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Notes

1. On the Evolution of US Foreign-Exchange-Market Intervention: Thesis, Theory, and Institutions

1. Useful surveys of the theoretical underpinnings and empirical effectiveness of foreign-exchange-market intervention include Dominguez and Frankel (1993b), Edison (1993), Almekinders (1995), Baillie, Humpage, and Osterberg (2000), and Sarno and Taylor (2001). Surveys of central banks' views are found in Neely (2001, 2007) and LeCourt and Raymond (2006), and surveys of market participants' views are found in Chueng and Chinn (2001). Neely (2005) also considers some econometric issues. Almekinders and Eijffinger (1994, 1996) and Baillie and Osterberg (1997) focus on reaction functions. While for the most part this book does not consider intervention among emerging and developing countries, Canales-Kriljenko (2003, 2004), the BIS (2005), and Ishii et al. (2006) contain surveys of that topic.

2. For a basic statement of the trilemma see Feenstra and Taylor (2008, 585–87).

3. The Federal Reserve Act requires the Federal Reserve to "promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates." This three-part object is generally expressed as the Federal Reserve's "dual mandate"—price stability and maximum employment—assuming that moderate interest rates result from achieving the "dual mandate." Most policymakers accept long-term price stability as a precondition for achieving both high employment and moderate long-term interest rates (see *Board* 2005).

4. Central banks will occasionally time these transactions to maximize or minimize their influence on exchange rates. In such circumstances, these commercial or customer transactions constitute a type of "passive intervention," as Adams and Henderson (1983) first described.

5. As O'Rourke and Taylor (2013) have recently pointed out, the trilemma is a simplification, but still a useful organizing mechanism. Historical evidence—as shown in this book—support its predictions. Also see Obstfeld, Shambaugh, and Taylor (2005).

6. Wages and prices were more flexible during the classical gold-standard era than today, but they were becoming less flexible after 1890 (Hanes 1993, 2000). In addi-

tion, banks and governments issued notes and currency on fractional-reserve bases, which gave rise to runs during uncertain times.

7. By "real" we mean an event that affects relative prices, such as terms-of-trade shocks, changes in productivity growth, or commodity price shocks.

8. This is an issue that deserves further study.

9. For small, advanced countries with relatively thin domestic securities markets, like Switzerland, the purchase of foreign exchange might offer a mechanism through which to conduct a quantitative-easing type of monetary policy. See our epilogue.

10. The portfolio balance mechanism also assumes that no restrictions exist on cross-border financial flows and that Ricardian equivalence does not hold.

11. Many models and empirical applications assume that relative changes in the stock of securities leave interest rates unaffected because monetary policy determines interest rates. Nevertheless, interest rates can be part of the adjustment process.

12. Consider also the voluminous literature on Taylor Rules.

13. This issue becomes critical to our story in chapters 5 and 6.

14. See chapter 5.

15. See Taylor (2005), Reitz and Taylor (2008), and Sarno and Taylor (2001).

16. Cheung and Chinn (2001, 462–64) report that traders are about evenly split on their assessment of intervention's effectiveness. Traders also suggest that intervention increases exchange-rate volatility, but a higher volatility can be consistent with market efficiency. Neely (2001, 2007) and LeCourt and Raymond (2006) report that central banks believe that intervention is effective.

17. The effect of the size of an intervention for the probability of success seems fairly robust across samples. The effect of coordinated intervention on the probability of success seems less robust. Humpage (1999) found support for coordination over the 1987 through 1990 period. Bordo, Humpage, and Schwartz (2012) find little support of coordination over the entire US experience. Still most research finds that coordination increases the effectiveness of intervention.

18. What constitutes coordination may be a trickier concept than often imagined. Most studies define coordinated intervention as occurring when the two central banks, whose currencies define the exchange rate, intervene in the same direction on the same day. Often, however, central banks will intervene for a long string of days. Over these periods, a bank may intervene on consecutive days in concert with the other central bank. Sometimes, however, one bank will skip a day or a few days, while the other bank intervenes on those days. Should these events be considered coodinated? What about the actions of third party central banks?

19. This section draws on Schwartz (1997). See also Henning (1999, 2008) and Osterberg and Thomson (1999).

20. In 1988 and 1990, for example, the ESF made temporary stabilization loans to Yugoslavia and to Hungary, respectively, whose currencies were of little economic importance to the United States, but the loans fostered foreign-policy objectives.

21. Since the late 1970s, Congress has imposed some oversight on operations and on the financing of the ESF, but these are largely after-the-fact reporting requirements. Fund operations remain squarely within the purview of the Treasury (Henning 2008).

22. Leahy (1995) and Task Force (1990e, Paper no. 10) calculate profits using an alternative formula. Their profit estimates, unlike the official calculations, take explicit account of the opportunity costs of holding foreign exchange. These calculations show that the United States has earned an overall cumulative profit on its accounts, that the United States has sometimes incurred losses on the accounts, and that the variability of the returns on the portfolio has risen with the portfolio's size.

23. Friedman's criterion considers only valuation gains and losses; it also abstracts from any net interest earnings.

24. Osler (1998) suggests that more elaborate trading rules, specifically head-and-shoulders rules, largely mimic much simpler rules.

25. The relationships among intervention, profits, and the private sector factor into our narrative several times in chapters 4, 5, and 6. Also, see the empirical appendix.

2. Exchange Market Policy in the United States: Precedents and Antecedents

1. Also after 1901, the bank would make sure that it had adequate supplies of gold by offering an above market price for gold from South Africa (Moggridge 1972, 8).

2. Although Austria-Hungary adopted a gold currency after decades of being on a paper standard, it never obligated the banks to redeem its notes in terms of gold. See also Yeager (1976).

3. According to Flandreau and Komlos (2002), the Austrian National Bank operated as if it were bound by a target zone as Bordo and MacDonald (2005) claim was the case for the core countries.

4. Although we focus mainly on the Bank of England, the Banque de France also engaged in extensive exchange market policies including gold policy, spot and forward market interventions, and swaps. See (Clarke 1967).

5. Reflecting higher eastbound Atlantic freight rates and higher interest costs of shipping gold from New York (Moggridge 1972 171).

6. It kept its operations secret by, for example, operating through the Anglo-International Bank and through numbered accounts at the New York Fed (Moggridge 1972, 184).

7. However, according to Howson (1980, 10), offsetting wasn't completely automatic because the supply of Treasury bills was determined not only by the operations of the EEA but by the Treasury's funding operations.

8. According to Rousseau and Sylla (2004), the financial system of the Northeast, especially the stock market and commercial paper market, was as advanced as England's by the 1830s.

9. See Temin (1969).

10. Rolnick and Weber (1986).

11. Throughout the nineteenth century the foreign exchange market was dominated by sterling bills. There was never a market outside the United States for bills in dollars.

12. See Perkins (1975) and Officer (1996).

13. According to Knodell (2003) the profit earned by the Second Bank's foreign exchange business completely covered the losses it suffered by serving as the Treasury's fiscal agent in paying and receiving taxes and servicing and managing the national debt.

14. In the fall of 1837, after the Second Bank of the United States lost its federal charter, Biddle, now head of the United States Bank of Pennsylvania, arranged a successful corner of the cotton market for the purpose of both reviving it and reducing the discount on sterling. A similar operation in 1839 failed and led to the bankruptcy of the bank (Redlich 1951, 133). We do not regard this manipulation as legitimate exchange market policy.

15. However, existing data on real GDP (Berry 1988) and Industrial Production (Davis 2002) do not indicate any decline in these years.

16. Indeed it may have served as a precedent for the gold (and silver) purchase policies followed by the Roosevelt administration in the 1930s, when the Treasury set a (daily) target from March 1933 to January 1934 for the price of gold with the objective of devaluing the dollar and raising the domestic price level.

17. The act also removed the aggregate limit on national bank notes and limited the retirement of greenbacks to the expansion of national bank notes.

18. Indeed they argue that the gold purchase policy was counterproductive since it raised the premium on gold, the opposite of what was required.

19. Timberlake (1975) disagrees with Friedman and Schwartz on the role of Treasury policy. He argues that the Resumption Act allowed the secretary of the Treasury to retire greenbacks equal to the gross amount of national bank notes issued without accounting for voluntary retirement of national bank notes by the commercial banks. Successive secretaries of the Treasury took advantage of this provision to reduce high-powered money.

20. See Friedman and Schwartz (1963, chapter 3).

21. Other policies followed included paying the interest on government debt early and acceptance of security other than government bonds as collateral for government deposits in national banks, hence allowing the government bonds to serve as national bank collateral (Friedman and Schwartz 1963, 151; Timberlake 1978, 176).

22. A similar device was used during a stringency in September/October 1906.

23. Also, by paying out gold certificates in place of Federal Reserve notes (Chandler 1958).

24. See Bordo and Eichengreen (1998) who demonstrate, based on a model of the gold exchange standard, that absent the Great Depression, the system could have survived for at least another thirty years.

25. Also see Wheelock (1991, 99). At the time Miller and the Board did approve the policies. See Meltzer (2003), chapter 4.

26. According to Schlesinger (1957, 466–67), "But by early January [1933] Roosevelt could assure William Randolph Hearst that it [his cabinet] would be a 'radical' cabinet; there would be no one in it who knows his way to 23 Wall Street. No one who is linked in any way with the power trust or with international bankers . . . the Secretary of the Treasury would not be a banker."

3. Introducing the Exchange Stabilization Fund, 1934–1961

1. The suggestion that Congress might be requested to appropriate additional funds to be used by the ESF was made on one occasion only. On 14 January 1948, in testimony before the Senate Foreign Relations Committee on financing the European Recovery Program, Treasury Secretary John W. Snyder proposed extending stabilization loans to European countries, adding, "At the appropriate time, Congress may then be requested to appropriate additional funds to be used by the United States Stabilization Fund to make those loans" (Treasury Annual Report 1948, 300).

2. The Republican minority of the House Committee on Coinage, Weights, and Measures (HR 6976, 1934, Report no. 202, pt. 2, 3–5) in its report on the Gold Reserve Act objected to section ten that created the ESF because "it places autocratic and dictatorial power in the hands of one man directly over the control of the value of money and credit and indirectly over prices. . . We believe it is too great a power to place in the hands of any one man."

3. The secrecy in which the two funds were designed to operate was subsequently modified.

4. The Morgenthau Papers (reel 12, book 42, 163–64) describes a case of funds transfer in which shipping gold rather than a direct foreign exchange transaction was possible. On 30 October 1936, Charles Cariguel, director of the Bank of France foreign exchange department telephoned Werner Knoke, manager of the FRBNY foreign exchange desk, to inform him that the bank had to repay £40 million sterling to the Bank of England that it had borrowed originally for three months and had

renewed three times. He intended to accumulate sterling if possible, and "it would help him greatly if the dollar-sterling rate could be kept steady at the present level." Knoke replied that "there was a very definite desire here to keep the sterling rate upon an even keel. I inquired guardedly whether 4.89 was the top price for his calculations." Cariguel answered that "over 4.89 would throw my calculations out of gear." He pointed out that if the market learned that he intended to pay off the loan, it was likely to speculate on the rise and try to push the rate higher. "This he did not want to happen." Knoke inquired "what he would do if he found that the rate, as a result of his operations, went up, also whether it was his preference to operate in sterling rather than repay in gold. Cariguel replied that he would operate in sterling if the market permitted, that probably the chance of his being able to do so was small, and that quite possibly the bulk of the operation would have to be done in gold." Cariguel said he wanted Knoke's reaction before going to London to discuss the repayment with his counterpart at the Bank of England.

5. It is ironic that the FRBNY became the fulcrum of foreign exchange intervention. A year earlier, the Banking Act of 1933 had stripped it of any discretionary power in foreign exchange matters.

6. The FRBNY was permitted to cooperate with foreign central banks to prevent the exchange rates of gold standard countries from actually reaching the gold export point, thus denying gold arbitrageurs a profit opportunity. The FRBNY could obtain gold from the Treasury for this purpose without redeeming gold certificates.

7. In a handwritten letter, dated 20 April 1936, Allan Sproul of the FRBNY remarked to H. A. Siepmann of the Bank of England, "I should think that you would be putting in a lot of time these days considering what you are going to do if France—in one way or another—leaves the gold standard and, incidentally, deprives you of the opportunity of buying and selling sterling against francs. In that event, there is going to be an immediate job of minimizing disturbances in the foreign exchange market which will bother us all, leaving out of consideration, for the moment, the longer range questions of policy which such an event would create. I haven't gone in for forecasting what is going to happen to the franc, but the next two or three weeks look critical, and I hope you will keep in touch with us" (Bank of England archives).

8. Nevertheless, commenting in a letter to Allan Sproul in May 1936, H. A. Siepmann of the Bank of England wrote, "I hope that we remain personally in touch like this, in spite of taboos."

9. A private dinner party at the home of the acting undersecretary of the US Treasury, which Morgenthau and the representative of the British Treasury attended, was the occasion on 7 May 1936 for the latter's writing to his superior in London (principal assistant secretary, overseas finance division of HM Treasury) that Morgenthau said to him, that "he would like, and it might be useful for the two treasuries, to have the channel of communication through myself open." The letter continues: "Since the United States Treasury has taken over the direct control of currency matters, the channel of communication between the Bank of England, the Reserve Bank of New York, and the United States Treasury, has been disused, if not entirely blocked, and Mr. Morgenthau, no doubt feels himself somewhat in the dark. Thus the position presumably is that the United States Treasury is expecting France to go off gold before long, that they are afraid this may be followed by a new round of currency unsettlement, that they do not themselves at all want to devalue the dollar further, but that they do not know British intentions and are somewhat nervous that if sterling were to follow the franc any distance an outcry for corresponding dollar depreciation would be raised here, and that they would accordingly be glad of information or of any measure of cooperation which they can get from His Majesty's Government (assuming I suppose in practice that they are anxious for the pound to

be held as steady as possible and would welcome any statement or action that can be made or taken to this end.) I don't know whether there is any answering gesture that we can usefully make, but you ought to know of this matter" (letter by T. K. Bewley, Archives, Bank of England).

10. Fears of inflation delayed adoption of a cheap money policy by the Bank of England until the spring of 1932 (Sayers 1976 II, 416, 430).

11. In Bank of England Archives there is a confidential note of a telephone conversation 28 January 1935 initiated by Jay Crane, deputy governor of the FRBNY, with B. G. Catterns, chief cashier (later deputy governor). Crane reported that, under US Treasury instructions, the FRB during the previous week had bought gold in Paris and London and some silver. On the twenty-sixth and twenty-eighth, the FRB had bought sterling. (On 30 April, Crane resigned his position at the FRB for a job at the Standard Oil Company).

12. Note that the calculation of the New York-London shipping parity differs, as the cost of an ounce of gold in New York is $35 plus the charges incurred in shipping to London, so the sterling equivalent price of gold is not the same as in the case of the London-New York shipping parity.

13. The significance of the description "fine troy ounce" of gold bars was revealed in a letter, dated 20 April 1937, from Allan Sproul (Harrison's successor at the FRBNY) to G. L. F. Bolton, principal, foreign exchange section, Bank of England. Sproul inquired whether fine bars assaying .995 or over, according to a sheet he thought Rothschilds might have published, were acceptable on the London gold market, and that bars less than .995 fine were not acceptable. Sproul complained that in the bank's shipment to the FRB of 11 March 1937 per steamship *Manhattan*, consisting of 766 bars, there were 288 bars (mutilated United States Assay Office bars), the fineness of which had ranged from .993 to .9948. When the bars were turned in to the United States Assay Office in New York, the FRB had to pay a parting and refining charge of a little over $2,000 on all those bars which assayed below .995. It turned out that the bars in question had been received by HM Treasury from Paris, and would not have been acceptable on the London market. The bars were sold to the FRB at a time when the bank was shipping gold to New York, and it seemed only reasonable to the bank's bullion office to give the FRB bars which had been minted at the United States Assay Office.

14. The text of the American declaration is available on reel 9, book 33, 258–60 of the Morgenthau Papers.

15. His announcement, however, of the change from the 31 January 1934 policy was not issued until 12 October after the technical details, described below, had been arranged with the Bank of England and the Bank of France.

A further step the secretary took to implement the new policy of reciprocal gold dealings with other countries and mutual consultation concerning the level of exchange rates was that he requested and obtained the president's approval on 5 November for purchase from and sales of gold to the general fund of the US Treasury by the ESF at a flat price of $35 per ounce.

16. The BIS (1937–38, 19) commented: "The first effect of the devaluation of the gold bloc at the end of September 1936 was a reflux of funds from the London market to France, the Netherlands, and Switzerland. The movement towards France, however, was reversed after about two months. Discussion at a BIS meeting on 11 and 12 October in Basle concluded that the return flow of capital to France would have been much larger had the government not penalized private gold hoarders who did not give up their gold to the Treasury, as the devaluation statute required, and had no tax been imposed on alleged profits from speculation" (Morgenthau Papers, letter dated 28 December 1936 from Cochran to Morgenthau, reel 12, book 43, 17).

The return flow of capital continued in the direction of the Dutch and Swiss markets. In the last quarter of 1936 and the first quarter of 1937, however, there was a flow of funds from London to the United States, sustained by large shipments of gold. Against the dollar the low point of $4.88 to the pound was reached at the beginning of March 1937.

17. On 1 December 1936, Cariguel of the Bank of France told Merle Cochran, first secretary of the US Embassy in Paris, that the handling charge was too expensive for him to deal in gold in the New York market. Even to earmark gold at New York would cost about ten centimes on the dollar, while to ship it, the one-quarter of 1 percent charge made a difference of about 32 centimes on the dollar; Cariguel said that it was necessary to hold the franc at a very fixed rate for the present. He could not afford variations which would permit payment of these charges (Morgenthau Papers, reel 12, book 43, 76).

18. On 12 December 1936, the governors of four Scandinavian central banks (Sweden, Norway, Finland, Denmark) met at Helsingfors in regard to the tripartite declaration and the supplements implementing it. They saw little immediate prospect that any one of the four would adhere to the arrangement for three reasons: (1) They wanted to stand together on monetary questions, and none of them was inclined to act unless the others acted similarly; (2) Denmark had exchange controls and was not eligible to join; (3) Sweden was satisfied with the facilities granted by London for gold transactions on that market (Morgenthau Papers, letter of 28 December 1936, from Cochran in Paris to Morgenthau, reel 12, book 43, 82–83).

19. On 26 September 1936, a Saturday following the declaration on Friday by the three tripartite governments, when it was deemed important for foreign exchange markets to be quiet pending devaluation of the French franc, Morgenthau was disturbed to learn that the price of sterling was falling. Werner Knoke, the FRBNY foreign exchange desk manager, reported that the Russian State Bank gave Chase an order to sell 1 million pounds sterling at any price for dollars. Morgenthau misinterpreted this order that weakened sterling as a communist attack on the tripartite program, and held a press conference to denounce the Russian government and crow that he had foiled that action by buying the 1 million pounds sterling that "they had ordered dumped on our market." He was then informed that the Russian sale of sterling was commercial, to repay Sweden for a loan (Morgenthau Papers, reel 10, book 34, 291–301, 354–57). Governor Harrison told Morgenthau that he had reacted before he had all the facts, but the latter continued to blame the Soviets for disturbing the foreign exchange market.

20. According to Sayers (1976 II index, 666), "Money Employed" was a customers' account. He describes it as follows: "The Bank of England was prepared to accept London balances for other central banks, and to employ these balances remuneratively for their owners. From this point the bank went on, in a purely technical way, to develop its standard practices in handling Money Employed (interest-bearing deposits, though avoiding the form), Treasury Bills and Fine Bank Bills for other central banks" (ibid., I, 158).

21. Brown (1942, 171) notes that the fluctuations in the no. 2 sterling account and the "Money Employed" account were closely related to special exchange transactions with the Central Bank of Argentina.

22. Why did sterling appreciate and arouse the Treasury's concern? The EEA had been accumulating gold from the time the franc was weak in the period leading up to the 1 October 1936 French law. The franc strengthened after its devaluation until the start of November, when it again lost repute. It was the flow of gold from France, principally to London, as confidence in the franc waned, that led to sterling appreciation. Gold also flowed from France to Holland, Switzerland, and the United States.

23. Della Paolera and Taylor (1999, 596, and 2001, 196, n. 21) emphasize that Argentina was scrupulous in servicing its large external debt in the 1930s but do not identify the creditor countries.

24. These currencies appreciated as a result of a reflux of funds from the London market to the Netherlands and Switzerland that followed the devaluation by the gold bloc at the end of September 1936. The movement of funds continued through the first quarter of 1937 (BIS 1938, 19).

25. Various suggestions to use the ESF for gold sterilization were not approved. One proposal would have directed the fund to acquire gold abroad by converting its foreign exchange into bullion. This gold would be sold to the general treasurer who would not deposit gold certificates with the gold certificate fund, as he usually did, but would issue securities to obtain funds.

According to another proposal, the ESF would purchase all imported gold on its arrival which would then be sold to the general treasurer. The ESF under this proposal would have operated in the same way as the EEA, which purchased all incoming gold with sterling obtained from the sale of Treasury bills.

Letters of instruction covering these two procedures were to be sent to the FRBNY, the Superintendent of the New York Assay Office, and the Philadelphia Mint.

In a memorandum to the secretary, Jacob Viner proposed that ESF be involved in only two classes of gold transactions: purchases of foreign gold or sales of gold abroad, whether or not sterilized, or purchases of domestic gold if sterilized. None of these proposals was put into effect.

26. The BIS (1937–38, 19–20) discussed second quarter 1937: “In the following months . . . when it was thought there might be a cut in the price of gold in the United States (followed perhaps in other centres), the markets came under the influence of the ‘gold scare’. The demand for dollars was intensified and a wave of gold selling occurred, more than £60 million being dishoarded on the London market alone, a fact not unconnected with the appearance of a ‘discount’ on the price of gold in London as compared with New York. . . . This tendency to purchase dollars continued throughout the summer but was offset to a large extent by the influx to London of French funds, particularly in May and June, and later, in September.” The report (20–21) added: “During the period of the gold scare from April to June 1937 the gold price in London fell below this parity; in the parlance of the market, there developed a ‘discount,’ an altogether abnormal situation. This was due to the fact that the American banks which usually made arbitrage purchases were reluctant to work under conditions that might have led to a considerable loss if the price of gold had been reduced in the United States, and thus gold in transit could be sold only at a price lower than $35 per fine ounce. As soon as these fears subsided, the ‘discount’ disappeared. Gold then moved to the United States at the shipping parity, showing that arbitrage was again working effectively. From the end of September the gold price in London rose above the shipping parity, and gold could therefore no longer be profitably shipped from London to the United States.”

27. “[O]n 7 April 1937 a spate of rumour swept through financial and commodity markets on both sides of the Atlantic, alleging that the Roosevelt Administration had determined to reduce the price. On the following day, representatives of the discount market came into the Bank for their regular weekly talk with the Governor, who told them that ‘the rumour of reduction in the U.S.A. gold price was not based on fact but was based on truth, it must come sooner or later’” (Sayers 1976, 484).

28. The EEA was funded with £175 million at its start; the amount was increased to £375 million in 1933, £435 million in 1936, and £635 million in 1937 (Sayers 1976, 488).

29. The BIS (1937–38, 20) commented: “In the second half of the year, when stock prices fell on Wall Street and a recession in American business set in, the trend turned against the dollar. In November this tendency was sharply intensified by the ‘dollar scare’ when it was feared in some quarters that there might be a further devaluation of that currency. Although this scare passed, the dollar rate in London remained around $5 to the pound in the following months. In the second half of 1937 a strong export surplus developed in the United States while in the United Kingdom the balance of trade became increasingly adverse.”

30. Georges Bonnet, minister of finance, in the 1937 government of Camille Chautemps, floated the franc in June of that year, when budget deficits plagued the Treasury, and capital flight drove the depreciation of the franc.

31. Chautemps was followed by Leon Blum in 1938. Edouard Daladier succeeded Blum. He presided over the deliberate depreciation of the franc below market level and kept it there. He obtained prior consent of neither the Bank of France nor the Treasury for this measure.

32. It repurchased most of the gold sold to Mexico, and purchased a small amount from the Central Bank of Chile.

33. Desterilization began in September 1937, when the Board of Governors of the Federal Reserve requested the Treasury to release $300 million from the inactive gold account. The Treasury released the amount requested, but continued to sterilize all further gold purchases, which amounted to $174 million in that month, so that inactive gold held by the Treasury fell only $126 million in September 1937, with a corresponding decline in Treasury cash and deposits at the FRB. As of 1 January 1938, the Treasury limited the addition to the inactive account in any one quarter to the amount by which total gold purchases exceeded $100 million, and on 19 April 1938 discontinued the inactive gold account, which then amounted to $1.2 billion. Gold sterilization involved Treasury sale of bonds to pay for gold purchases, offsetting an increase in the monetary base that would have arisen from a gold inflow. Desterilization reversed the process. The Treasury instead of selling bonds printed gold certificates, which it deposited at the Federal Reserve banks.

34. From 27 April to 5 May the ESF bought 37 million francs and sold only 3.5 million francs for the account of the Bank of France. The bank was a steady buyer of gold amounting to $45 million from the ESF until 23 May, the greater part by 5 May.

35. Sayers (1976, 563) reports an untrue story that circulated in November to the effect that an American-Anglo agreement had been reached on a $4.50 rate for sterling. He comments that the Americans at that time would never have accepted that degree of sterling depreciation, and that the British would have had no confidence in their ability to maintain that rate in the conditions confronting them.

36. As Alfred Hayes, then president of the FRBNY, remarked at a 5 December 1961 Federal Open Market Committee (FOMC) meeting, “The Stabilization Fund has been used for a number of purposes, such as shoring up weaker countries—which is almost a State Department activity.” See the (FOMC *Minutes*, 5 December 1961, 1054).

37. The 1936 Treasury annual report contains no reference to the agreement with Mexico.

38. Mecatta and Goldsmid and the National Provincial Bank, Ltd., were selected as depositories of silver in London, with the approval of Morgenthau, and the London branch of the Guaranty Trust Company was chosen as depository for the sterling proceeds of gold sold. The FRBNY chose seven New York silver depositories, all safe deposit companies.

39. Chase Bank and National City Bank of New York were appointed as agents. According to Brown (1942, 35), the number of London depositories of silver was

increased to seven, with the addition "of the remaining five bullion brokers," but he mentions only four: Samuel Montagu & Son, Pixley and Abell, Sharp and Wilkins, and N. M. Rothschild & Son.

40. The Silver Purchase Act specified that no more than 50 cents an ounce be paid for silver in the country on 1 May 1934. A purchase price of 64.5 cents for newly mined silver had previously been decreed. There was no limit on the price paid for foreign silver. In 1934 the average market price of silver in New York was under 60 cents (Census 1975, Series M-270).

41. The delay in shipment was occasioned by the rise of the sterling price in London from 24 to 32 pence per ounce. As a result the Central Bank of China could not obtain silver in Shanghai on the terms of the contract with the Chase Bank.

42. The program destabilized the Chinese silver standard and ultimately led to its abandonment for a fiat monetary system in 1935. China had been a large importer of silver and had benefited from the 46 percent decline in the US silver price in 1929–31. The silver lobby argued for an increase in silver prices to help China, when in fact a low silver price had obtained a relative advantage for China over gold standard countries in terms of the deflation they experienced. China suffered less thanks to the fall in silver prices. The silver purchase program that raised silver prices harmed not only China but also Mexico and other countries on a silver standard (Jastram 1981, 98–99).

43. In his chapter 6, Meltzer (2003, 456–576) exaggerates the importance of the ESF as the means by which Morgenthau asserted his ability to control monetary policy. For two of many explicit statements by Meltzer, see pp. 457–58 and 574–75. Two facts undermine this view. First, the ESF had limited resources, not the $2 billion in capital the statute allocated to it from the devaluation profit, but only the $200 million the Treasury assigned to it for operating. Second, the ESF balance sheets before 1940 show the small amounts of its holdings of government securities (Schwartz 1997, table 1, 144). Morgenthau, as Meltzer is well aware, wanted low interest rates, not control of open-market operations. If he had attempted to supersede the Federal Reserve, its officials would have expressed their opposition in the many forums available to them. There is no record of such action by Morgenthau and of Federal Reserve dissent. No one disputes that the Federal Reserve was dominated by the Treasury during the New Deal, but it was passive not because of threats by Morgenthau but because of its own beliefs that low interest rates and excess reserves proved that monetary policy was accommodative and needed no further attention.

4. US Intervention during the Bretton Woods Era, 1962–1973

1. For an overview of Bretton Woods see Meltzer (1991, 2009a, b), Bordo (1993), and James (1996). Previous discussions of US intervention during the period include Coombs (1976), Pauls (1990), Todd (1992), and Hetzel (1996).

2. Article VI of the IMF Articles of Agreement authorized restrictions on financial flows.

3. In contrast, Germany and the Netherlands revalued in 1961.

4. To construct the real price of gold, we deflate the official price using the nonseasonally adjusted consumer price index, 1982–84 = 100.

5. All US balance-of-payments data are from the US Commerce Department as reported in the CEA (1969).

6. Coombs (1976, 48) notes: "By the late fifties Washington officials were already dropping hints of government concern over the erosion of our gold stock, which further sensitized the qualms already felt by many European officials."

7. Triffin (1960) suggested creating a source of nondollar international reserves through the IMF. The IMF first issues special drawing rights in January 1970.

8. Unless otherwise indicated, data on gold in this section are from Board of Governors (1976) tables 14.1 and 14.3.

9. These figures include a $344 million payment (gold subscription) to the IMF in 1959.

10. Until 1968, US law mandated a 25 percent gold reserve requirement on outstanding notes and deposit liabilities of the Federal Reserve banks. On 3 March 1965, the Congress dropped the gold reserve requirement on deposit liabilitities, and on 18 March 1968, Congress eliminated the gold reserve requirements on notes. This further limited the amount of gold freely available to meet foreign central bank claims.

11. See Darby et al. (1983).

12. Bordo and Eichengreen (2013) show that most FOMC dissents between 1961 and 1966 were for tighter monetary policy and that dissenters justified their actions, at least in part, on balance-of-payments concerns.

13. Meltzer (1991), Hetzel (1996), and Pauls (1990) also discuss the issues raised in this section. See also James (1996).

14. Hetzel (1996, 22) notes that most key European currencies were undervalued relative to the dollar.

15. Budget deficit data are from the CEA (2005), table B-78, and include on-budget and off-budget balances.

16. The data in this section appear in Bordo and Eichengreen (2013), appendix 2.

17. See the discussions of FOMC decisions in Bordo and Eichengreen (2013).

18. This program became known initially as "Operation Nudge" and eventually as "Operation Twist."

19. Congress established the Exchange Stabilization Fund under the Gold Reserve Act of 1934 for the purpose of foreign-exchange-market intervention. We discuss the ESF in chapter 3.

20. Unless otherwise indicated, the information and data in section 4.4 about Treasury interventions come from "Treasury Experience in the Foreign-Exchange Market," and is hereafter referred to as "US Treasury, *Experience.*" See References. See also *Bulletin*, (September 1962, 1138–53).

21. US Treasury *Experience* (1962a, 721).

22. This statement, of course, ignores the cost of financing and covering the transactions.

23. Debt prepayments stemmed from negotiations between the Eisenhower administration and Germany over the cost of troop deployment.

24. We report data from the *Desk Report* (1963, 7, B-23), which differ from the *Bulletin*, (September 1962, 1144).

25. The Treasury swaps were on an ad hoc basis. Unlike the Federal Reserve System, which we discuss below, the Treasury did not maintain formal reciprocal swap lines that reverted to a standby basis when not drawn down.

26. The analysis in this section draws on the Federal Open Market Committee *Minutes* (12 September 1961, 19 December 1961). See also Hetzel (1996), Todd (1992), and Task Force (1990d, Paper no. 1).

27. These data on the ESF are discussed in US Treasury *Memorandum* (1962b, 2). US Treasury *Experience* (1962a) also contains a table showing foreign currency holdings.

28. Whether the impetus for the Federal Reserve's participation in US foreign-exchange operations originated with the Treasury or with the Federal Reserve System is not entirely clear. The Treasury's website suggests that the Treasury "invited" the Federal Reserve to participate in the interventions in 1962, and this is the conventional view (see www.ustreas.gov/offices/international-affairs/esf/history). Coombs

(1976, 71) and FOMC *Minutes* (9 January 1962, 66–67) suggest a different view that we subsequently develop.

29. Todd (1992, 134–35), who once served on the legal staffs at the Federal Reserve Banks of New York and Cleveland, argues that Hackley set out to interpret the Federal Reserve Act in a way that would support intervention, rather than to provide an objective interpretation of the statute.

30. Although open-market operations, including foreign-exchange interventions, fell under the purview of the FOMC, these associated activities fell under the Board of Governor's jurisdiction.

31. In the 1920s and 1930s, however, the Federal Reserve Bank of New York was providing stabilization funds to foreign central banks; it was not directly defending the dollar's exchange value.

32. Warehousing refers to a swap transaction between the Federal Reserve System and the US Treasury in which the Treasury sells foreign currency to the central bank for dollars spot and buys it back forward at a specific rate and settlement date. See chapter 5 on warehousing.

33. Hackley (1961, 19–20), however, did not believe that the Federal Reserve could deal directly with the IMF in any way other than in its capacity as an agent of the Treasury.

34. Why the Treasury did not seek to increase the ESF's appropriation is unclear. The Treasury may have feared that Congress would only increase the ESF's appropriation if the Treasury would agree to some type of congressional oversight. The ESF is unusual in that only the president and the secretary of the Treasury can review its actions (Schwartz 1997).

35. A copy of this letter is found in Task Force (1990a, Paper no. 2, appendix A).

36. Robert H. Knight, general counsel of the Treasury, had warned Hackley that the Federal Reseve should move forward without legislation in part because "there was a range of ideas on the Hill with regard to the Federal Reserve System, including varying views with respect to the operation and organization of the Federal Reserve. Legislation, if sought, might become a vehicle for adding various amendments the nature of which could not be foretold." (See FOMC *Minutes*, 9 January 1962, 61).

37. Governor Robertson expressed the reasons for his dissent at the 5 December 1961 FOMC meeting. See FOMC *Minutes* (5 December 1962, 57–62). See also Task Force (1990a, Paper no. 2, 3–4).

38. In 1982, with the onset of developing-country-debt problems, some members of Congress expressed concern that the Fed might use its authority to invest in foreign securities as a means of providing financial assistance to debtor countries (FOMC Task Force 1990d, Paper no. 1, 23–24).

39. This section is based on the discussion that appears in the FOMC *Minutes* (13 February 1962, 82–95). See also *Bulletin* (September 1962, 1150–53), and Task Force (1990a, Paper no. 2).

40. The Federal Reserve had maintained very small balances in accounts with the Bank of Canada, the Bank of England, the Bank of France, and the Bank for International Settlements since before the Second World War.

41. The Treasury also has maintained swap lines, but typically on an ad hoc basis. With the exception of a Mexican swap line, Treasury swaps were not reciprocal. Often the Treasury established swap with developing countries to provide those countries with temporary loans. The Treasury's first swap line was with Mexico in 1936.

42. Moreover, the liquidity that swap drawings provided did not add to the US balance-of-payments deficit.

43. The Federal Reserve sometimes undertook "third party swaps" in which it would swap one foreign currency for another. These were typically used to pay down an outstanding balance on swap line.

44. In the late 1970s, as discussed in chapter 5, conditionality with respect to swap drawings became a problem and encouraged the United States to accumulate a large portfolio of foreign exchange.

45. "All this may seem to be an excessively roundabout way for the Federal to borrow foreign currencies. But apparently when the Federal Reserve Act was drafted, no one had contemplated such a need, and no explicit statutory provision for such borrowing was made. The swap technique, on the other hand, was clearly authorized and yielded precisely the same results as a direct borrowing from a foreign central bank" (Coombs 1976, 77).

46. Coombs (1976, 75–76) reprints the original swap agreement with the Bank of France.

47. The European central banks include those of Austria, Belgium, England, France, Germany, Italy, the Netherlands, and Switzerland.

48. In 1967, the FOMC did not accept a proposal to extend a swap line to Venezuela because that country did not meet IMF Article VIII requirements (FOMC *Minutes*, 4 April 1967, 10–13; Holland 1967). In 1969, the FOMC did not accept a proposal to extend a swap line to Ireland because of its relatively small size (Reynolds 1969).

49. A general chronology of events is found in *Bulletin* (various issues) and *Desk Reports* (various issues).

50. The Federal Reserve established a Swiss franc swap line with the BIS in 1962 to supplement its line with the SNB, which faced statutory limits on loans to non-Swiss banks (Task Force 1990f, Paper no. 9, 11).

51. See the previous discussion of the "Guidelines For System Foreign Currency Operations."

52. The data in this paragraph come from Solomon (1971, 3–4). We do not have comparable data for the entire 1962 through 1971 period.

53. For background see Bordo, Dib, and Schembri (2010) and Yeager (1966).

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

55. Although US monetary authorities did not undertake very many spot market transactions with the objective of affecting the exchange rate, they frequently made spot market purchases and sales of foreign exchange in conjunction with other activities. They might, for example, buy foreign currency in the spot market to repay a swap or to meet forward exchange commitments.

56. A general chronology of events is found in *Bulletin* (various issues) and *Desk Reports* (various issues).

57. Actually, the Bundesbank sold marks against dollars in Germany and the Federal Reserve "took over" the Bundesbank transactions.

58. At this time the Netherlands bank, which maintained a fairly rigid limit on dollar accumulation, was also selling dollars spot into the market, so these transaction amounted to a market swap with the dollars reverting to the United States.

59. The Treasury undertook similar transactions in 1962 or 1963.

60. The G10 were: Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, the United Kingdom, the United States, Sweden. Switzerland joined the General Arrangements to Borrow in 1964.

61. A negative net forward position indicated that the agency had more outstanding foreign currency liabilities that foreign currency assets.

62. Modern warehousing involves a spot purchase of foreign exchange from the Treasury coupled with a forward sale back to the Treasury. Chapter 5 discusses warehousing.

63. The narrative in this section draws on *Bulletin* (1963 through 1968).

64. In fact, the UK pound experienced several crises between 1945 and 1962. Bordo, MacDonald, and Oliver (2010) offers a brief discussion and references.

65. In early January 1963, the Federal Reserve drew $25 million equivalent British pounds from its swap line with the Bank of England and sold $5.6 million equivalent of this drawing to support the dollar.

66. The Federal Reserve used its holdings of sterling to obtain other currencies during the year. On 31 March 1964, the Federal Reserve sold $10 million equivalent sterling to the US Treasury, which used these funds to acquire Swiss francs through a sterling-Swiss franc swap with the BIS. In September and December, both the Federal Reserve and the US Treasury swapped sterling for Dutch guilder. Federal Reserve and Treasury swaps of sterling for Swiss francs were reversed in December.

67. The banks lent dollar reserves.

68. See chapter 5 for a discussion of intervention tactics.

69. As discussed below, France would not participate in a scheme that it equated with maintaining the reserve status of a specific currency, but would offer a general line of credit to the United Kingdom (Coombs 1976, 134).

70. After some cantankerous negotiation, other central banks reluctantly agreed to $400 million in credits (Coombs 1976, 143).

71. Estimates of the gold points appear in the *Desk Report* (1964) and Coombs (1976, 47).

72. On the collapse of the Gold Pool, see Coombs (1976, 152–73).

73. "Mr. Coombs said that the swap line with the French was useless. The only purpose in continuing the swap line was to symbolize some continuing link between the Bank of France and the Federal Reserve, and to avoid an overt disruption of relationships which might lead to market disturbances" (FOMC *Minutes*, 23 August 1966, 21).

74. The Netherlands Bank also sold $30 million in gold to the US Treasury (FOMC *Memoranda*, 18 June 1968, 3).

75. The controls actually required French banks to break outstanding forward contracts with their customers and turn over to the Bank of France the spot foreign exchange held as cover for those contracts.

76. The Bank of France also repaid $45 million of its swap debt in February and $12 million in March.

77. The Treasury swapped nearly its entire mark portfolio for Swiss francs during the Cuban missile crisis.

78. See Coombs et al. (1963, 114–21).

79. The possibility of an imminent mark revaluation left the Treasury, with outstanding forward commitments to sell marks, exposed. On 18 November, the Federal Reserve sold the Treasury $52.3 million to provide partial cover.

80. At their Bonn meeting on 20 November 1968, the G10 countries recommended that Germany revalue the mark.

81. The narrative in this section draws on the *Bulletin* (1968–1973).

82. Following the closing of the US gold window, the French foreign exchange market closed until 23 August, when it reopened on a two-tier basis. The Bank of France would defend an official rate for trade and related transactions. All other transactions would occur at a floating market rate. Pressure continued on the official rate, and French reserves increased $1.1 billion in August 1971.

83. Germany's experience was far from unique. Other countries, including Belgium, France, Japan, the Netherlands, and the United Kingdom had similar experiences with reserve accumulations.

84. See chapter 5 on the period between the Smithsonian agreement and the advent of generalized floating.

85. In July 1973, most of the swap lines were increased to allow for renewed US

foreign exchange interventions, see chapter 5. At this time the line with the Swiss National Bank increased from $1.0 billion to $1.4 billion and the Swiss franc line with the BIS rose from $1.0 billion to $1.25 billion.

5. US Intervention and the Early Dollar Float, 1973–1981

1. Most of the liquidity entered Germany. See Hetzel (2002) for brief history and useful references.

2. Greene (no. 127, August 1984a; no. 128, October 1984b; no. 129, August 1984c) provides detailed surveys of US interventions over select intervals between January 1975 and September 1981. Greene was an assistant vice president in charge of the foreign exchange desk over these years.

3. This paragraph follows Bordo and Eichengreen (2013). See also Romer and Romer (2002, 57), and Hetzel (2008, 68).

4. Orphanides (2002, 118) estimated a Taylor rule for the period, and found that the coefficient on the unemployment gap was substantially greater than the coefficient on the inflation term. This result suggests that policymakers gave more weight to the former than the latter in their policy decisions.

5. Barsky and Kilian (2004, 126) argue that OPEC's actions in late 1973 were a reaction to high US inflation rates in the late 1960s and early 1970s. The resulting dollar depreciation eroded the real purchasing power of the cartel's revenues and strengthened OPEC by increasing the demand for oil outside of the United States. Similarly, the growing lack of confidence in US monetary policy and the fear of inflation that emerged over the 1970s may have distorted economic decisions in ways that further eroded growth in the nation's potential to produce.

6. The United States increased the official gold price from $35 per ounce to $38 per ounce. Chapter 4 discusses the collapse of Bretton Woods.

7. These financial controls included the interest equalization tax, controls imposed through the office of foreign direct investment, and the Federal Reserve's voluntary credit restraint program.

8. The Smithsonian Agreement allowed for wider (2 1/4 percent) bands on either side of the new dollar parities. This change conceivably permitted European currencies to fluctuate as much as 4 1/2 percent against each other. At their 7 March 1972 Basle conference, the six EEC members agreed to limit fluctuations in their currencies to 2 1/4 percent. See also chapter 4.

9. Treasury Secretary Connally did not want reform discussions to take place within the G10 because he believed that the G10 was stacked against US interests (Solomon 1982, 219).

10. In early 1973, Germany, the United Kingdom, and the United States favored a temporary float, while Belgium, France, Japan, the Netherlands, and the developing countries most strongly opposed floating (de Vries 1985, 187–97).

11. We discuss the Jurgenson Report in chapter 6.

12. The FOMC *Memoranda* (19–20 March 1973, 49–71) contain a discussion of this meeting, which Chairman Burns, Governors Daane and Bryant, and Special Manager Coombs attended. This paragraph draws on that discussion.

13. Chapter 4 discusses this problem and its resolution.

14. Under Bretton Woods, except for the case of revaluation, the borrower assumed any exchange risk associated with exchange-rate movements within intervention bands.

15. The FOMC had authorized Coombs to negotiate an increase in the swap lines on 20 March 1973 (FOMC *Memoranda*, 19–20 March 1973, 87).

16. After December 1980, any country drawing on the swap lines agreed to take the full exchange risk in exchange for changes in the interest rates (Task Force 1990f, Paper no. 9, 7).

17. The official US intervention data does not draw a distinction between active and passive interventions.

18. The remainder of this section draws heavily on Hooper (1977) and Pardee (1973).

19. In 1981, the Federal Reserve placed simultaneous bid and offer rates in the market. "In all, the Trading Desk at the Federal Reserve Bank of New York operated in the market as *a net buyer* of marks on nine of fourteen trading days between February 2 and 23." [emphasis added] (*Bulletin*, June 1981, 486–87).

20. Greene (no. 127, 1984a) analyzes the US interventions from January through March 1975. We do not analyze these individual cases separately because outside of the motivating factors, the operations were all broadly similar in size and frequency.

21. The US Treasury purchased German marks from the market in October 1973 and January 1974 and used these funds to retire outstanding mark-denominated securities with the private sector and to repay mark obligations with the IMF. The Treasury also paid marks to a foreign central bank. The Treasury added a small amount to its balances in January 1974, but sold this in the market during February 1974.

22. Evidence suggests that large interventions increase the chances for "success." See Bordo, Humpage, and Schwartz (2012).

23. This paragraph draws on Greene (no. 128, 1984b, 10–12).

24. Burns had expressed uncertainty about intervention at least as early as July 1977 (see FOMC *Transcripts*, 19 July 1977, 3).

25. Burns' views are found in the FOMC *Transcripts* (5 January 1978, 8; 17 January 1978, 5–15).

26. Burns chaired the 28 February 1978 FOMC meeting because Miller, who was to have taken over at this point, was still testifying to Congress.

27. Our data also indicate that between November 1976 and January 1979, the Federal Reserve continuously sold marks off-market to some other official entity for Swiss francs to retire outstanding debt obligations. These sales totaled $353 billion and were largely financed out of swap borrowings and transactions with the market (see chapter 4).

28. In January 1974, the desk bought $4.6 million worth of Japanese yen for the Treasury's account (*Bulletin* 1974, 205).

29. The Federal Reserve also drew nearly $152 billion on its Japanese yen swap line, and the desk sold $194 million yen by late November. The Treasury accounted for approximately 15 percent of the Japanese yen sales. Likewise the Federal Reserve drew $707 million on its Swiss swap line in November and December and sold these funds in the market. The Treasury did not intervene in Swiss francs.

30. Truman (2005, 354) reports that the "Bundesbank would not agree to the [1 November 1978] package . . . until the Federal Reserve agreed to a decisive monetary policy move."

31. We explain warehousing below.

32. Volcker (January 1976, 8) already expressed a similar assessment of earlier interventions: "intervention is a tactic—sometimes useful, sometimes not. By itself, it will accomplish little if not accompanied by appropriate domestic policies, by internal stability, and by some willingness to take account of international considerations in policymaking."

33. Truman (2005, 354) indicates that Volcker "received a harangue from the German authorities about getting the US economic house in order."

34. This section draws on Axilrod and Holmes (1979), Greene (no. 129, 1984c), Holmes and Pardee (1979), Morton and Truman (1979), and Task Force (1990h, Paper no. 8).

35. In late 1978, the Federal Reserve temporarily acquired a balance of $1.5 billion equivalent German marks through a warehousing-type operation with the US Treasury. Since warehousing operations are swaps, these funds did not increase the Federal Reserve's net open position in German marks, as holding reserves outright would have.

36. This, of course, was not the first time that the issue came up. In 1975, for example, Pardee recommended increasing the amount of working balances in German marks to avoid having to buy marks when the mark was trading at the top of the snake (FOMC *Memoranda*, 15 July 1975, 4).

37. Ironically, as Morton and Truman (1979, 5) warned, as the United States increased its own holdings of foreign exchange, it might *have* to undertake a greater amount of intervention. Other countries—particularly the smaller ones—might diversify their portfolios to hold fewer dollars. When the dollar subsequently depreciated, these foreign countries might be less inclined to intervene in dollars.

38. The Treasury issued an additional $1.1 billion equivalent German mark denominated Carter bonds in 1980.

39. The net open position equals foreign currency balances plus any net forward position less foreign currency liabilities.

40. Greene (no. 129, 1984c, 12–13) describes the desk's perception of market disorder: "In making judgments about conditions in the exchange market and the need for orderly market intervention, US authorities considered many dimensions of trading. They evaluated the variability of the exchange rate itself as indicated, for example, by the magnitude and speed of rate changes within a day, day to day, cumulatively over several days or longer, and relative to perceived or known changes in the underlying economic fundamentals. They also evaluated market participants' perceptions of the risk of dealing as indicated, for instance, by the width of bid-asked spreads, the existence of large gaps between successive rate quotations, or an unwillingness on the part of market professionals to take currency into position even temporarily and thereby cushion the impact on the market of their customers' currency needs."

41. Greene (no. 129, 1984c, 12) also notes that no institution that sold foreign exchange to the desk had enough information to deduce the overall size of the operation on a given day.

42. As Holmes and Pardee (1979, 9–10) note, central banks invest the funds that other central banks deposit with them in bills of their domestic governments.

43. As explained in chapter 4, the FOMC is authorized to buy foreign exchange from the "open-market," which includes the US Treasury.

44. "In order that the [Federal Reserve] System's weekly statement would not reflect too large an increase in its 'other assets,' the System at the end of its statement week of July 27 [1966] swapped $88.2 million [equivalent] pounds for one day with the U.S. Treasury." (*Desk Report* 1967, 10) Why the Board did this is unclear, but it may have taken the action so that speculators would remain uncertain about the degree of support being offered to the pound.

45. On Coomb's desire to give the Federal Reserve a bigger say in the policy decisions, see (FOMC *Memoranda*, 14 November 1967, 31). As we show in chapters 4, 5, and 6, this was a frequent motive for maintaining and expanding the Federal Reserve's involvement in intervention.

46. During the last half of 1976, the Treasury undertook two swap drawings with England totaling $300 million. These were repaid by the end of the year.

47. Exactly why the Federal Reserve began warehousing directly with the Treasury instead of the ESF remains unclear, since foreign currencies obtained from the sale of Carter bonds could easily be transferred from the Treasury to the ESF. Indeed, subsequent to the authorization, this may have been how the transactions were actually handled: "In the case [1978–79], the German marks and Swiss francs obtained from Carter bond sales were credited to the Treasury's General Fund Special Accounts at the Bundesbank and the Swiss National Bank, but then were immediately sold to the ESF. Since the ESF's resources were insufficient at the time to handle the transactions . . . the ability to warehouse the foreign currencies with the [Federal Reserve] System enabled the ESF to acquire these bond proceeds from the General Fund" (Task Force 1990h, Paper no. 8, 25).

48. Carter bonds allowed the Treasury to acquire foreign exchange without expanding the foreign money supply when the foreign exchange was sold for dollars.

49. The United States intervened on 30 March 1981, following an assassination attempt on President Reagan. See Greene (no. 129 1984c, 29) for a detailed account.

6. US Foreign-Exchange-Market Intervention during the Volcker-Greenspan Era, 1981–1997

1. The Reagan administration seemed to begin its minimalist intervention strategy in late February or early March of 1981. United States intervention was very heavy in January 1981, but tapered off in February with a final heavy intervention on 22 February 1981, when President Reagan was shot. Treasury Secretary Donald Regan formally announced the new policy on 17 April 1981 (see chapter 5).

2. Chapter 5 discusses the inauguration of Chairman Volcker's monetary-policy initiatives.

3. The FOMC adopted monetary targets in 1970 and began making these targets public in early 1975.

4. In October 1982, the FOMC formally abandoned monetary targets for a federal funds rate target. On this episode, see Silber 2012.

5. During most of the Reagan years, the Republican Party maintained a small majority in the US Senate, but the Democrats had a substantially larger majority in the House of Representatives.

6. "Although I accept that [a higher real return on investment] could in principle help explain the dollar's strength, my judgment was that the magnitude of the decline in national saving was substantially greater than the increased demand for investment" (Feldstein 1994, 67).

7. As chapter 4 explains, Sprinkel contended that because sterilized intervention did not alter fundamental macroeconomic determinants of exchange rates, it could exert only a temporary influence on the market at best. He also maintained that intervention—even when sterilized—could interfere with domestic monetary policy.

8. This was the most enduring conclusion from the report. As we will show, FOMC participants referred to it, often noting that to be effective, monetary policy had to back up intervention. The desk and the Treasury seemed to forget the finding. This conclusion ultimately became the focal point for arguments against intervention within the FOMC.

9. Solomon (1983, 7–8) also discussed this problem.

10. Rogoff (1984) provides a thorough survey of the empirical tests of the portfolio-balance model, especially of those papers important for the study of foreign-exchange intervention. Rogoff's paper circulated as a memo in early 1983 and was undoubtedly part of the background research for the Jurgensen Report.

11. We consider here only high-frequency empirical studies of the effects of intervention. Empirical studies of intervention profits appear in chapter 1, and early studies of intervention appear in chapter 5.

12. In 1984, the Treasury removed the withholding tax on interest paid to foreigners, which would have increased foreign demand for US financial assets and would have encouraged a real dollar appreciation.

13. See the collection of papers that appear in Federal Reserve Bank of Kansas (1985).

14. These congressional inquires eventually produced the Omnibus and Trade Competitiveness Act of 1988, which encouraged the president to pursue macroeconomic-policy coordination and exchange-market intervention and instructed the Treasury secretary to analyze the exchange-rate policies of other countries for exchange-rate manipulation.

15. These were not the only interventions during the minimalist, or pre-Plaza period, but the intervention that began in January 1985 marked a change in the administration's attitudes toward intervention. An analysis of all pre-Plaza interventions follows in the next section.

16. Japanese intervention data for the period are not available.

17. We do not know the exact day of this intervention because it does not appear in the Board's official daily data on US foreign exchange operations.

18. We did not include the earlier interventions of the minimalist period in figure 7 because they were largely one-off actions. We also do not consider the single US interventions against Japanese yen on 1 February 1985, which was not successful by our criteria.

19. Bagshaw and Humpage (1986) studied volatility using the moments of a stable-Paretian distribution.

20. Volcker had this assessment of exchange markets: "I was pretty well convinced by then [August 1985] as a matter of market judgment that the basic direction of the dollar was lower. Certainly, the growth of the U.S. economy seemed to be losing momentum, and if there was to be any change in monetary policy it would likely be toward greater ease and lower interest rates. But the prospects for a lower dollar were not so clear to others and the dollar rebounded." (Volcker and Gyohten 1992, 242–43).

21. The G5 (Group of Five) consisted of France, Germany, Japan, the United Kingdom, and the United States. The G6 consisted of the G5 plus Italy. The G7 consisted of the G6 plus Canada.

22. A reprint of the Plaza communiqué can be found in Funabashi (1988, 261–66). The text references paragraph 18.

23. Volcker and Gyohten (1992, 244) also indicate that the United States proposed a 10 to 12 percent appreciation of foreign currencies relative to the dollar.

24. We are not sure to which market—Singapore, Hong Kong, Tokyo, or all three—the term "Far East" refers.

25. A further statistical analysis of success under our criteria appears below in table 3.

26. Feldstein (1986) does find a somewhat faster yen depreciation after the Plaza, but attributes it to shift in policy rather that the intervention.

27. On 27 January 1987, the United States sold $50 million equivalent yen to demonstrate cooperation with Japanese authorities who had recently been buying dollars (*Bulletin*, May 1987, 333). On 11 March 1987, the United States made a unilateral $30 million purchase of German marks.

28. Funabashi (1988, 45–49) and Destler and Henning (1989, 51–52) discuss this episode. These two accounts differ on whether Volcker had worked out an agreement with Pöhl before or after the Board's vote and his threat to resign. The text follows

Destler and Henning, which is consistent with Volcker and Gyohten (1992, 274), and with Silber (2012, 254–56).

29. The G6 communiqué is reprinted in Funabashi (1988, 279–80).

30. Funabashi's book is based on anonymous interviews with individuals associated with the G5, G6, or G7 meetings.

31. Frankel (1994, 307) notes: "Most knowledgeable observers surmised that probably no explicit quantitative range had in fact been agreed on."

32. See also Kahn and Jacobson (1989) and, for a somewhat different opinion, Obstfeld (1983).

33. See chapter 1 on the transmission mechanisms of sterilized intervention.

34. See Klein and Rosengren (1991), Dominguez (1992), and Kaminsky and Lewis (1996).

35. One of the Jurgensen Report's conclusions maintained that monetary authorities needed to back their sterilized interventions with appropriate monetary policies, if such operations were to have anything other than a fleeting effect on exchange rates.

36. Eleven of the eighteen US interventions against German marks (or 61 percent) proved successful according to our criteria since 27 June 1988. This percentage is not obviously greater than the amount typically observed by chance (see table A2.1 in appendix 2). Moreover, the dollar generally appreciated during this period despite the repeated sales of dollars.

37. The view that intervention increases exchange-rate volatility has considerable empirical support.

38. Cross discusses discrete intervention as a tactical choice (see chapter 4). He did not discuss it as a means for avoiding a conflict between monetary policy and intervention.

39. Cross explained discrete intervention: "That is to say, we operated through a bank acting as an agent so they—although the word does get around in some way and people who are following these markets closely can often tell a lot of what's going on—we did not go in openly buying foreign currencies" (FOMC *Transcripts*, 5 and 6 July 1989, 3).

40. Cross's assessment is not generally true. As discussed in appendix 2, US intervention did not have negative forecast value after March 1985, implying that traders could not on average expect to profit by betting against US interventions. Traders could profit on average by betting against US interventions during the early float period; see chapter 5.

41. The page numbers in this paragraph refer to Cross and Truman (1990).

42. The transcripts do not explain how Brady determined this amount. The Board redacted part of the transcripts. The amount may include foreign intervention amounts against yen. Since 1 January 1989, the United States had purchased $13 billion equivalent Japanese yen.

43. Congressman Gonzales was currently threatening to hold hearings on the Federal Reserve System's portfolio of foreign exchange.

44. This and subsequent Japanese interventions are from published official Japanese Ministry of Finance data, which we converted to dollars at prevailing exchange rates.

45. See also (Goodfriend 2013, 345–47).

46. The article initially appeared in the Federal Reserve Bank of Richmond's 1995 Annual Report.

47. On these last interventions see also Goodfriend (2013, 347–49).

48. FOMC *Transcripts* are not yet publically available for 2011.

49. Much of the background on Mexico's swap lines comes from Maroni (1994a, b).

50. Goodfriend (2013, 341–45) also provides a detailed account of this episode.

51. Federal Reserve Bank of Richmond President Broaddus dissented.

52. NAFA is a financial agreement among the participants of NAFTA, the North American Free Trade Agreement, to provide swap lines.

53. The United States also set up a $2 billion swap line with Canada.

54. Texas Congressman Henry Gonzalez was highly critical of the swap lines, claiming that Congress never granted the Federal Reserve explicit legal authority for swap lines, and that they exposed US taxpayers to default risk.

55. On the "take-out" see (Goodfriend 2013, 343–44).

7. Lessons from the Evolution of US Monetary and Intervention Policies

1. If a central bank routinely had better information about pricing than the market, then its trades should serve as a forecast of subsequent exchange-rate movements. See our empirical appendix.

2. That said, the Federal Reserve has occasionally considered balance of payments or exchange rate objectives in its monetary-policy decisions.

3. See McCallum (2003).

Epilogue: Foreign-Exchange-Market Operations in the Twenty-First Century

1. Dollar amounts of Japanese intervention are from Chaboud and Humpage (2005).

2. Studies of Japanese intervention include Fatum and Hutchison (2003), Frenkel, Pierdzioch, and Stadtmann (2005), Galati, Melick, and Micu (2005). Humpage and Ragnartz (2005) apply the same methodology as Chaboud and Humpage (2005) to Swedish intervention.

3. Rich (1987, 2000) explains that in the late 1970s and in the mid-1990s when financial inflows appreciated the franc, the Swiss National Bank modified its strict adherence to monetary and price targets to account for exchange-rate movements.

4. We did not have access to official Swiss intervention data, but inferred intervention activity from changes in Swiss foreign-currency reserves, official (but general) statements about intervention, and data on components of the Swiss monetary base.

5. Following the 11 September 2001 terrorist attacks, the Federal Reserve also instituted similar swap lines with the European Central Bank ($50 billion) and the Bank of England ($30 billion). At that time, the Federal Reserve expanded its existing swap with the Bank of Canada to $10 billion. The lines expired after thirty days. The European Central Bank drew $23.4 billion on its line and repaid the amount on 17 September 2001. The Bank of Canada and the Bank of England did not draw on the lines. See *Bulletin* (December 2001, 761).

6. Our discussion of foreign banks' balance sheets draws on: McGuire and von Peter (2009), and Moessner and Allen (2010). See also Fleming and Klagge (2010), and Goldberg, Kennedy, and Miu (2010).

7. On this aspect of the swap lines, see especially Goldberg, Kennedy, and Miu (2010).

8. An overnight index swap (OIS) is an interest-rate swap where the period floating rate in the swap is equal to a geometric average of the federal funds rate. The OIS rate refers to the floating rate portion of the swap. Hence the OIS rate is related to the average federal funds rate over the period of the obligation.

9. A very good introduction to exchange-market operations in developing and emerging market economies is Canales-Kriljenko (2003, 2004) and Canales-Kriljenko, Guimarães, and Karacadağ (2003). This section drew heavily on these

articles. See also the papers in Bank for International Settlements (2005). These sources also provide many useful references.

10. As noted in chapter 5, the United States bought foreign exchange to build a portfolio of foreign-exchange reserves in the late 1970s and early 1980s.

11. We calculated the trade-weighted appreciation using J. P. Morgan's real, broad, effective exchange-rate index.

12. China's currency is the renminbi, but its currency unit is the yuan, whose symbol is ¥.

13. The People's Bank also raised reserve requirements and imposed direct controls on bank lending to control inflation.

14. On sterilization, see also Ouyang, Rajan, and Willett (2010) and references therein.

Appendix 2: Empirical Method for Assessing Success Counts

1. Chaboud and Humpage (2005) and Humpage and Ragnartz (2005) apply this same methodology to Japanese intervention (1991–2004) and Swedish intervention (1993–2002), respectively.

2. The United States conducts most US interventions by far in the New York market, but has occasionally placed orders through correspondents in both the European and Far Eastern markets. We cannot isolate these few transactions.

3. The United States did not abruptly end its intervention on 19 March 1997. United States interventions began to taper off in the early 1990s. After August 1995, the United States intervened against Japanese yen on 17 June 1998, against euros on 22 September 2000, and again against Japanese yen on 18 March 2011. These last three interventions are the only instances of US intervention during the floating exchange rate era not included in our analysis. Our exchange-rate data determined our sample, which ends on 19 March 1997.

4. The United States intervened against some other European currencies during the 1970s and early 1980s, but data on these currencies are not available.

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Abbreviations use in text for references:

BIS: Bank for International Settlements
Board: Board of Governors of the Federal Reserve System
Bulletin: *Treasury and Federal Reserve Foreign Exchange Operations, or Treasury and Federal Reserve Foreign Exchange Operations: Interim Report*
CEA: Council of Economic Advisors
Desk Report: *Federal Reserve Bank of New York, Annual Report on Operations in Foreign Currencies*
FOMC *Memoranda*: *Federal Open Market Committee, Memoranda of Discussion*
FOMC *Minutes*: *Federal Open Market Committee, Minutes of the Federal Open Market Committee*
FOMC *Transcripts*: *Federal Open Market Committee, Transcripts of Federal Open Market Committee*
IMF: International Monetary Fund
Task Force: *Task Force on System Foreign Currency Operations*

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