliver $66.6 million worth of pounds to settle previous forward contracts. In addition, to hide a huge $300 million Bank of England swap-line drawing on its weekly statement of operations, the Federal Reserve swapped $88.2 million worth of pounds for dollars for one day with the Treasury on the last day of the statement week (Desk Report 1967, p.10).

Pressure on the pound subsided in the summer, but foreign central banks were now extremely reluctant to supply further credits to the United Kingdom (Coombs 1976, pp. 138 – 143). The United States decided to shoulder a greater burden, and the Federal Reserve increased its entire swap facility—all currencies—from $2.8 billion to $4.5 billion. This included an 80 percent increase in the United Kingdom's swap line to $1,350 million. Underlying this multicurrency action was the fear that if the pound came under speculative attack, the dollars expended to support the pound very likely would end up in the portfolios of other central banks. The Federal Reserve might then need to provide these banks with cover through swap drawings to protect the U.S. gold reserves (Coombs 1976, p. 141).

An increased demand for pounds followed the announced expansion of the swap lines and credit facilities as traders sought to cover short positions. Interest rates spreads subsequently began to favor pounds and the United States again engaged in market swaps to lower the forward discount on pounds. Fortuitously, the United Kingdom posted its first post-war trade surplus in November 1966. With funds moving into pounds, the United Kingdom was able to repay its obligations to the United States. The Federal Reserve expected the full payment of outstanding swap balances by June 1967, but this expectation proved premature.

By early June 1967, expectations of an imminent Middle East conflict caused financial flight out of pounds. The Bank of England began losing foreign-exchange reserves and, as the

situation worsened, the Bank drew heavily on its swap line with the United States and credit arrangements with other central banks. The United States began intervention purchases of sterling. Despite these interventions and increases in the Bank of England's discount rate, selling pressures persisted and intensified. On 18 November 1967, the United Kingdom devalued the pound by 14.3 percent.

After the pound's devaluation, the United Kingdom received additional international credits to defend the new parity. The Federal Reserve increased its swap line to $1.5 billion in late November 1967. The pound initially traded well above its new parity, but by the end of 1967 it had weakened. During 1968 and 1969, the pound generally remained under downward pressure as countries sought to diversify out of sterling and rumors of a German mark appreciation and a French franc devaluation heightened uncertainties about the long-term viability of the pound's new parity. The United Kingdom sought additional credit lines and the Federal Reserve raised its swap line with the Bank of England to $2 billion in March 1968. Swap drawings raised the outstanding balance to $1.4 billion by May of that year. Following the French franc devaluation in August of 1969 and the revaluation of the German mark in October 1969, the pound began to stabilize and strengthen. By December 1969, the pound rose above par for the first time since April 1968, and by early 1970, the Bank of England had liquidated its swap debt with the United States.

The devaluation of the British pound soon increased demand for gold, which began pushing the market price above the official price. Countries participating in the Gold Pool—a consortium to keep the market price of gold near the official price—subsequently sold $3 billion worth of gold before the collapse of the Gold Pool in March 1968. Although the United States financed most of the gold sales, the other participants' gold sales only resulted in their further

accumulation of unwanted dollar balances. Increasingly, Gold Pool participants believed that the United States should absorb those dollars through an IMF drawing, rather than through swap operations, and that the United States should take corrective actions to reduce the U.S. balance-of-payments deficit (FOMC *Minutes* 12 December 1967, pp.17 – 19). They viewed the U.S. balance-of-payments problem as fundamental.

Other Uses Swaps—Eurodollar Intervention

The Federal Reserve established a second swap line—in addition to its Swiss franc line—with the BIS in 1965 to provide that bank with a means of acquiring temporary cash for routine transactions and to provide the Federal Reserve with access to additional foreign currencies. Previously the BIS had borrowed against gold that it held at the Federal Reserve Bank of New York. The Federal Reserve soon began using this swap line to supply funds to the Eurodollar market during times of strain when high Eurodollar rates would draw funds from the United States (Task Force *Paper #9*, 1990 p. 12). The Federal Reserve asked the BIS to draw dollars on its non-Swiss franc swap line and to place the funds in the Eurodollar market.[18] Previously, the Federal Reserve had asked foreign central banks to place dollar balances in the Eurodollar market during times of stress, particularly if the stress threatened to affect the foreign-exchange market. The Federal Reserve sometimes provided forward cover to facilitate such operations (MacLaury 1969, p.10). These placements became fairly routine but were often insufficient to the task. The Federal Reserve intended the BIS operations as a supplemental arrangement. The Federal Reserve chiefly undertook BIS interventions under two circumstances: a spike in Eurodollar interest rates and downward pressure on the British pound (MacLaury 1969, p.12). Almost all such drawings were repaid within a month, either at, or prior to, their maturity date.

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[18] Much of the information in this section is from MacLaury (30 January 1969) and pertains to operations prior to 1968. We have no information on such operations after 1968.

The only exception occurred in a November 1967 drawing that extended for two months. After the United Kingdom, the BIS was the heaviest drawer on the U.S. swap lines, accounting for nearly 15 percent of the drawings between 1962 and 1971.

Sterilization

Swap drawings had the potential to affect U.S. bank reserves, depending on what the Federal Reserve did with the foreign currency that it received—the desk can buy dollars or hold and invest the funds—and on what the foreign central bank did with the corresponding dollars—it could buy foreign exchange, buy Treasury securities, hold a deposit at the Federal Reserve, or place the funds in the Eurodollar market. In any case, the Federal Reserve could easily sterilize the transaction to any extent that it found necessary. The Manager of the domestic desk, in determining the appropriate amount of open-market operations to undertake on a particular day, regularly took account of changes in foreign accounts at the Federal Reserve, changes in Treasury cash balances, changes in float, and changes in the amount of currency in circulation. Swap drawings can affect many of these factors. In addition, close communications between central banks and with the BIS generally kept the desk appraised of any prospective swap drawing and aware of the anticipated use of the funds. The desk's ability to sterilize was further enhanced because the value date of a swap drawing occurs two business days after the transaction date. McLaury (1969, p. 9) summarized the Federal Reserve's review of sterilization:

> In practice, the size of foreign drawings, large as they have been at times, has not been more than the domestic trading desk could offset—for the most part immediately—through open market operations. So long as the availability of the swap line is unconditional, the reserve consequences of foreign drawings are one of the operating factors that the Manager for domestic operations has to take into account in determining the size or direction of his own operations

> in any given day or week. They thus fall in the category of changes in Treasury cash balances, changes in float, and changes in currency in circulation. (McLaury 1969, p. 9).

The effect was no different than the normal, non-swap problems that the desk faces because of the dollar's reserve and vehicle currency status.

4. Swaps and the Collapse of Bretton Woods

Although much of the exchange-market turmoil during the late 1960s reflected the misalignment of cross-rates among foreign countries, notably the United Kingdom, France, and Germany, a new more profound threat to Bretton Woods—an accelerating U.S. inflation rate—was slowly taking precedence. These cross-rate problems did not directly reflect U.S. balance-of-payments developments and eventually terminated in revaluations. As they unfolded, however, inflation in the United States rose from below 2 percent in 1964 to above 6 percent by the end of 1969. By 1970, Bretton Woods faced an inflation-induced dollar crisis. The Nixon administration, however, shifted much of the blame, contending that the United States' major trading partners were deliberately discriminating against the United States. The administration adopted a position of "benign neglect" about the growing U.S. balance-of-payments deficit and the U.S. commitments to Bretton Woods (Coombs 1976, pp. 204 – 211).

Despite some earlier tightening in monetary policy, the onset of a recession in early 1970 induced the Federal Reserve to again loosen monetary policy and to maintain an accommodative stance in 1970 and 1971. By 1969, however, many European countries were tightening monetary policy to ward off inflation pressures. Even when European countries lowered interest rates, as they eventually had to do, their movements typically lagged those in the United States during this period. This interest-rate pattern induced heavy financial flows out of dollar-denominated assets. Initially, much of the dollar flows went to United Kingdom and France,

which needed to rebuild reserves and repay debts (*Bulletin* September 1971, p. 783). The dollar reflows, however, quickly became a problem for countries like, Germany, Italy, Belgium, the Netherlands, and Switzerland. Dollar inflows pushed their currencies to their upper parity limits vis-à-vis the dollar, forcing their central banks to intervene. In many cases, the acquisition of dollar reserves offset domestic monetary restraint programs designed to reduce inflation.

By the summer of 1971, confidence in U.S. monetary policy was rapidly evaporating and a crisis atmosphere was emerging in the foreign-exchange market. Inflation in the United States remained relatively high despite slow economic growth and high unemployment. The U.S. balance-of-payments continued to deteriorate. Speculation against the dollar was intensifying, and the Treasury began losing large amounts of gold (Coombs 1976, p. 215). On 15 August 1971, President Nixon closed the gold window. He also ordered a 90-day wage-and-price freeze and introduced a 10 percent surcharge on dutiable imports. The announcements surprised the major European governments, who quickly closed their foreign-exchange markets. When they reopened them, they formally adhered to their parities, but suspended their commitment to defend them. The foreign currencies continued to appreciate despite heavy intervention, and foreign central banks continued to accumulate dollar reserves. Many adopted or tightened foreign-exchange restraints.

In 1971, prior to the closing of the U.S. gold window, the Federal Reserve frequently initiated large swap drawings to forestall foreign central banks from converting their growing excess dollar balances into U.S. monetary gold. On 1 January 1971, the Federal Reserve had outstanding swap commitments of $810 million. By July 1971, the Federal Reserve reduced this amount to $605 million with the aid of U.S. Treasury sales of gold and SDRs, borrowing from the IMF, and the issuance of foreign currency-denominated securities. But, as funds continued

to flow abroad, the Federal Reserve—with U.S. Treasury backstopping the operations—drew $2.2 billion from swap lines to provide further cover against central banks' dollar balance through 13 August 1971.

After that date, the Federal Reserve made no further drawings on its swap lines. At the end of August 1971, the Federal Reserve had outstanding swap obligations of approximately $3.0 billion in U.K. pounds, German marks, Swiss francs, and Belgian francs (Task Force Paper #10, p. 21).[19] The Federal Reserve now encountered difficulties in repaying its outstanding swaps because most foreign countries objected to the Federal Reserve buying their currencies when they were appreciating in the market. They preferred instead to roll-over existing swaps obligations, until new parities were established and financial flows reversed course (FOMC *Minutes*, 16 November 1971, p. 15; *Bulletin*, September 1971, p. 787). Dollar devaluations in December 1971, under the Smithsonian Agreement, and in February 1972, failed to restore confidence in Bretton Woods and also created substantial uncertainties about the United States' outstanding swap obligations.

As noted, swap obligations included revaluation clauses that protected a country initiating a swap drawing in case the creditor country revalued its currency. In such cases, the creditor country was to provide the debtor country sufficient funds at the pre-revaluation exchange rate to extinguish the drawing. The upward drift of many currencies against the dollar and the Smithsonian Agreement had created uncertainty as to whether, and to what extent, the dollar had been devalued or foreign currencies revalued. In 1972, the position emerged that a broad-based appreciation of foreign currencies against the dollar implied a dollar devaluation (FOMC

[19] The U.S. Treasury had outstanding obligations totaling nearly $1.8 billion (Task Force paper #10, p.21).

Minutes 21 March 1973, p. 63). Hence, the revaluation clauses did not legally apply, and the United States faced a substantial loss on its outstanding swap obligations.

The Federal Reserve did not have much difficulty in paying down its outstanding swap obligations in German marks and U.K. pounds. The desk had purchased marks and pounds in the market and also acquired marks from the Bundesbank in a sufficient amount to repay its swap obligations against these currencies in summer 1972.

The Federal Reserve, however, had difficulty extinguishing its Belgian and Swiss obligations. In part, the difficulty resulted because the National Bank of Belgium and the Swiss National Bank did not want the Federal Reserve to buy their currencies in the market when both currencies were relatively strong. The Federal Reserve did manage to make some small purchases of both currencies throughout 1971 and 1972, but in December 1973, the Federal Reserve halted such purchases at the U.S. Treasury's request. The Treasury did not want the Federal Reserve to make further payments on its swap obligations until the United States reached a risk sharing agreement with Belgium and Switzerland.

The Federal Reserve did not reach such an agreement with these central banks until December 1975. The Federal Reserve then managed to liquidate the swap line with the National Bank of Belgium by November 1976 and that with the Swiss National Bank by April 1979. The Federal Reserve and the Treasury took seven and one-half years to pay off their pre-August 1971 debt obligations. The estimated losses to the Federal Reserve and the U.S. Treasury on these obligations were $989 million and $1.5 billion respectively (Task Force Paper #10 1990, p. 25)

5. The Fundamental Lesson

The Federal Reserve's vast swap network formed the first line defense in U.S. efforts to forestall Treasury gold losses and to instill confidence in the Bretton Wood parity structure.

Although the operations sometimes became rather convoluted—with the United States and other countries extending maturities, expanding borrowing limits, and trading obligations in one currency to cover obligations in another—they often proved successful in buying time for more fundamental adjustment. But, as eventually became clear, the large industrialized countries were unwilling to pursue fundamental adjustment. In the end, they would not subordinate their domestic policy objectives—they ones most important to their electorates—to the rigors of fixed exchange rates. The United States would not depress real economic activity to achieve a real dollar depreciation, and surplus countries were unwilling to inflate their economies to achieve a real appreciation. Special Drawing Rights, Triffin's (1960) solution to his paradox, arrived too late to be of any use, and countries were unable and unwilling to bottle up financial flows. Absent a political consensus for such fundamental adjustments, the Bretton Woods system could not remain credible. In that sense, the swap mechanism was a failure: it maintained an ultimately unsustainable arrangement, arguably making the inevitable adjustment more difficult.

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