Working Paper

Foreign Exchange Intervention Since Plaza: The Need for Global Currency Rules

Joseph E. Gagnon, Ph.D.
Senior Fellow, Peterson Institute for International Economics

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This paper is a work in progress and has not been submitted for editorial review.
The Plaza Agreement of September 1985 marked the beginning of global coordinated efforts to manage exchange rates in the floating exchange rate era. Plaza involved much more than intervention in foreign exchange markets, but that was a major element in the public’s eye and it is the focus of this paper.

Many economists and officials were, and remain, skeptical that intervention can have significant sustained effects on exchange rates and current account balances. The evidence of 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 Agreement, 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 Agreement do not dominate the global economy as they did in the 1980s; emerging and developing economies

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1 Senior Fellow at the Peterson Institute for International Economics. I thank Fred Bergsten, Bill Cline, Hali Edison, Josh Felman, Signe Krogstrup, Marc Noland, Brad Setser, and Ted Truman for helpful comments.

2 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 each other after 1973, including most notably the Exchange Rate Mechanism in the European Community (European Union after 1992).
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, we need forceful global rules on currency management.

**Did Plaza Work?**

We can never be sure what would have happened without 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 foreign countries agreed that the dollar was overvalued. 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 Plaza helped to speed the process of adjustment in an orderly manner. Figure 1 displays the exchange rates of the dollar against the deutschmark (DM) and the yen, with a vertical line denoting the date of Plaza. The dollar had declined somewhat from its peaks in February (yen) and March (DM) 1985, but it was still at a historically high level.³ The depreciation briefly accelerated after Plaza and then persisted for many months.

The success of Plaza had little to do with actual intervention in foreign exchange markets. Figure 2 shows that G-7 official flows out of dollars (negative values) were negligible in 1985 and quickly returned to inflows in 1986.⁴ ⁵ To the extent that Plaza succeeded in

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³ The dollar’s strength against the yen at this time was less apparent than it was against the DM. 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.
⁴ Quarterly data on reserve stocks suggest that dollar outflows were limited to the last two quarters of 1985 and the first quarter of 1986. (International Monetary Fund, *International Financial Statistics* database)
⁵ In this paper I use the concept of financial flows as defined in the *Balance of Payments Statistics* of the International Monetary Fund. 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
pushing the dollar down, it must have 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 1.) It is difficult to infer from this one episode whether intervention made a difference. Many economists were (and still are) skeptical.

Shortly before Plaza, in 1983, a report of a G-7 working group under the leadership of Philippe Jurgensen highlighted the limits of sterilized intervention. According to the report, “intervention did not generally have a lasting effect” and using intervention 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 lasting effects through changes in investor portfolios. In the portfolio balance model, private investors

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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.

6 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 paper, “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 intervention operations 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.
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 and Branson and Henderson 1985). When governments sell one currency in exchange for another, they alter the supplies of those currencies available to the public. According to the portfolio balance theory, such changes in relative supplies of two currencies should affect their relative price, in other words, the exchange rate.

However, 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. With efficient markets, 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 was published in the same year as the Jurgensen Report, which demonstrated that predicting exchange rates was nearly impossible, and that portfolio-balance models in particular were not useful in explaining exchange rates (Meese and Rogoff 1983). The Jurgensen Report and the Meese-Rogoff article provided considerable support to the efficient markets view.

Plaza and Louvre sparked numerous studies of the effects of intervention. Hali 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, for example by 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 Taylor 2001,
Ito 2002, and 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, it is fair to say that skepticism about any independent long-term effect of foreign exchange intervention was fairly widespread among academic economists. Edwin 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 Plaza and Louvre

1987 marked the high point of G-7 coordinated intervention operations. However, the three highest points in figure 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 3 takes a broader perspective, displaying net official flows of nearly all countries into foreign-currency assets. 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. More to the point, it is the measure that the portfolio balance theory suggests is the relevant one for economic analysis because it includes all government actions that affect the relative supplies of currencies. Note

Footnote 7: The primary missing countries are oil exporters with large unreported sovereign wealth funds (SWFs): Bahrain, Brunei, Oman, Qatar, and the United Arab Emirates. Taiwan is also missing.
that the scale in figure 3 is eight times larger than that in figure 2. The burst of intervention with the Louvre Accord is not particularly noticeable compared to the flows after 2000.

These massive flows appear to be strongly correlated with the rise of global current account (or trade) imbalances since 2000. Figure 4 displays 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). The solid line is their combined net official flows and the dashed line is their combined current account surplus. The imbalances peaked in 2007 and have declined since then. This apparent relationship suggests that intervention may be 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 we 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. Also important are other Asian emerging economies, such as Malaysia, Korea, the Philippines, and Singapore. Oil exporters such as Kuwait, Norway, and Saudi Arabia loom large. Finally, Japan and Switzerland have contributed importantly, but with high volatility.

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8 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. For most countries, the current account is dominated by trade.
9 The imbalance is understated because of the lack of data for Bahrain, Brunei, Oman, Qatar, Taiwan, and the United Arab Emirates.
10 Incomplete data for 2014 and the first half of 2015 suggest that the aggregate current account surplus has declined somewhat further and the associated net official flows have declined a lot further since 2013. The Chinese current account surplus in particular has been increasingly supported by net private outflows.
11 Morris Goldstein and Nicholas 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.
12 Arvind Subramanian and Martin Kessler (2012) show that many Asian currencies increasingly move together with China’s renminbi, perhaps reflecting a desire to remain competitive with China.
Effectiveness of Intervention Redux

Figure 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 decide not to buy reserves? It is possible that the private sector would buy an equal volume of foreign assets instead (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.

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 economists do not have workable models of exchange rates. Exchange rates are highly volatile and nearly impossible to predict. They respond to forces that are intrinsically difficult to measure, such as financial market fads and manias, noise trading, and a plethora of
regulatory and institutional barriers to trade and financial flows.\footnote{Nevertheless, a recent paper finds an effect of intervention on the exchange rate that is roughly consistent with (indeed larger than) our findings below (Adler, Lisack, and Mano 2015). According to this paper, an intervention of 1 percent of GDP that is sustained for several years will cause the exchange rate to depreciate around 4 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 in table 1 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. 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 4 percent at this median value implies a sustained increase in the trade balance equal to 1 percent of GDP. (Data on value added in trade are from the Organization for Economic Cooperation and Development – World Trade Organization Statistics on Trade in Value Added database.)}

In ongoing research, I and some colleagues have instead focused on the effects of net official flows (including intervention) on current account balances. We base our analysis in 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. We know that 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.

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 1 presents results for a set of instruments.
that we like, but we got broadly similar results in a previous paper using two entirely different sets of instruments (Bayoumi, Gagnon, and Saborowski 2015). One principle that 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, and thus these flows are good instruments for net official flows.

We have found 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.\textsuperscript{14} 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. It ranges from 0 in countries and years with substantial restrictions on all categories of capital flows to 1 in countries and years without any

\textsuperscript{14} To some extent, the government itself may create the link between official flows and the current account. For example, it may 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.
legal barriers to capital flows.\textsuperscript{15}

The results in table 1 are based on a group of 133 countries over the past 30 years. The left side of the table lists the variables that are used to explain current account balances. The first column displays the estimated effects of these variables in countries and years when the capital mobility measure is 0. The second column displays the estimated effects when the capital mobility measure is 1.\textsuperscript{16} In most countries and years, the mobility measure lies between 0 and 1, and thus the estimated effect lies between the values shown in the two columns. In many countries capital mobility has risen over time.

The first explanatory variable in table 1 is the measure of capital mobility. Starting from the most restricted capital markets, 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 and by the time all restrictions are removed, it has a significant, though still small effect. The coefficient of 0.04 under high capital mobility implies that, other things equal, a country with completely open capital markets will have a current account surplus of 4 percent of GDP. The second variable is 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 between 0 and 1.\textsuperscript{17} Increasing the share of financial

\textsuperscript{15} The median value in the estimation sample is 0.45. Around 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.

\textsuperscript{16} The regression includes both the variables shown on the left and the products of these variables and the measure of capital mobility. The first column displays coefficients on the specified variables. The second column displays the sums of the coefficients in the first column and the coefficients on the variables multiplied by capital mobility.

\textsuperscript{17} The median value in the estimation sample is 0.10. 95 percent of observations take values less than 0.27.
transactions is associated with a statistically significant decrease in the current account for high-mobility countries.\textsuperscript{18}

The third variable is per capita income relative to the US level. 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 64 years old, 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 5-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 have a lower current account balance. This holds true in our regressions, especially when capital markets are more open for external borrowing. Under high mobility, a one 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. 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.\textsuperscript{19}

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 $0.33 under high mobility. The ninth variable reflects a persistent effect of past official flows, such

\textsuperscript{18} The expected signs of the coefficients of the first two variables are theoretically ambiguous. Demographic and other structural factors determine whether a country is a net borrower or lender in global markets. Openness and depth of capital markets merely facilitate a country’s ability to borrow or lend.

\textsuperscript{19} This result rejects the proposition of Ricardo neutrality, which argues that private saving behavior fully offsets any saving or borrowing by governments.
that for each $1 of the net stock of foreign assets in the previous year, the current account is
not much affected under low mobility and increases $0.03 under high mobility. Because the
lagged stock of net assets is often many times greater than the net flows in a given year, this
stock effect is quite important when mobility is high.

We believe that the coefficient on lagged net assets arises purely from portfolio
balance, which relates to the stocks of assets people own. When the government has amassed
a large stock of foreign exchange (paid for out of domestic currency), this puts upward pressure
on the value of foreign currency and downward pressure on the value of domestic currency.
This pressure persists as long as the government retains the foreign-currency assets. 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 of imperfect capital
mobility. As expected, when 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 1.

Overall, the results in table 1 suggest that net official flows, both current and lagged,
have very large effects on current account balances, but they are hardly the only factors at
work.20

20 New 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 (and reduce the yields on) the
bonds being purchased and bonds with similar characteristics (Gagnon and Hinterschweiger 2013).
Case Studies

As an alternative to the dry statistics of table 1, it may be useful to display historical examples of movements in net official flows and their effect on current account balances. These case studies allow us to consider the issue of causality in greater depth, providing a useful reality check on the instruments used in the statistical analysis. In other words, how convincing is the answer to the question: “what if net official flows had been different?”

These examples are not intended to be “typical.” Instead, I cherry-pick examples of large movements in net official flows that are 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. Rather, the point is 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 provides extra assurance that the net official flows really are having an important effect on the current account.

Sovereign Wealth Funds: Norway

Figure 5 displays data for Norway after it switched to a floating exchange rate in 1992. Norway is a major oil exporter. In 1996, to save for future generations, the government of Norway began to set aside a portion of the revenues from Norway’s oil exports in a SWF. The solid line in figure 5 is the current account balance; the dashed line is SWF flows into foreign assets; and the dotted line is net energy exports. All are expressed in percent of Norwegian GDP.

The close relationship between SWF flows and the current account is strikingly apparent. Flows out of Norway’s SWF are driven by revenues minus expenses in the oil sector.
plus returns on the SWF assets. Oil revenues are driven by global oil prices and long-term production plans that are essentially exogenous to the Norwegian economy. Returns on the SWF assets are also exogenous to Norway. The government has taken the conservative philosophy of drawing down only around 4 percent per year of the value of SWF assets for current budgetary needs. The key point for our analysis 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 does not have external official debt, net official flows are thus dominated by SWF flows.

Some would argue that Norway’s current account surplus mainly reflects the fact that it is net oil exporter and not that it has large net official flows. However, there are many current and former net oil exporters that have run current account deficits, including other medium-sized advanced economies such as Australia and Canada. The world’s largest oil exporter, Saudi Arabia, had a current account deficit for most of the 1980s and 1990s.

Norway’s SWF flows correspond closely to its overall fiscal balance. Based on data from Norway alone, we would not be able to determine whether the current account surplus arises from SWF flows or from 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. Again, 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

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

22 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 numbers for Canada were 8 percent and -2 percent.
responsible for Australia’s current account deficit, but the point is that 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 1 suggest that both the fiscal surplus and the SWF flows play a role in sustaining Norway’s large current account surplus.  

*External Borrowing for Development: Morocco*

Figure 6 displays part of the story of Morocco in the late 1970s and 1980s. Morocco is currently a medium-sized 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 in 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). It is worth noting at this conference that Secretary Baker started the consultative process that eventually produced Brady bonds through his 1985 Baker Plan.

Figure 6 shows that net official flows during this episode were almost entirely composed of official external borrowing. Morocco bought and sold very few foreign exchange reserves at this time. 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  

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23 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, Norway’s current account (which reflects the difference between saving and investment in Norway) would not have risen.
1990.\textsuperscript{24} As the country increased its official external borrowing, the current account moved into deep deficit.\textsuperscript{25} As it gradually eliminated external borrowing, net official flows and the current account both returned to zero. The effect of net official flows on the current account in Morocco is very clear.

\textit{Political Pressures on Intervention Policy: South Korea}

Korea was hit hard by the Asian financial crisis of 1997-98. A sharp economic downturn and a sudden stop 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. Figure 7 shows that the Korean current account surplus was 2 percent of GDP in 2000, and net official flows, mainly reserve accumulation, totaled more than 4 percent of GDP. 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 settled around 1 percent of GDP.

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 domestic spending was weakened by a credit card crisis. The Korean government resisted these upward pressures by stepping up intervention markedly. Both exports and

\textsuperscript{24} The IMF coarse scale of exchange rate regimes (1=tight peg and 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. http://www.carmenreinhart.com/data/browse-by-topic/topics/11/ (accessed August 20, 2015)

\textsuperscript{25} 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.
intervention continued to boom in 2004, and the government allowed only a relatively modest amount of exchange rate appreciation. The record-setting reserves purchases 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.26 Opposition politicians criticized the losses on reserves and questioned whether the level of reserves was excessive (Kim 2011, 23, and Noland 2007).

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.27 Intervention declined further in 2006 and 2007, as the won continued to appreciate. Figure 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. 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.28 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 2 lists the countries with the eight largest current account surpluses (excluding net

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26 In 2005 the government began to report information on its derivatives position in foreign exchange, which revealed a substantial loss from won appreciation.
27 Korea also established an SWF, the Korean Investment Corporation, in 2005 to achieve better returns on a portion of the accumulated foreign assets.
28 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 and its current account surplus has increased dramatically.
investment income) in 2013 among countries that also report net official flows.\textsuperscript{29} The countries are listed in order of increasing capital mobility (shown in the final column). China had the most closed financial markets of these countries and the largest current account surplus in 2013 at $243 billion. The fitted value of the statistical model shown in table 1 calls for a Chinese surplus of $262 billion, slightly more than the actual surplus but reasonably close considering that the model explains only about half of the variation in current account balances. According to the model, the Chinese surplus derives entirely from Chinese net official flows. Factors operating in the opposite direction include China’s rapid trend growth and its negative net energy exports (these are not shown in table 2).

Four of these countries are major oil exporters: Russia, Saudi Arabia, Kuwait, and Norway. The model explains only about half of Russia’s surplus, but it does considerably better for the other oil exporters. Russia was a net seller of foreign official assets 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 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 $43 billion of Saudi Arabia’s $121 billion surplus, $35 billion of Kuwait’s $58 billion surplus, and $40 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 around 40 to

\textsuperscript{29} Some countries are missing data for 2014. Net investment income is excluded because the regressions in table 1 are based on current accounts minus net investment income.
50 percent of the current account surpluses. Aging populations and fiscal balances explain another 25 percent (Singapore), 35 percent (Switzerland), and 50 percent (Korea) of the surpluses. In Korea and Singapore, negative net energy exports and relatively fast growth rates work in the opposite direction to reduce surpluses.

Taken together, official flows and stocks explain $485 billion out of the $736 billion in surpluses of these eight countries in 2013.

Policy Implications

The primary objective of this paper 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 probably the single biggest factor behind global current account imbalances since 2000, especially when account is taken of the lagged effect of these flows.

Of course, official flows are not the only source of current account imbalances. There have been times in the past when imbalances, driven by market forces and economic policies other than net official flows, reached unhealthy levels. The Plaza Agreement occurred at one of those times. The evidence presented in this paper demonstrates that foreign exchange intervention can be a useful tool to counter these market-driven imbalances.

Not all current account surpluses and deficits are undesirable. Fast-growing developing economies with relatively youthful populations should have modest deficits as they borrow to finance productive capital. Conversely, slow-growing advanced economies with rapidly aging populations should have modest surpluses as they save for retirement. 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.\textsuperscript{30} The main exception to this rule concerns countries in which exports of nonrenewable natural resources comprise 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 the savings must flow abroad. The appropriate degree of net foreign saving will vary across resource exporting countries, but in all cases it should be considerably less than 100 percent of resource revenues net of production costs. A number of oil exporting countries have had net official flows close to net resource revenues in recent years, suggestive of excessive net foreign saving.

Both official flows and current account imbalances have diminished since their peak in 2007. But they remain substantial by historical standards. Officials in many countries can now see that several Asian economies, a few oil-exporting countries, and Switzerland have 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 in the future, as they have pledged in the G-20, many smaller economies may not.\textsuperscript{31} Indeed, Korea’s continued net official flows of nearly 4 percent of GDP and current account surplus of more than 6 percent of GDP in 2014 already seem inconsistent with its G-20

\textsuperscript{30} In their widely cited work on fundamental equilibrium exchange rates, William Cline and John Williamson (2011, 3) define sustainable current account balances to lie between -3 percent and +3 percent of GDP. They cite several studies that support a range of this magnitude.

\textsuperscript{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, and G-20 finance ministers reiterated this pledge in Ankara in September 2015. G-20 materials are available at https://g20.org/.
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 damps foreign exports, but the increased domestic spending counteracts the exchange rate effect on foreign exports, and there are also 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 (IMF 2015). On the other hand, the essential 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 when they have a sustained current account surplus. A country in such a position that has a fixed exchange rate should be required to use

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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. Lars Svensson (2003) proposes using the exchange rate (supported by intervention) as part of a strategy for monetary easing at the zero bound. Svensson ignores the spillover effects of his strategy on other countries. For a discussion of unconventional policy options in Switzerland, see Gagnon (2014).
monetary policy to stabilize its exchange rate or else to revalue or to 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 pro-active 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, at least 10 and probably 20 percent bands. When exchange rates move outside these ranges, countries would be encouraged to intervene in a stabilizing direction to encourage a return to 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 is outside of a reasonable range. This is pretty much what Plaza and Louvre were all about.

Conclusion

At the time of the Plaza Agreement there was widespread skepticism that foreign exchange intervention was a potent tool for managing exchange rates and current account imbalances.  

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 publically identify members in violation of Article IV has proved impossible in recent years (Blustein 2013).  

34 C. Fred Bergsten and John Williamson (1983) originated the idea of target zones for the major exchange rates, which is a stronger version of reference ranges in that it implies some commitment toward maintaining exchange rates with the zones.
Now we 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.

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. Countries are more likely to agree to forceful rules at a time when the rules would not impinge on their behavior.

The case for new and forceful rules to limit official flows is persuasive. We need them 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.

References


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<tr>
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<th>Lowest Capital Mobility</th>
<th>Highest Capital Mobility</th>
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<tbody>
<tr>
<td>Inverse Index of Legal Restrictions on Capital Mobility [0-1]</td>
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<td>Share of Private Financial in Total Cross-Border Transactions [0-1]</td>
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<td>-0.11**</td>
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<td>Per Capita GDP Relative to US</td>
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<tr>
<td>Lagged 5-Year Growth Rate</td>
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<td>Net Energy Exports/Trend GDP</td>
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<td>Fiscal Balance/Trend GDP</td>
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<td>Lagged Net Official Assets/Trend GDP</td>
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<td>(R^2)</td>
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<td>Observations</td>
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Note: This table presents averages of coefficients from instrumental variables regressions of equations 2 and 3 in Bayoumi, Gagnon, and Saborowski (2015) after adding a complete set of interaction terms between the independent variables and the lagged inverse index of legal restrictions on capital mobility from Aizenman, Chinn and Ito (2015). (Equation 2 is the current account regressed on the independent variables. Equation 3 is net private flows regressed on the explanatory variables. Net investment income is subtracted from both dependent variables. For equation 3, 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.)

The first column is the effect of the independent variables when the capital mobility measure is 0. The second column is the effect of the independent variables when the mobility measure is 1; it is the sum of the base and interacted coefficients. 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. Instrumental variables for net official flows are the non-reserves portion of net official flows and a dummy variable for external crisis in the previous three years (Laeven and Valencia 2012). The sample includes 133 countries over the period 1985-2014. Many countries are missing data for some years. * and ** denote coefficients that are statistically significant at the 5 percent and 1 percent levels, respectively, based on the averages of the standard errors from equations 2 and 3.

Source: Bayoumi, Gagnon, Londono, Saborowski, and Sapriza (forthcoming).
Table 2. Contributions to 2013 Global Current Account Imbalances (USD billions)

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<td>401</td>
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Source: Table 1 and author’s calculations.
Figure 1. US Dollar Exchange Rates, Jan 1982 to Dec 1989


Figure 2. G-7 Official Net Dollar Flows, 1980-2014

Note: G-7 net dollar flows are estimated as the sum of non-US G-7 foreign exchange reserve flows minus US reserve flows.
Figure 3. Net Official Flows, 1980-2013

Note: 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: Bayoumi, Gagnon, Londono, Saborowski, and Sapriza (forthcoming).

Figure 4. External Accounts of Surplus Countries, 1980-2013

Note: See Figure 3. Data are summed over all countries with a current account surplus in each year.
Source: Bayoumi, Gagnon, Londono, Saborowski, and Sapriza (forthcoming).
Figure 5. Norway, 1993-2014

Figure 6. Morocco, 1975-89

Sources: IMF International Financial Statistics, Norwegian Ministry of Finance, and World Bank World Development Indicators.

Figure 7. South Korea, 2000-2007