Foreign Exchange Intervention since the Plaza Accord

The Need for Global Currency Rules

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The Plaza Accord of September 1985 marked the apogee of global coordinated efforts to manage exchange rates in the floating exchange rate era.[1] It involved much more than intervention in foreign exchange markets, but such intervention was a major element in the public's eye and is the focus of this chapter.

Many economists and officials were, and remain, skeptical that intervention can have significant sustained effects on exchange rates and current account balances. The evidence from the 1980s does not refute that skepticism. However, the experience of the past 15 years shows that intervention can have important sustained effects if it is large enough. A number of countries—most notably China—have used massive and sustained intervention to hold their currencies down (sometimes in conjunction with other policies) and maintain large current account surpluses for years at a time.

At the time of the Plaza Accord, the issue was what officials could or should do when they believed that private markets had mispriced foreign exchange rates. Although that potential problem remains, a new problem has arisen: What should officials in some countries do when officials in other countries cause substantial exchange rate misalignments and trade imbalances? A further complication is that the original parties to the Plaza Accord no longer dominate the global economy as they did in the 1980s; emerging

1. The floating rate era is generally accepted as beginning in 1973. However, some groups of countries maintained systems of more or less fixed exchange rates with one another after 1973. The most notable example is the exchange rate mechanism in the European Community (the European Union after 1992).

193

economies and developing countries are increasingly important. The new global steering group is the G-20, but it is in danger of becoming irrelevant because it is unwieldy and lethargic. Now more than ever, forceful global rules on currency management are needed.

Did the Plaza Work?

One can never be sure what would have happened without the Plaza. The dollar's rise in the first half of the 1980s created a then-record US trade deficit. By 1985 officials in the United States and many other countries agreed that the dollar was overvalued.

The dollar had declined somewhat from its peaks in February (the yen) and March (the deutsche mark) 1985, but it was still at a historically high level (figure 11.1).[2] The depreciation briefly accelerated after the Plaza and then persisted for many months.

The rise of US external liabilities associated with the trade deficit probably would have contributed to downward pressure on the dollar at some point. But the evidence suggests that the Plaza helped speed the process of adjustment in an orderly manner.

The success of the Plaza had little to do with actual intervention in foreign exchange markets: G-7 official flows out of dollars (negative values) were negligible in 1985 and quickly returned to inflows in 1986 (figure 11.2).[3, 4] To the extent that the Plaza succeeded in pushing the dollar down, it had more to do with the message that was sent to financial markets about policy intentions and the implied threat of further dollar sales.

Intervention was far more pronounced (in the opposite direction) after the Louvre Accord of February 1987, in which G-7 ministers and governors stated that dollar depreciation had gone far enough. Japan conducted about half of the dollar buying that year, in a desperate attempt to cap the yen's rise. The yen did stabilize in 1988 and even depreciated a bit in 1989 (see figure 11.1). It is difficult to infer from this one episode whether intervention made a difference. Many economists were (and still are) skeptical.

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2. The dollar's strength against the yen at this time was less apparent than it was against the deutsche mark. Japan's rapid productivity growth and low inflation in the 1980s implied that the yen should have been appreciating steadily against the dollar since 1980.

3. Quarterly data on reserve stocks suggest that net dollar outflows were limited to the last two quarters of 1985 and the first quarter of 1986 (IMF *International Financial Statistics* database).

4. In this chapter I use the concept of financial flows as defined in the IMF's *Balance of Payments Statistics*. Financial flows include purchases or sales of and accrued earnings on assets in other countries. They do not include changes in the market values of assets. Flows out of dollars are defined as the sum of US flows into foreign assets and foreign flows out of US assets. The official sector refers to general governments and central banks. Some studies use data on official foreign exchange intervention, which refers to a subset of official purchases or sales of foreign assets with the specific intent of influencing the foreign exchange market.

**Figure 11.1   Exchange rate of the US dollar
against deutsche mark and yen,
January 1982–December 1989**

deutsche mark per dollar   yen per dollar
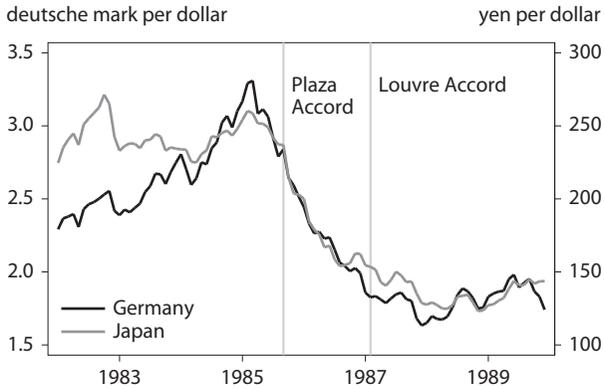
Source: IMF, *International Financial Statistics* database.

**Figure 11.2   Official net dollar flows by G-7 countries,
1980–2014**

billions of US dollars
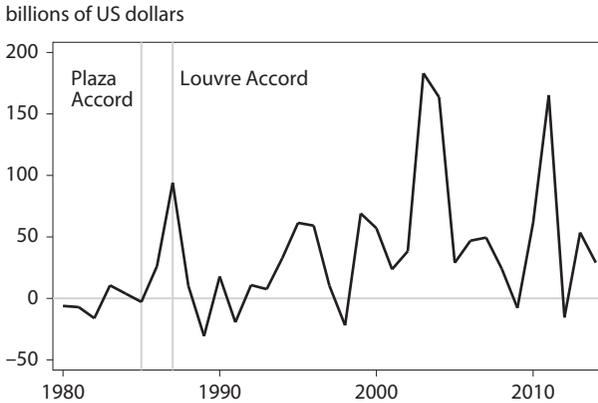
Note: G-7 net dollar flows are estimated as the sum of non-US G-7 foreign
exchange reserve flows minus US reserve flows.

Source: IMF, *Balance of Payments Statistics* database.

In 1983 a report of a G-7 working group under the leadership of Philippe Jurgensen highlighted the limits of sterilized intervention.[5] According to the report, "intervention did not generally have a lasting effect"; using it to pursue exchange rate objectives that are inconsistent with economic fundamentals, including monetary and fiscal policies, "tended to be counterproductive" (Jurgensen 1983, 17).

The Jurgensen Report was at odds with the view that intervention could have an effect through lasting changes in investor portfolios. In the portfolio balance model, private investors must be offered a higher return (lower price) in order to buy more of a given asset—or conversely must be offered a lower return (higher price) in order to sell some of a given asset (Tobin 1969, Branson and Henderson 1985). When governments sell one currency in exchange for another, they alter the supplies of both currencies available to the public. According to the portfolio balance theory, such changes in relative supplies of two currencies should affect their relative price (that is, the exchange rate).

An opposing view gaining adherents at the time was that financial markets are (nearly) efficient. According to the efficient markets theory, investors do not care about the currency composition of their portfolios. In an efficient market, all that matters for exchange rates are the current and expected future interest rates on each currency as well as any other policies and factors, such as tariffs and inflation rates, that affect the long-run equilibrium exchange rate. An influential article (Meese and Rogoff 1983) published the same year as the Jurgensen Report demonstrated that predicting exchange rates was nearly impossible and that portfolio balance models in particular were not useful in explaining exchange rates. The Jurgensen Report and the Meese-Rogoff article provided considerable support to the efficient markets view.

The Plaza and Louvre sparked numerous studies of the effects of intervention. Edison (1993) surveyed the first round of studies and concluded that any effect of sterilized intervention was at most temporary. The scholarly debate then focused on the conditions under which intervention might have a significant temporary effect—by, for example, accelerating the reaction to a long-lasting change in monetary or fiscal policy through what became known as the signaling channel (Dominguez and Frankel 1993, Obstfeld 1995, Sarno and

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5. Intervention is sterilized when it is not associated with a change in domestic interest rates, in particular the short-term interest rates closely associated with monetary policy. In this chapter, "intervention" refers to sterilized intervention. Unsterilized intervention is best described as a combination of intervention and monetary policy. In general, sterilization requires that the monetary authorities issue domestic bonds or sell domestic assets equal in value to the foreign exchange purchased. Unsterilized intervention implies a net increase in high-powered money and thus a reduction in the policy interest rate and a loosening of monetary conditions. It is widely agreed that monetary policy does have a lasting effect on the exchange rate. In practice, however, the vast majority of interventions are conducted without any change in monetary policy and are thus sterilized. In the context of a growing economy, intervention may be considered sterilized if the purchases of foreign exchange replace purchases of domestic assets that would have been necessary to keep the money supply on a steady growth path with stable interest rates.

Taylor 2001, Ito 2002, Dominguez 2003). Even the studies most supportive of intervention effectiveness were not able to show strong evidence of effects lasting beyond a few days or weeks.

By the turn of the millennium, skepticism about any independent long-term effect of foreign exchange intervention was widespread among academic economists. Truman (2003, 263) summarized the prevailing view in his comments on Dominguez (2003): "Intervention is not a separate instrument of policy that can be used regardless of the stance of other economic and financial policies; it is not effective in achieving discrete adjustments in exchange rates, moving them from one level to another and holding them there."

Intervention since the Plaza and Louvre

Coordinated intervention operations by the G-7 never returned to their intensity of 1987. The three highest points in figure 11.2 (2003, 2004, and 2011) primarily reflect unilateral dollar purchases by Japanese officials. Apparently, Japanese officials retained greater confidence in the effectiveness of intervention than the economics profession.

Figure 11.3 takes a broader perspective, displaying net official flows of nearly all countries into foreign currency assets.[6] These flows include purchases of and earnings on foreign exchange reserves and external sovereign wealth fund (SWF) assets minus official borrowing in foreign currency; reserves constitute by far the largest portion of these flows. Net official flows is the broadest measure of official intervention in foreign exchange (note that the scale in figure 11.3 is eight times larger than the scale in figure 11.2). It is the measure that the portfolio balance theory suggests is relevant for economic analysis, because it includes all government actions that affect the relative supplies of currencies. The burst of intervention with the Louvre Accord is not particularly noticeable compared with official flows after 2000.

These massive flows appear to be strongly correlated with the rise of imbalances in global trade since 2000.[7] Figure 11.4 displays aggregate data for countries with current account surpluses (the included countries change from year to year depending on whether they moved in or out of surplus).[8] Imbalances peaked in 2007 but remained at historically high levels during and after the global financial crisis of 2008, as countries resisted further current account adjustment.[9] This apparent relationship suggests that intervention may be

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6. The primary missing countries are oil exporters with large unreported SWFs: Bahrain, Brunei, Oman, Qatar, and the United Arab Emirates. Taiwan is also missing.

7. The current account balance is the sum of the balances on trade, income, and unilateral transfers. It reflects the difference between what a country earns from abroad and what it pays to foreigners. In most countries, it is dominated by trade.

8. The imbalance is understated because of the lack of data for Bahrain, Brunei, Oman, Qatar, Taiwan, and the United Arab Emirates.

9. Incomplete data for 2014 and the first half of 2015 suggest that the aggregate current account

Figure 11.3   Global net official flows, 1980–2013

billions of US dollars   percent of world GDP
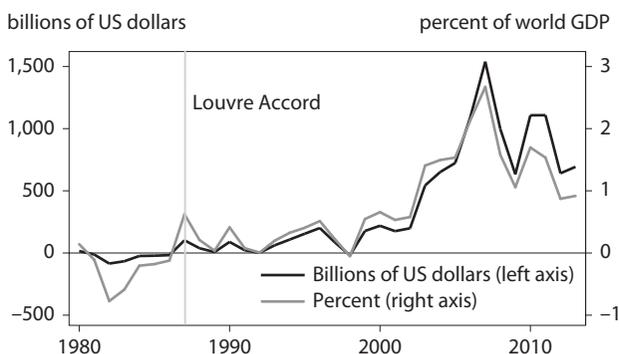
Note: Global net official flows are purchases of foreign currency reserves and other official foreign assets plus earnings on those assets minus official borrowing in foreign currency. Data exclude countries with unreported flows from sovereign wealth funds.

Source: Gagnon et al. (2015).

Figure 11.4   Aggregate net official flows and current account balance of all countries running surpluses, 1980–2013

percent of world GDP
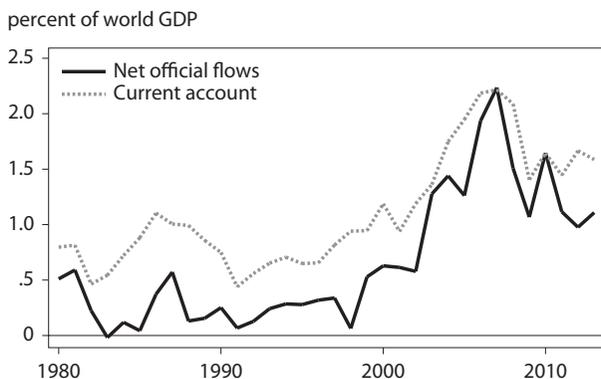
Note: See figure 11.3. Data are summed over all countries with a current account surplus in each year.

Source: Gagnon et al. (2015).

having an important sustained effect on exchange rates, which in turn affect current account balances. Perhaps the portfolio balance model is relevant after all—it just takes much larger movements in portfolios than observed in the 1980s and 1990s.

What countries are behind the rise and fall of net official flows since 2000? China is the single biggest contributor.[10] Also important are other Asian emerging economies, such as South Korea, Malaysia, the Philippines, and Singapore.[11] Oil exporters such as Kuwait, Norway, and Saudi Arabia loom large. Japan and Switzerland have made important contributions but with high volatility.

Effectiveness of Intervention Redux

Measuring the effect of intervention on the exchange rate is difficult because economists do not understand exchange rates well. An alternative approach is to look at the effect of intervention on the current account balance.

The Difficult Question of "What If Intervention Had Not Occurred?"

Figure 11.4 suggests that intervention can have a sustained and important effect, at least when conducted on a sustained and massive scale. But causality may run in both directions:

- A large intervention may hold down the exchange rate and create or sustain a current account surplus.
- An increase in the current account surplus may put upward pressure on the exchange rate, which a country may choose to resist by foreign exchange intervention.

The first possibility has causality running from intervention to the current account. The second has causality running from the current account to intervention. In the latter case, the question then becomes: What would happen if officials decided not to buy reserves? It is possible that the private sector would buy an equal volume of foreign assets (as implied by the efficient markets theory), but it is also possible that the exchange rate would appreciate and move the current account toward balance (as implied by the portfolio balance theory). To the extent that intervention reduces the appreciation that would otherwise occur, it is sustaining a current account surplus.

surplus has declined somewhat farther and the associated net official flows much farther since 2013. The Chinese current account surplus in particular has been increasingly supported by net private outflows.

10. Goldstein and Lardy (2009) provide a detailed account of how China's rapid economic development interacted with its exchange rate regime during the run-up of these large imbalances.

11. Subramanian and Kessler (2012) show that many Asian currencies increasingly move together with China's renminbi, perhaps reflecting a desire to remain competitive with China.

The difficulty of knowing what would have happened if a country had not intervened has been the bane of research in this area since the beginning. A key part of the problem is that exchange rates are highly volatile and nearly impossible to predict. Standard economic models suggest that changes in fundamentals often cause exchange rates to overshoot their long-run levels. Moreover, some of these fundamentals, such as expected long-run differences in price levels across countries or regulatory and institutional barriers to trade and financial flows, are difficult to measure. Exchange rates also respond to nonfundamental forces, such as financial market fads, manias, and noise trading, which are also difficult to measure

A recent paper (Adler, Lisack, and Mano 2015) finds an effect of intervention on the exchange rate that is roughly consistent with the findings I present here. According to its authors, an intervention of 1 percent of GDP that is sustained for several years will cause the exchange rate to depreciate by about 3 percent. To translate that result into an effect on the trade balance, I note that the median share of exports in GDP in the countries on which table 11.1 is based is about 40 percent. To be conservative, I focus on the share of exports that is not composed of imported parts and materials, about 70 percent, the median value for a group of advanced and emerging markets.[12] Together these data imply that domestic value added in exports has a median value of just over 25 percent of GDP. Applying a standard macro trade price elasticity of 1 to a depreciation of 3 percent at this median value implies that a sustained intervention of 1 percent of GDP increases the trade balance by 0.75 percent of GDP.

The Current Account as an Alternative Gauge

In ongoing research some colleagues and I have focused on the effects of net official flows (including intervention) on current account balances. We base our analysis on a framework that models current accounts across countries and over time in response to exogenous factors that affect desired saving and investment.

Economists have had more success in explaining current account balances than in explaining exchange rates. Current account surpluses in some countries must be associated with current account deficits in other countries because trade adds up around the world. In the absence of specific differences across countries in underlying saving and investment conditions, current account balances should be zero. Current accounts are flows, measured in the same dollars as net official flows, which makes the two concepts easier to relate to each other than to exchange rates, which are prices not flows. All of these considerations help to ease the "what if?" problem that bedevils work on the effectiveness of intervention.

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12. Data on value added in trade are from the Organization for Economic Cooperation and Development (OECD)–World Trade Organization (WTO) Statistics on Trade in Value Added database.

A key step in addressing the "what if?" problem is to identify episodes in which a country chose to borrow or lend abroad for reasons not related to pressures on the exchange rate. In the jargon of statistics, we use "instrumental variables" for net official flows. We tried many different instruments and specifications. Table 11.1 presents results for a set of instruments that we like, but we obtained broadly similar results in a previous paper using two entirely different sets of instruments (Bayoumi, Gagnon, and Saborowski 2015). One principle we believe is useful is that official responses to exchange rate pressures are generally conducted using foreign exchange reserves as well as monetary and fiscal policy. Borrowing for development projects and flows out of SWFs proceed out of longer-term motivations; these flows are thus good instruments for net official flows.

We find that restrictions on cross-border financial flows have a powerful influence on the way the current account responds to economic factors. In the extreme case of no private capital mobility, only the government can lend or borrow abroad and the current account must equal net official flows. In this case other factors have no effect on the current account. The exchange rate moves to keep the demand for (supply of) foreign currency from net official flows equal to the supply of (demand for) foreign currency from the current account balance.[13] As channels for private capital flow open up, other factors may affect the current account and the tight link between net official flows and the current account is loosened. However, if private investors care about the currency composition of their portfolios, net official flows will affect the exchange rate, and thus the current account, even in the absence of capital flow restrictions. Our measure of capital mobility is the Aizenman-Chinn-Ito (2015) inverse index of legal barriers to capital flows, which ranges from 0 (substantial restrictions on all categories of capital flows) to 1 (no legal barriers to capital flows).[14]

Statistical Results

Table 11.1 presents averages of coefficients from instrumental variables regressions of equations 2.1 and 2.2 in Gagnon et al. (2015).[15] The current account is regressed on the variables listed on the left as well as the products of each

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13. To some extent the government itself may create the link between official flows and the current account. It may, for example, borrow and use the proceeds to purchase machinery and equipment for a development project. In such a case the exchange rate would not need to move at all.

14. The median value in the estimation sample is 0.45. About 5 percent of observations take the value of 0, and 25 percent take the value of 1. A value of 0 does not imply the complete absence of private capital flows, and a value of 1 may still be consistent with implicit costs and barriers to capital flow.

15. The dependent variable in equation 2.1 is the current account. The dependent variable in equation 2.2 is net private flows. Net investment income is subtracted from both dependent variables. For equation 2.2 the reported coefficient on net official flows is 1 plus the estimated coefficient, based on the accounting identity that the current account equals net private flows plus net official flows.

Table 11.1   What moves the current account balance?

Dependent variable: (Current account – net investment income)/trend GDP

Variable	Capital mobility = 0	Capital mobility = 1
Inverse index of legal restrictions on capital mobility [0 – 1]	–0.01	0.05**
Share of private financial in total cross-border transactions [0 – 1]	0.01	–0.11**
Per capita GDP relative to United States	0.03	–0.02*
Projected population aging	2.79	1.51
Lagged five-year growth rate	0.04	–0.61**
Net energy exports/trend GDP	0.27**	–0.01
Fiscal balance/trend GDP	0.17**	0.54**
Net official flows/trend GDP	0.72**	0.31**
Lagged net official assets/trend GDP	–0.01	0.03**
R^2		0.49
Observations		2,053

* Statistically significant at the 5 percent level; ** statistically significant at the 1 percent level.

Note: Instrumental variables for net official flows are the nonreserves portion of net official flows and a dummy variable for external crisis in the previous three years (Laeven and Valencia 2012). Sample includes 141 countries over 1985–2014. Many countries are missing data for some years.

Source: Data from Gagnon et al. (2015).

of those variables and the index of capital mobility. The first column displays the coefficients on the listed variables; the second column displays the sums of the coefficients in the first column and the coefficients on the listed variables times capital mobility. The numbers in the first column thus reflect the effects of the listed variables when the capital mobility measure is 0. The numbers in the second column reflect the effects of the listed variables when the mobility measure is 1. For countries and years with mobility measures between 0 and 1, the implied effects lie between those of column 1 and column 2. All regressions include a full set of year effects.

The first two explanatory variables in table 11.1 are measures of capital mobility and financial market depth and integration with the rest of the world. The expected signs of the coefficients of these variables are theoretically ambiguous. Demographic and other structural factors determine whether a country is a net borrower or lender in global markets. Openness, depth, and integration of capital markets merely facilitate a country's ability to borrow or lend.

The first coefficient in the first column implies that in countries with the tightest restrictions on capital flows, increasing capital mobility has a tiny and statistically insignificant negative effect on the current account. At some point, however, the effect of removing capital flow restrictions turns positive; by the time all restrictions are removed, it has a significant effect. The coefficient of 0.05 under high capital mobility implies that, other things equal,

a country with completely open capital markets will have a current account surplus of 5 percent of GDP.

The second variable is based on the depth of a country's financial market integration with the rest of the world. It is defined as the share of private financial transactions in total cross-border transactions (including exports and imports). It is another measure of the ease of borrowing and lending across a country's borders. Because it is constructed as a share, it is bounded by 0 and 1.[16] Increasing financial integration is associated with a statistically significant decrease in the current account for high-mobility countries.

The third variable is per capita GDP relative to the United States. This variable has a very small negative effect on the current account under high mobility.

The fourth variable is the projected change in the ratio of the population over the age of 64, which has an economically important but statistically insignificant positive effect on the current account. This effect presumably reflects saving for retirement.

The fifth variable is the lagged five-year economic growth rate, which is meant to proxy for trend growth potential. Fast-growing countries are expected to borrow more because they have more investment opportunities and thus a smaller current account balance. Our regressions confirm this expectation, especially when capital markets are more open for external borrowing: Under high mobility a 1 percentage point increase in trend growth reduces the current account by 0.6 percent of GDP.

The sixth variable is net energy exports, which have a moderate positive effect under low mobility and no effect under high mobility. Under low capital mobility, a $1 increase in net energy exports increases the current account $0.27.

The seventh variable is the fiscal balance. A higher fiscal balance (smaller government budget deficit) is associated with a higher current account balance. As expected this effect is larger when capital markets are more open. Under high mobility a $1 increase in the fiscal balance increases the current account by $0.54.[17]

The eighth variable is net official flows (including foreign exchange intervention). For each $1 of net official flows, the current account increases $0.72 under low mobility and $0.31 under high mobility.

The ninth variable reflects a persistent effect of past official flows, such that for each $1 of the net stock of official foreign assets (including foreign exchange reserves) the previous year, the current account is little affected under low mobility and increases $0.03 under high mobility. Because the lagged stock

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16. The median value in the estimation sample is 0.10; 95 percent of observations take values less than 0.27.

17. This result rejects the proposition of Ricardo neutrality, which argues that private saving behavior fully offsets any saving or borrowing by governments.

of net assets is often many times greater than the net flows in a given year, this stock effect is important when mobility is high.

The coefficient on lagged net assets arises purely from the portfolio balance, which relates to the stocks of assets people own. The government's amassment of a large stock of foreign exchange (paid for with domestic currency) puts upward pressure on the value of foreign currency and downward pressure on the value of domestic currency. As long as the government retains the foreign-currency assets, private portfolios have less exposure to foreign currencies than they otherwise would. This ongoing scarcity of foreign currencies keeps their value high. Without private capital mobility, the portfolio balance effect cannot operate, which explains why the coefficient on the net asset stock increases with capital mobility.

The coefficient on the net official flow combines a portfolio balance component (this year's stock equals last year's stock plus this year's flow) with a direct effect that arises from imperfect capital mobility. As expected, when the mobility of private capital is very low, the coefficient on net official flows is close to 1. As private capital mobility increases, this coefficient decreases, as shown in table 11.1.

An issue that is not directly addressed in the regression results displayed in table 11.1 is that of dynamic adjustment or lags. The effect of intervention on the exchange rate is expected to be very rapid. In contrast, the effect of the exchange rate on trade and the current account is generally believed to take place over a period of about two years. Some of the effect of intervention ought to show up the same year as the intervention, but some ought to occur the following year, and a small amount might even linger into a third year. The residuals of the regression in table 11.1 suggest that such dynamics may be important, but it has not been possible to model them, because they appear to differ across countries and across independent variables.[18] The coefficients are best interpreted as capturing the long-run effect of intervention and other factors, not the immediate effect.

Overall, the results in table 11.1 suggest that intervention in foreign exchange markets—broadly defined as net official flows, both current and lagged—has very large effects on the current account balance but that it is hardly the only factor at work.[19]

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18. First-order autocorrelation of the residuals in table 11.1 is about 0.7.

19. Recent research also shows that portfolio balance effects are at work in government transactions with domestic assets, in particular the new monetary tool commonly known as quantitative easing (QE). Numerous studies find that large-scale purchases of long-term bonds significantly increase the prices of (reduce yields on) bonds purchased and bonds with similar characteristics (Gagnon and Hinterschweiger 2013).

Figure 11.5 Norway's current account, net energy exports, and sovereign wealth fund (SWF) flows, 1993–2014

percent of GDP
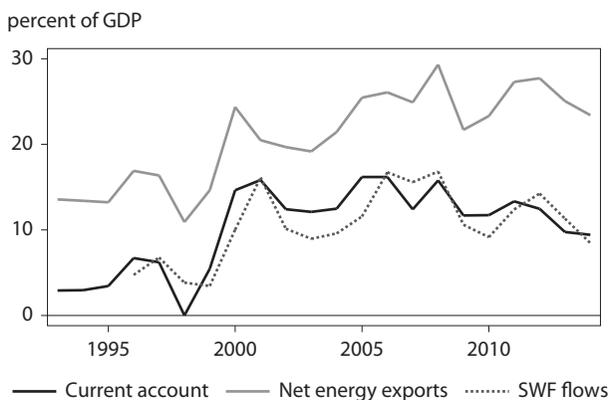
Sources: IMF, *International Financial Statistics*; Norwegian Ministry of Finance; World Bank, *World Development Indicators*.

Case Studies

As an alternative to the dry statistics in table 11.1, it may be useful to examine historical examples of movements in net official flows and their effect on current account balances. These case studies allow the issue of causality to be studied in greater depth, providing a useful reality check on the instruments used in the statistical analysis. They help reveal how convincing the answer to the question "what if foreign exchange intervention had not occurred?" is.

The examples are not intended to be typical: I cherry-picked examples of large movements in net official flows that were associated with large movements in current account balances. The purpose is not to deny that other factors can be important and can sometimes mask the correlation between net official flows and current accounts but rather to show that in important cases when the two variables move together, the underlying motivation for the net official flows was not to stabilize the exchange rate in response to the current account. This evidence provides extra assurance that foreign exchange intervention really is having an important effect on the current account.

Sovereign Wealth Funds: Norway

Figure 11.5 displays data for Norway after it switched to a floating exchange rate in 1992. The country is a major oil exporter. In 1996, to save for future generations, the government began to set aside a portion of the revenues from oil exports in an SWF. The dark line in figure 11.5 is the current account balance; the dotted line is SWF flows into foreign assets, which are equivalent to foreign exchange intervention; and the light grey line is net energy exports. All are expressed as percent of Norwegian GDP.

The close relationship between SWF flows and the current account is striking (figure 11.5). Revenues minus expenses in the oil sector plus returns on the assets of the SWF drive flows into Norway's sovereign wealth fund. Global oil prices and long-term production plans that are essentially exogenous to the Norwegian economy drive oil revenues. Returns on the SWF assets are also exogenous to Norway. The government has taken the conservative philosophy of drawing down only about 4 percent of the value of SWF assets a year for current budgetary needs.[20]

The key point for the analysis here is that the exchange rate plays essentially no role in the setting of SWF flows. Indeed, since Norway moved to a floating exchange rate in 1992, flows into and out of foreign exchange reserves have been small. As Norway has no external official debt, SWF flows dominate net official flows.

Some observers would argue that Norway's current account surplus mainly reflects the fact that it is a net oil exporter and not that it has large net official flows. The results in table 11.1 show that energy exports have essentially no long-term effect on the current account balance of a country with high capital mobility, as Norway does. Moreover, many current and former net oil exporters—including other medium-size advanced economies, such as Australia and Canada—have run current account deficits;[21] the world's largest oil exporter, Saudi Arabia, had a current account deficit for most of the 1980s and 1990s. Although oil exports have little long-term effect on the current account, there is a significant temporary effect, which means that increases in oil revenues boost the current account and SWF flows at the same time. This temporary effect of changes in net oil revenues explains the apparent lack of any lag in the connection between SWF flows and the current account in figure 11.5.

Norway's SWF flows correspond closely to its overall fiscal balance. Based on data from Norway alone, one would not be able to determine whether the current account surplus arises from SWF flows or the fiscal surplus. However, data for other countries show that fiscal surpluses often do not lead to current account surpluses in the absence of net official flows. Australia is a case in point. Its fiscal balance moved into sustained surplus after 1997, yet its current account balance became even more negative. Other factors are surely responsible for Australia's current account deficit, but it seems unlikely that Norway's current account surplus would remain as large as it is if a substantial portion of the fiscal surplus were invested at home. The results of table 11.1 suggest that both the fiscal surplus and foreign exchange intervention (in the form of SWF flows) play roles in sustaining Norway's large current account surplus.[22]

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20. There is some allowance for countercyclical fiscal policy, but these changes are small relative to the changes induced by oil prices.

21. In 2014 Australia had a net energy balance of 11 percent of GDP and a current account balance of –3 percent of GDP. The analogous figures for Canada were 8 percent and –2 percent.

22. These results are strong evidence against Ricardo neutrality in Norway. If Norwegian households had reduced their saving by an amount equal to the increase in public saving after 1996,

Figure 11.6   Morocco's current account, official external borrowing, and net official flows, 1975–89

percent of GDP
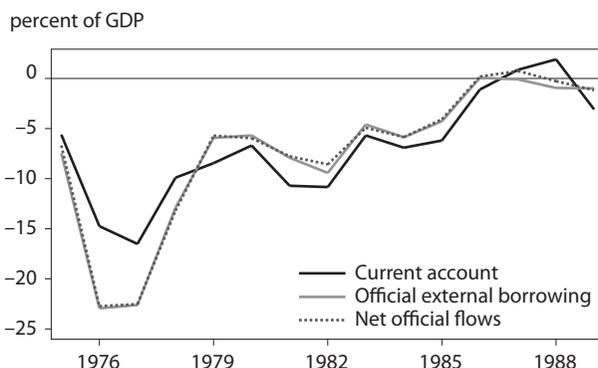
Sources: IMF, *International Financial Statistics* database and yearbooks.

External Borrowing for Development: Morocco

Morocco is a medium-size rapidly growing middle-income economy. Its history is not particularly unusual. In the late 1970s the Moroccan government launched a large-scale public sector investment boom to help boost economic development. The borrowing binge continued into the early 1980s. Although the investments were not entirely wasted, they did not yield returns as high as expected, and the government had difficulty repaying its loans.

Under the tutelage of the International Monetary Fund (IMF) and the World Bank, the Moroccan government was weaned off foreign borrowing, had its debts restructured through Brady bonds, and adopted a private sector export-oriented development strategy (Friedman and Sharkey 2010). Secretary Baker started the consultative process that eventually produced Brady bonds through his 1985 Baker Plan.

Net official flows during this episode were composed almost entirely of official external borrowing (figure 11.6). Morocco bought and sold very few foreign exchange reserves at this time, but, from the viewpoint of the portfolio balance model, official borrowing in a foreign currency has effects comparable to those of negative foreign exchange intervention. According to the IMF, Morocco allowed a considerable degree of exchange rate flexibility throughout the 1980s before moving to a more tightly managed exchange rate in 1990.[23]

Norway's current account (which reflects the difference between saving and investment in Norway) would not have risen.

23. The IMF's coarse scale of exchange rate regimes (1= tight peg, 4 = freely floating) rates Morocco as a 3 for most of the 1970s and 1980s, switching to a 1 starting in 1990. Purchases of foreign exchange reserves jumped significantly with the start of the peg (see www.carmenreinhart.com/data/browse-by-topic/topics/11/ [accessed on August 20, 2015]).

As the country increased its official external borrowing, the current account moved into deep deficit.[24] As it gradually eliminated external borrowing, both net official flows and the current account returned to zero. The effect of net official flows on the current account in Morocco is very clear.

Political Pressures on Intervention Policy: South Korea

South Korea was hit hard by the Asian financial crisis of 1997–98. A sharp economic downturn and the sudden cessation of foreign capital inflows quickly turned the Korean current account deficit into a surplus by 1999. The government decided to rebuild and then greatly increase its stock of foreign exchange reserves as a war chest against future turbulence. The current account surplus was 2 percent of GDP in 2000, and net official flows, mainly reserve accumulation, totaled more than 4 percent of GDP (figure 11.7). The Korean currency (the won) bottomed out against the US dollar in 2001 and rose modestly in 2002. The Korean government gradually reduced the pace of reserve accumulation and the current account surplus remained around 1 percent of GDP in 2001 and 2002.

In 2003 Korea experienced strong demand for its exports as well as an increase in net private capital inflows. These factors put unwelcome upward pressure on the won at a time when a credit card crisis weakened domestic spending. The Korean government resisted these upward pressures by stepping up intervention markedly. Both exports and intervention continued to boom in 2004, and the government allowed only a relatively modest amount of exchange rate appreciation. The record-setting purchase of reserves in 2004 (6 percent of GDP) attracted a great deal of negative publicity amid reports that the government was losing money on the reserves as the dollar fell against the won.[25] Opposition politicians criticized the losses on reserves and questioned whether the level of reserves was excessive (Noland 2007, Kim 2011).

At least partly in response to this political pressure, the Korean government reduced intervention purchases sharply in 2005, allowing the won to appreciate more quickly.[26] Intervention declined further in 2006 and 2007, as the won continued to appreciate. Figure 11.7 clearly shows that this politically driven decision to change intervention policy had a pronounced effect on the current account balance. Declining intervention led quickly to a declining current account.

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24. As Morocco had the lowest possible measure of capital mobility (0) from 1975 through 1985, direct government actions probably played an important role in current account outcomes. To the extent that the government and public sector corporations used the proceeds of the foreign loans directly to import machinery and supplies, the exchange rate may not have needed to move by much and the lags would have been short.

25. In 2005 the government began to report information on its derivatives position in foreign exchange, which revealed a substantial loss from won appreciation.

26. In 2005 Korea established an SWF (the Korea Investment Corporation) to earn better returns on a portion of the accumulated foreign assets.

**Figure 11.7   Korea's current account, exchange
rate, and net official flows, 2000–07**
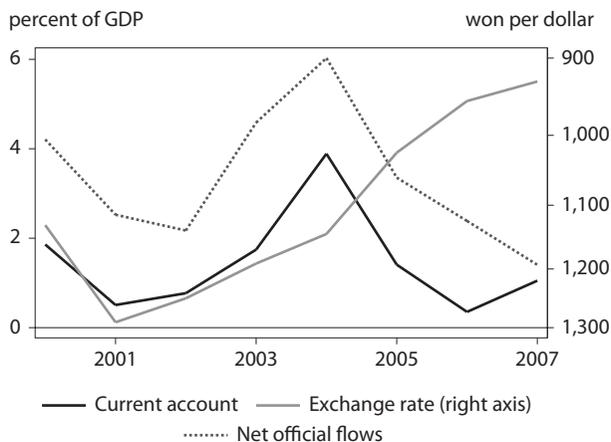
Sources: IMF, *Balance of Payments Statistics* and *International Financial Statistics*
databases.

The Korean experience suggests strongly that even when intervention is an
endogenous response to exchange rate pressures, the answer to the "what if?"
question is clear:[27] If a country chooses not to intervene, its current account
will be lower than if it does intervene.

Contributions to Recent Current Account Imbalances

Table 11.2 lists the countries with the eight largest current account surpluses
(excluding net investment income) in 2013 among countries that also report
net official flows.[28] Despite a decline in the price of its oil exports, Russia's
surplus grew as its economy slowed. Surpluses also appear to be increasing
in China, Korea, and Singapore. In contrast, slow growth in the euro area and
a strong currency are putting downward pressure on Switzerland's surplus.
Limited data suggest that net official flows dropped sharply in 2014 and
2015 in most of these countries, reflecting both a reduction in oil revenues
to be invested through SWFs and net outflows of private capital in China and

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27. After the global financial crisis of 2008–09, in which it drew down a modest portion of its
reserves, Korea decided to resume large-scale purchases of foreign exchange reserves. Its current
account surplus has increased dramatically.

28. Net investment income is excluded, because the regressions in table 11.1 are based on current
accounts minus net investment income. Missing data do not permit a full accounting of imbal-
ances in 2014. Declines in oil prices led to smaller surpluses in Kuwait, Norway, and Saudi Arabia
in 2014, with further declines likely in 2015. Current account estimates and projections for 2014
and 2015 are from the IMF's *World Economic Outlook* database.

Table 11.2 Contributions to global current account imbalances, 2013
(billions of US dollars)

Country	2013 current account (excluding investment income)	Model-fitted current account	Contribution of net official flows	Contribution of net official stock	Capital mobility measure
China	243	267	306	−5	0.16
Russia	101	54	−12	8	0.65
Saudi Arabia	121	97	31	13	0.70
Kuwait	58	67	27	7	0.70
South Korea	72	38	20	8	0.71
Norway	52	71	20	21	1.00
Singapore	54	38	3	21	1.00
Switzerland	35	28	5	15	1.00
Total	736	660	400	88	

Source: Table 11.1 and author's calculations.

Russia that put downward pressure on their exchange rates. It appears that, to the extent that they persisted, global imbalances in 2015 were being driven mainly by market forces rather than government intervention.

Of the countries included in table 11.2, China had the least open financial markets and the largest current account surplus ($243 billion). The fitted value of the statistical model shown in table 11.1 calls for a Chinese surplus of $267 billion, slightly more than the actual surplus but reasonably close considering that the model explains only about half the variation in current account balances. According to the model, the Chinese surplus derives entirely from Chinese net official flows, which, in turn, are composed almost entirely of foreign exchange intervention. Factors operating in the opposite direction include China's rapid trend growth and its negative net energy exports (not shown in table 11.2).

For the four major oil exporters in the sample, the model explains only about half of Russia's surplus; it does considerably better for Saudi Arabia, Kuwait, and Norway. Russia was a net seller of foreign exchange reserves in 2013. The main factors in the model that support Russia's surplus are an aging population and large net energy exports. A factor that is not in the model of table 11.1 is pessimism among investors about Russia's economic prospects in the context of Western sanctions over Ukraine. This pessimism (both inside and outside Russia) drove private financial flows out of Russia, weakening the ruble and supporting a large current account surplus. Official flows and stocks explain $44 billion of Saudi Arabia's $121 billion surplus, $34 billion of Kuwait's $58 billion surplus, and $41 billion of Norway's $52 billion surplus. Other factors contributing to surpluses in these countries include positive net energy exports and fiscal balances (not shown).

For Korea, Singapore, and Switzerland, net official flows and stocks explain 40–50 percent of the current account surpluses. Aging populations and fiscal balances explain another 25 percent in Singapore, 35 percent in Switzerland, and 50 percent in Korea of the surpluses. In Korea and Singapore, negative net energy exports and relatively rapid growth rates work in the opposite direction to reduce surpluses.

Taken together official flows and stocks explain $488 billion of the $736 billion in surpluses of these eight countries in 2013.

Policy Implications

The primary objective of this chapter is to demonstrate that foreign exchange intervention, and official financial flows more broadly, have important and lasting effects on the world economy. Indeed, net official flows are the single biggest factor behind global current account imbalances between 2000 and 2013, especially when account is taken of the lagged effect of these flows.

Official flows are not the only source of current account imbalances: Imbalances driven by market forces and economic policies other than net official flows have sometimes reached unhealthy levels. The Plaza Accord occurred at one of those times. In 2015 market forces again appeared to be driving imbalances. The evidence presented in this chapter demonstrates that foreign exchange intervention can be a useful tool to counter market-driven imbalances.

Not all current account surpluses and deficits are undesirable. Current account imbalances may reflect economic fundamentals, both cyclical and secular. Countries experiencing temporarily strong domestic demand tend to have deficits, and countries in recession tend to have surpluses. Fast-growing developing economies with relatively youthful populations should have persistent modest deficits as they borrow to finance productive capital. Conversely, slow-growing advanced economies with rapidly aging populations should have persistent modest surpluses as they save for retirement.[29] But experience shows that large imbalances often lead to financial crises, so that imbalances should normally be limited to less than 3 percent of GDP, especially for the largest economies.[30] The main exception to this rule concerns countries in which exports of nonrenewable natural resources constitute a large share of GDP. There is a strong case for saving a significant fraction of net revenues from resource extraction. When the domestic economy is small in relation to resource exports, much of these savings must flow abroad. The appropriate degree of net foreign saving will vary across resource-exporting countries, but

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29. As an aging advanced economy, the United States should be running a current account surplus, albeit a smaller one than Japan or Europe, which are growing more slowly and aging more rapidly. The persistence of the US deficit provides further evidence of the lasting harm caused by excessive currency intervention in many countries.

30. In their widely cited work on fundamental equilibrium exchange rates, Cline and Williamson (2011) define sustainable current account balances as lying between –3 percent and +3 percent of GDP. They cite several studies that support a range of this magnitude.

in all cases it should be considerably less than 100 percent of resource revenues net of production costs. A number of oil-exporting countries had net official flows close to net resource revenues in recent years, suggestive of excessive net foreign saving. Surpluses of commodity exporters diminished sharply in 2014 and 2015.

Long after their peak in 2007, official flows and current account imbalances remained substantial by historical standards. Net official flows appear to be down sharply in 2015, but the reasons behind the decline may not be long-lived. Officials everywhere can now see that several Asian economies, a few oil-exporting countries, and Switzerland managed to sustain large current account surpluses through massive foreign exchange intervention or SWF outflows. They will be tempted to use this policy instrument to deliver growth through exports in the next economic slowdown. Even if China, Japan, and other large countries restrain themselves, as they have pledged in the G-20, many smaller economies may not.[31] Indeed, as recently as 2014, Korea had net official flows of nearly 4 percent of GDP and a current account surplus of more than 6 percent of GDP, figures that seem inconsistent with its G-20 commitments. The risk of a real currency war at some future date, with beggar-thy-neighbor policies on a large scale, is serious.

Some observers have mistakenly argued that loose monetary policy in the major advanced economies constitutes a currency war aimed at emerging markets. However, monetary policy and foreign exchange intervention are very different, in both design and effect. Monetary policy is conducted in domestic markets with domestic financial instruments. It is designed to increase spending at home. A side effect is to weaken the exchange rate, which dampens imports, but the increased domestic spending counteracts the exchange rate effect on imports and there are positive financial market spillovers. A series of reports by the IMF shows that the net effects of monetary easing in the advanced economies on emerging markets are rather small and generally positive (e.g., IMF 2015). In contrast, the purpose of foreign exchange intervention is to shift spending away from foreign competitors toward domestic producers; it has no other effects and is thus a pure beggar-thy-neighbor policy.

Because it involves the purchase of assets in foreign countries, there is a strong presumption that intervention policy should be subject to international rules. A minimum standard for rules on foreign exchange intervention would be to prevent destabilizing behavior. For example, countries with more than adequate stocks of reserves should not be allowed to buy additional reserves

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31. At the St. Petersburg summit of September 2013, G-20 leaders declared: "We reiterate our commitments to move more rapidly toward more market-determined exchange rate systems and exchange rate flexibility to reflect underlying fundamentals, and avoid persistent exchange rate misalignments. We will refrain from competitive devaluation and will not target our exchange rates for competitive purposes." Similar statements have been made since Seoul in 2010; G-20 finance ministers reiterated this pledge in Ankara in September 2015. G-20 materials are available at https://g20.org/.

when they have a sustained current account surplus.[32] A country in such a position that has a fixed exchange rate should be required to use monetary policy to stabilize its exchange rate or revalue or float. The rule should be symmetric, in that countries with less than adequate reserves should not be allowed to sell reserves if they have a sustained current account deficit.[33]

A stronger standard would encourage proactive stabilizing behavior. Countries would agree on reference ranges for currencies designed to keep current account balances close to zero (Williamson 2007). Given the uncertainty and likely disagreement on equilibrium currency values, the reference ranges would need to be fairly wide (bands of at least 10 and probably 20 percent). When exchange rates move outside these ranges, countries would be encouraged to intervene in a stabilizing direction to encourage a return to rates within the bands. Countries would retain independent monetary and fiscal policies aimed at full employment and low inflation. Reference ranges are fully consistent with floating exchange rates, as there would be no specific target for the exchange rate or even any commitment to keep it within the range.[34] All that would be implied would be a modicum of intervention when the exchange rate fell outside a reasonable range. Occasional intervention to push exchange rates toward their equilibrium values is pretty much what the Plaza and Louvre were all about.

Conclusion

At the time of the Plaza Accord there was widespread skepticism that foreign exchange intervention was a potent tool for managing exchange rates and current account imbalances. We now know that intervention is effective—it just takes far larger magnitudes of intervention than anyone (except the Japanese) was willing to contemplate in the 1980s. Massive purchases of foreign assets by governments have been a key driver of the unprecedented current account imbalances since 2000.

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32. Exporters of nonrenewable resources would be allowed to purchase foreign assets while running current account surpluses within agreed limits. Switzerland poses an interesting question, as it faces deflationary pressure while its short-term policy interest rate is at the zero lower bound. Svensson (2003) proposes using the exchange rate (supported by intervention) as part of a strategy for monetary easing at the zero bound. He ignores the spillover effects of his strategy on other countries. For a discussion of unconventional policy options in Switzerland, see Gagnon (2014).

33. A minimum standard along these lines would seem to follow from the IMF Articles of Agreement, which state that "members shall... avoid manipulating exchange rates or the international monetary system in order to prevent effective balance of payments adjustment or to gain an unfair competitive advantage over other members" (Article IV, Section 1). However, the IMF lacks appropriate sanctions to enforce this stricture. Even getting the IMF Executive Board to publicly identify members in violation of Article IV has proved impossible in recent years (Blustein 2013).

34. Bergsten and Williamson (1983) originated the idea of target zones for the major exchange rates. It is a stronger version of reference ranges, in that it implies some commitment to maintaining exchange rates within the zones.

Net official flows (including intervention) appear to be down sharply this year, as low commodity prices reduce outflows from SWFs and a wave of pessimism has sparked private outflows from Brazil, China, and other emerging markets. This situation is not likely to persist indefinitely, but it may present a useful opportunity, as countries are more likely to agree to forceful rules at a time when the rules would not impinge on their behavior. Countries that would benefit from forceful rules, primarily the United States, should press hard for their adoption.

The case for new and forceful rules to limit official flows is persuasive. They are needed not only to help counter market excesses but also to prevent a devastating round of beggar-thy-neighbor devaluations in the next global recession. This is no time for complacency.

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