Box 2.1 A stylized model of the macroeconomy

Current account	$CA = a1 - a2\,RER + a3\,GDP^* - a4\,GDP + U1$
Financial flows	$FF = NPF + NOF$
Net private flows	$NPF = b1 + b2\,RER + b3\,(IR^* - IR) + U2$
Consumption	$C = c1 + c2\,GDP + U3$
Investment	$I = d1 - d2\,IR + U4$
GDP identity	$GDP = C + I + G + CA$
BOP (balance of payments) identity	$CA = FF$
Saving	$S = GDP - C - G$
GDP identity implies	$S - I = CA$

Endogenous variables: *CA* (current account), *FF* (financial flows), *NPF* (net private flows), *C* (consumption), *I* (investment), *GDP* (output or income), *RER* (real exchange rate), S (saving).

Policy variables: *IR* (interest rate), *G* (government spending), *NOF* (net official flows).

Exogenous variables: *GDP**, *IR** (foreign); *U*1, *U*2, *U*3, *U*4 (shocks) (*U*1–*U*4 are random shocks and economic forces outside of the model; they are not to be confused with the different measures of the US unemployment rate, sometimes referred to as *U*1–*U*6).

Parameters: a1, a2, a3, a4, b1, b2, b3, c1, c2, d1, d2

Endogenous Interaction between the Exchange Rate and GDP

The simple elasticities model explains how exchange rates and GDP play key roles in determining the current account balance. However, the model reflects only part of the workings of the economy. In a broader model of the overall economy, the current account has important effects on the exchange rate and GDP.

Box 2.1 displays a stylized macroeconomic model that includes our simple elasticities model of the current account as well as feedback from the current account onto exchange rates and GDP. An important addition is international financial flows, which also influence the exchange rate. The current account equation is the simple elasticities model discussed above. The second equation is net international financial flows. Net financial flows reflect the balance between domestic acquisitions of foreign assets and foreign acquisitions of domestic assets. Acquisitions include outright purchases as well as reinvested interest and dividend payments. A net financial outflow occurs when domestic acquisitions of foreign assets exceed foreign acquisitions of domestic assets; in this case financial flows are positive. A net financial inflow occurs when foreign acquisitions of domestic assets exceed domestic acquisitions of foreign assets; in this case

Factors Underlying the Current Account

Economists have studied the current account equation, or similar treatments of its components (goods imports, services imports, goods exports, etc.) for decades (Goldstein and Khan 1985, Marquez 2002, IMF 2015c).[10] The sizes of the coefficients vary across countries, depending on how exposed they are to international markets and what types of goods and services they produce and consume. Typically, a 10 percent depreciation of the exchange rate raises the current account balance by 1 to 2 percent of GDP after two years or so. The effect on GDP depends on the state of the business cycle. Trend growth typically has little effect on the current account, but domestic growth above trend tends to lower the current account and foreign growth above trend tends to raise the current account.[11]

The current account equation by itself does not reveal much about the underlying drivers of trade balances, however, because these underlying factors also have important effects on GDP, the exchange rate, and the shocks to the current account equation. The volatility of the exchange rate, as it plays its role of equilibrating trade and financial flows, makes it especially difficult to estimate its direct effect on the current account (parameter a2 in box 2.1). For example, an import tariff or other trade barrier tends to increase the current account for a given level of the exchange rate and GDP. However, the market outcome may instead be a permanent appreciation of the exchange rate that keeps the current account nearly unchanged. A statistician would observe an increase in the real exchange rate but no change in the current account, thus concluding that a2 = 0 when it does not. Economists call this the "simultaneity problem."

There is a constant interplay between the current account and the financial account. The exchange rate moves to reflect the balance between these forces. If all the underlying muscle were on the financial side, the current account would move passively in response to the exchange rate, and it would be easy to measure the coefficient a2. If all the muscle were on the trade/current account side, financial flows would move passively in re-

10. The feedback between the trade balance and the exchange rate, and the lags in these effects, can make it difficult to get sensible estimates of the direct effect of the exchange rate on the current account. A thorough study by the IMF (2015c) shows that despite the rise of imported inputs in the exports of most countries, there is no evidence of any growing disconnect between exchange rates and trade balances, as some observers have suggested.

11. Countries with high trend growth tend to have lower trade balances, but they do so as much from higher investment demand working through interest rates and exchange rates as from a direct effect of GDP on the trade balance. China and other East Asian economies represent notable exceptions to this general result; in these economies, exchange rate policies (net official flows) play an important role.

sponse to the exchange rate, and it would be easy to measure the coefficient b2. In practice, both set of forces are at work, and it is difficult to separate them out. If economists could readily observe all underlying factors and had a complete and accurate model of how they affect the current account, they could solve the simultaneity problem. But they lack good measures of many factors, including many trade barriers, which may arise for technological or competitive reasons as well as from official policies.

In response to the simultaneity problem, Chinn and Prasad (2003) began a line of research that focuses directly on the underlying policies and exogenous factors (the shocks in box 2.1) that move current account imbalances. This literature recognizes that the same underlying factors affect exchange rates and cyclical movements in GDP. Instead of estimating the simple elasticities model of the current account, this literature regresses current account balances directly on the underlying factors without including exchange rates and GDP. The approach uses data on dozens of countries over many years to maximize the available statistical information.

Early studies of this type did not include exchange rate policy in the explanatory variables. Gagnon (2012, 2013) and IMF (2012a) were the first to include measures of exchange rate policy in the form of net official flows. IMF (2012a) excludes countries with some of the largest net official flows (Persian Gulf oil exporters) and uses an incorrect measure of official flows in some countries with large current account surpluses, such as Norway and Singapore. It finds a statistically significant effect of net official flows on the current account balance, but the size of the effect is implausibly small and limited to countries with low capital mobility.[12]

Gagnon et al. (2017) show that correcting these errors and allowing capital mobility to have a pervasive effect on all coefficients leads to sensible and robust coefficient estimates. Table 2.1 presents results from a regression on 141 countries using annual data for 1985–2014. The regressions are based on the current account minus investment income, which is subtracted for two reasons. First, an important explanatory variable in regressions of the overall current account is a country's net foreign assets. Countries with positive net foreign assets tend to have positive net investment income, which is part of the current account balance. Excluding net investment income from the regression eliminates the need to include net foreign assets and allows inclusion of a subset of net foreign assets (net official assets) to capture the portfolio balance effect of past official flows. Second, the current account minus net investment income is almost equal to the trade balance, which aligns a bit more closely with the concept of

12. The IMF also used inappropriate instruments to control for endogeneity of net official flows, which biased the coefficient downward (Gagnon 2013).

Table 2.1 What moves the current account balance?

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

Variable	Countries with lowest capital mobility	Countries with highest capital mobility
International capital mobility [0–1]	–0.01	0.05**
International financial integration [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
Cyclically adjusted 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	

* and ** denote coefficients that are statistically significant at the 5 percent and 1 percent levels, respectively, based on the averages of the standard errors in the two columns.

Note: Table presents averages of coefficients from instrumental variables regressions shown in the middle two columns of table 2 in Gagnon et al. (2017) with the addition of the financial integration variable. The current account is regressed on the variables listed on the left as well as the products of each 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 figures in the first column thus reflect the effects of the listed variables when the capital mobility measure is 0; the figures 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. 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 the period 1985–2014. Many countries are missing data for some years.

Source: Gagnon (2016).

balance, which matters for economic growth and employment (and thus the domestic politics of trade issues).

An important feature of table 2.1 is that the effects of these underlying factors are allowed to vary with the degree of international capital mobility, as measured by an index of legal restrictions on private financial flows across a country's borders (Aizenman, Chinn, and Ito 2015). This measure equals 1 when there are no legal restrictions and 0 when there are important restrictions on all classes of financial flows. However, a value of 0 does not mean there are no private financial flows, and a value of 1 does not mean that flows across borders are as cheap and easy as flows within borders. The

median value of capital mobility across countries is 0.45. About 5 percent of the 2,053 available observations have the minimum value of 0, and 25 percent have the maximum value of 1.

The left side of the table lists the variables that are used to explain current account balances. The first column in table 2.1 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.[13] In most countries and years, the mobility measure lies between 0 and 1; the estimated effect thus lies between the values shown in the two columns. In many countries capital mobility has risen over time.

The first two explanatory variables in table 2.1 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 and policy factors determine a country's desired saving and investment rates. It is the difference between savings and investment that drives a country's current account balance. However, openness, depth, and integration of capital markets are critical factors in determining the extent to which these underlying factors are able to influence a country's current account. If private agents are not allowed to borrow or lend across borders, a country will not be able to run a current account in surplus or deficit, even if the underlying factors would call for one. In these financially closed economies, interest rates and other yields on financial assets will differ from those in the rest of the world. Any current account surplus or deficit would have to be financed by the government through official financial flows.

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, the effect is modest but significant, because outflows rise more than inflows.

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. The correlation coefficient between the

13. 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.

two variables is 0.36. Because it is constructed as a share, financial integration is bounded between 0 and 1.[14] High integration is associated with a slightly higher current account when mobility is low. The effect of financial integration declines and becomes significantly negative as capital mobility increases, because capital inflows rise more than capital outflows. For many countries with high capital mobility and high financial integration, the negative effect of financial integration mainly offsets the positive effect of capital mobility, so that the overall effect of these two variables for most countries is small.

The third variable is per capita GDP relative to the US level. This variable has a very small negative effect on the current account under high mobility.[15]

The fourth variable is the projected change in the ratio of the population over the age of 64 over the subsequent 10 years. It has an economically important but statistically insignificant positive effect on the current account. A projected increase in the older population 10 years ahead presumably increases desired savings for retirement now and thus increases the current account balance.

The fifth variable is the lagged five-year economic growth rate, which is meant to proxy for trend growth potential. Rapidly growing countries are expected to borrow more, because they have more investment opportunities. They thus have lower current account balances. This effect is especially important 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 0.61 percent of GDP.

Many Asian economies had both high growth rates and large current account surpluses in the 2000s. As shown below, these surpluses were driven by net official flows (foreign exchange intervention), which secured export-led growth. This fact is particularly remarkable given that most rapidly growing economies tend to have current account deficits.

The sixth variable is net energy exports. It has 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 by $0.27.

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

15. The sign of this coefficient under high capital mobility is the opposite of its expected value, although the magnitude is small. The result may reflect some collinearity between per capita income and the other independent variables, such as aging and trend growth rates.

The seventh variable is the cyclically adjusted fiscal balance.[16] 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] (We return to the effects of fiscal policy later in this chapter.)

The eighth variable is net official flows (including foreign exchange intervention).[18] For each $1 of net official flows, the current account increases by $0.72 under low mobility and by $0.31 under high mobility. The effect of net official flows is expected to be larger under low mobility, because private capital flows are small, leaving official flows as the main factor capable of moving the current account. As capital mobility increases, financial markets are free to arbitrage rates of return across countries closer toward equality. In so doing, private financial flows undo some—but not all—of the effect of official financial flows. Even in economies with no legal restrictions on capital mobility, the effect of net official flows remains significantly positive.

All of the variables in table 2.1 influence the current account in part through their effect on the exchange rate, but it is net official flows that are most closely associated with official policy toward the exchange rate. These coefficient estimates imply that official flows have a greater effect on the exchange rate when capital mobility is low, reflecting the reduced ability of financial markets to substitute between assets in different currencies. As capital mobility increases, financial markets are able to substitute one currency for another, but even when capital mobility is high, that substitutability is not perfect. In the jargon of finance, international financial markets are not fully efficient.

The regression uses instruments to control for endogeneity of net official flows to exchange rates. The instruments are a dummy variable for financial crises in the previous three years and the part of net official flows that does not arise from foreign exchange reserves. The first instrument captures a higher propensity to build up foreign exchange reserves following a crisis episode. The second reflects official saving or borrowing that

16. In order to remove any endogenous policy response, this variable is the residual of a regression of the fiscal balance on the level and change in the output gap. The output gap is the deviation between real GDP and a centered 11-year moving average of real GDP, using IMF projections for GDP beyond 2015.

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

18. Box 2.2 discusses sterilized versus unsterilized intervention. The vast majority of net official flows in our data are sterilized, as central banks generally succeeded in controlling inflation. The regression results are not noticeably affected by including a control for monetary policy (and thus unsterilized intervention) in the growth in central bank assets.

is not motivated by exchange rate movements; countries that stabilize their exchange rates use foreign exchange reserves for that purpose.[19] This instrument primarily reflects flows from sovereign wealth funds and official development loans that reflect longer-term saving and investment motives. Although in some cases these flows respond to oil exports, we assume that oil exports are exogenous and control for any effect of oil exports on the current account in our regression to avoid endogeneity bias. Gagnon et al. (2017) show that external saving out of oil revenues is a policy decision that differs markedly across oil exporters and does not reflect an endogenous response to the current account. Indeed, for a given level of oil exports, countries have higher current account balances only when they choose to save the revenues abroad. Oil exporters without significant net official flows (e.g., Angola, Canada, and Nigeria) do not have current account surpluses.

Together these instruments explain a significant amount of the movements in net official flows while excluding movements that might be endogenous reactions to the current account or exchange rate. Moreover, the results are robust to alternative specifications. The net official flows coefficients are little affected by replacing the instruments with a dummy variable for each country or adding a country fixed effect (with the original instruments).[20]

The ninth variable reflects the persistent effect of past official flows. 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 by $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 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. Accumulation by the government of a large stock of foreign exchange (paid for out of 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 would otherwise have. This ongoing scarcity of foreign currencies keeps them highly valued. Without private capital mobility, the portfolio balance effect cannot operate, which explains why the coefficient on the net asset stock increases with capital mobility.

---

19. Because China did not have a financial crisis during the sample period and the vast majority of its net official flows were in foreign exchange reserves, it has essentially no effect on the estimated coefficients.

20. Previous research shows that the effect of net official flows on the current account is significant when using other instruments as well (Bayoumi, Gagnon, and Saborowski 2015).

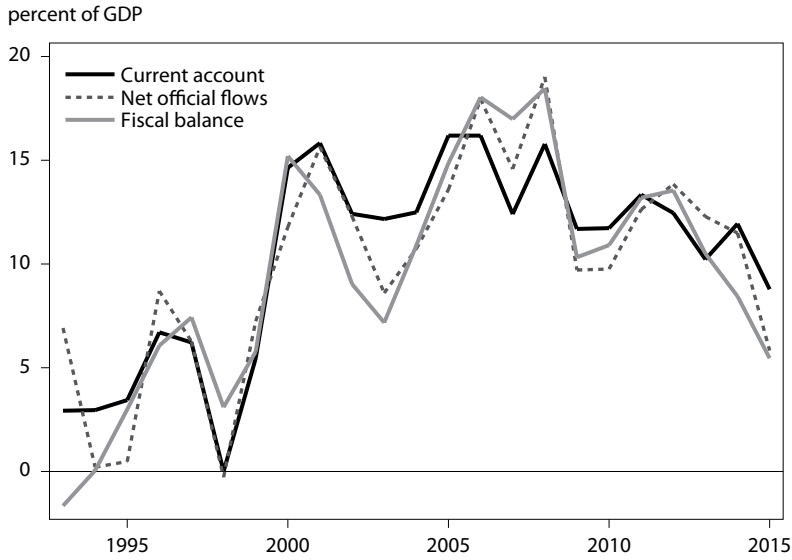
The coefficient on the net official flow combines a portfolio balance component (this year's stock equals last year's stock plus this year's flow) with a direct effect that arises from imperfect capital mobility. As expected, when the mobility of private capital is very low, the coefficient on net official flows is close to 1. As private capital mobility increases, this coefficient decreases (as shown in table 2.1), but it remains positive even at the highest levels of capital mobility. This result suggests that financial markets are not fully efficient, even when allowed by law to operate unfettered.

Gagnon et al. (2017) find that monetary expansion has a small and marginally significant positive effect on the current account when capital mobility is low and that this effect disappears as mobility increases. As they note, there is some question as to whether the estimated monetary effect under low mobility arises spuriously from the effect of financial crises. The results under high mobility are consistent with the view (discussed later in this chapter) that the effect of monetary policy on the current account is ambiguous and relatively small because the exchange rate effect is offset by a domestic spending effect. In light of the small and uncertain effect of monetary policy on the current account, we do not include it here.

An appealing property of the coefficients in table 2.1 is the joint behavior of the coefficients on net official flows and the fiscal balance. The fiscal coefficient captures the effect of government saving in the local currency. The net official flows coefficient captures the effect of government borrowing in the local currency to invest in foreign currency. The sum of these coefficients captures the effect of government saving entirely in foreign currency. With low capital mobility, the sum of these coefficients is 0.89, most of it arising from the net official flows effect. With high capital mobility, the sum is 0.85, most of it arising from the fiscal effect. Regardless of the degree of capital mobility, a government's decision to save entirely in foreign currency has a very large—nearly one-for-one—effect on the current account.

In many countries with large sovereign wealth funds, net official flows and the fiscal balance are nearly identical, implying that governments are saving almost entirely in foreign currency. In Norway, for example, the current account moves closely with net official flows and the fiscal balance, consistent with the sum of the coefficients being close to 1 (figure 2.1). Norway's central bank has successfully targeted inflation and has a floating exchange rate with very little foreign exchange intervention. There is thus little reason to believe that net official flows and the fiscal balance are directly affected by the current account there. Rather, the causality runs entirely from oil exports to net official flows and the fiscal balance and then to the current account.

Figure 2.1 Current account and policy variables in Norway, 1993–2015



Source: Authors' calculations based on data from sources listed in appendix A.

Table 2.1 does not address dynamic adjustment or lags. Although the effect of intervention on the exchange rate is expected to be essentially simultaneous, the effect of the exchange rate on trade and the current account is generally believed to take place gradually, over a period of about two years. In the annual data, some of the effect of intervention ought to show up in the same year as the intervention, but some ought to occur in the following year and a small amount might even linger into a third year. The residuals of the regression in table 2.1 suggest that such dynamics may be important, but we were unable to model them successfully, because they appear to differ across country and across independent variables (the first-order autocorrelation of the residuals in table 2.1 is about 0.7). The coefficients are best interpreted as capturing the long-run effect of intervention and other factors, not the immediate effect.

Economic Policies and the Current Account Balance

Monetary Policy

Monetary policy has two opposing effects on the trade balance. First, lower interest rates make domestic assets less attractive to foreigners, thus pushing down the exchange rate. A depreciated exchange rate boosts exports and

dampens imports, increasing the current account. This effect is known as the *expenditure-switching effect*. Second, lower interest rates encourage more domestic investment and consumption, increasing GDP. Higher GDP boosts imports and reduces the current account. This effect is known as the *expenditure-augmenting effect*. The expenditure-switching and expenditure-augmenting effects push the current account in opposite directions.

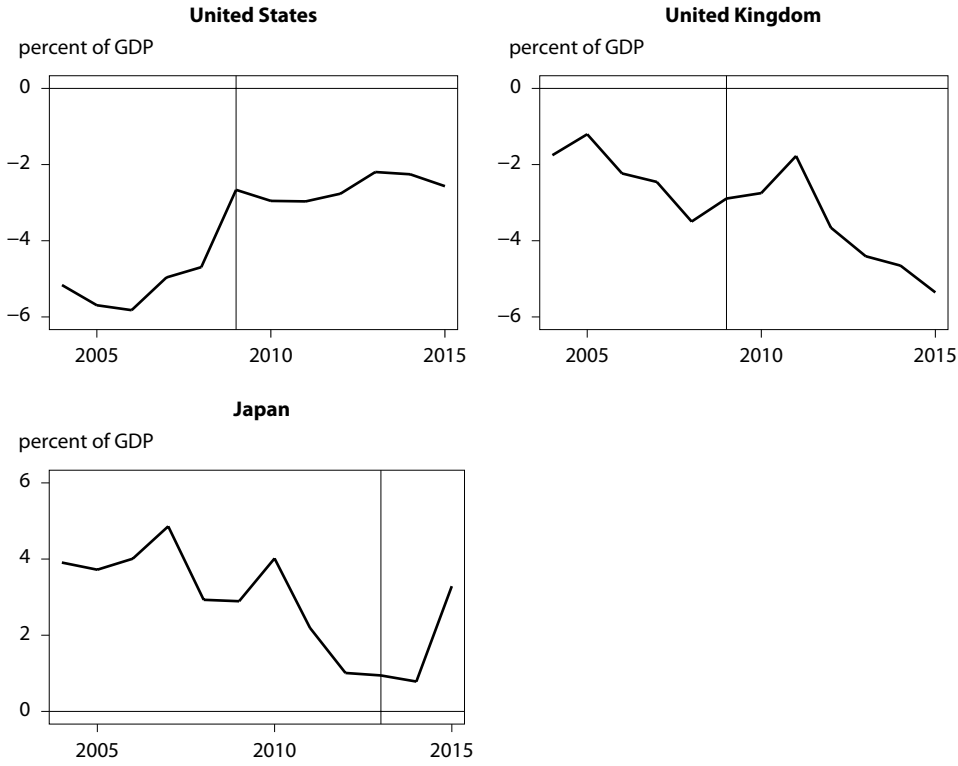
Macroeconomic models disagree on which effect is stronger, but whether the net effect of monetary policy on the current account is positive or negative, it is typically small. In the Federal Reserve's FRB/US model of the US economy, an increase in the US short-term interest rate of 1 percentage point causes the US current account to rise by only 0.03 percent of GDP after two years.

In the regression of table 2.1, only the exogenous component of policy can be included as an explanatory variable. We were unable to construct useful measures of exogenous, or cyclically adjusted, interest rates to include in the regression. As an alternative, Gagnon et al. (2017) use the cyclically adjusted change in central bank domestic assets. This measure has the appealing property that it captures the unconventional monetary policy known as quantitative easing, which the United States and some other major advanced economies adopted in recent years. Gagnon et al. find that this measure of monetary policy has no effect on the current account in countries with high capital mobility, which includes the countries that adopted quantitative easing.

Figure 2.2 displays the behavior of current account balances in the United States and the United Kingdom, which adopted quantitative easing policies beginning in 2009, and Japan, which adopted quantitative easing in 2013 (implementation of significant quantitative easing in the euro area is too recent to have had any effect on the data). The deep recession narrowed the US current account deficit in 2009; the collapse of US import demand transmitted that recession to its major trading partners. This narrowing occurred too early to have been plausibly caused by quantitative easing, which started only in 2009. After 2009 the current account balance was steady for several years; lately the deficit has begun widen. The UK balance has trended downward since the adoption of quantitative easing in 2009. In Japan quantitative easing had little initial effect on the current account balance. The increase in 2015 mainly reflects the global fall in the prices of oil and other commodities that are major components of Japanese imports.

In its analysis of the effects of quantitative easing in the United States on other countries, the IMF (2011b) finds little effect on current account balances and a moderate positive effect on GDP in other countries. Perhaps most important, it finds no evidence that quantitative easing operates differently from conventional monetary policy. The effect on foreign GDP

Figure 2.2 Current accounts in major quantitative easing episodes, 2004–15



Note: Vertical lines denote the launch dates of quantitative easing policies. Data are from sources listed in appendix A.

arises because lower bond yields in the United States led to lower bond yields and higher stock prices in other countries, which boosted their domestic spending. To a large extent, these spillovers reflect a policy decision in other countries to follow US monetary policy, in part to reduce the appreciation of their exchange rates.

This episode highlights how difficult it can be to disentangle the effects of individual policies on the global economy. Too many other factors, including how policymakers in other countries react, are at play. In many cases policymakers may overrespond to upward pressure on their currencies. The effect of US quantitative easing on exchange rates is highly salient in many foreign countries, whereas the effect on US consumption, investment, and imports is less obvious.

Fiscal Policy

Fiscal policy operates through taxes and government spending. More expansionary fiscal policy (lower taxes or higher spending) pushes up GDP, increases imports, and thus reduces the current account. Tighter fiscal policy has the opposite effects. In the Fed's FRB/US model, an increase in government spending sufficient to lower the fiscal balance by 1 percent of GDP reduces the current account by 0.3 percent of GDP after two years. This simulation assumes no monetary response, but the effect on the current account is broadly similar if monetary policy tightens in response to fiscal loosening, because monetary policy has only a small effect on the current account. In the IMF's Flexible System of Global Models, a permanent reduction in the fiscal balance of Japan equal to 1 percent of GDP lowers the current account by 0.5 percent of GDP after two years (Andrle et al. 2015).

The effect of fiscal policy on the current account in the FRB/US model is slightly less than that implied by the fiscal coefficient in table 2.1 for a country with highly mobile capital. The effect in the IMF model for Japan is essentially identical to that implied by table 2.1, whereas the spillover of fiscal policy for a country with median capital mobility is 0.3 percent of GDP for each percentage point increase in the fiscal balance.[21]

Official Financial Flows

The largest component of official financial flows for most countries is foreign exchange intervention, which consists of official purchases or sales of foreign currency intended to affect the exchange rate. Financial flows are typically the most important drivers of the exchange rate and the current account. Foreign exchange intervention is a financial flow conducted by the public sector. It is part of a broader category of official financial flows, which includes external public borrowing and investment by sovereign wealth funds. As discussed in box 2.2, most official flows are conducted independently of monetary policy and thus have no direct impact on monetary policy.

The results in table 2.1 document the important effect of net official financial flows on current account balances. Other recent studies support this result. They confirm that official purchases of foreign exchange tend to depreciate a country's exchange rate, relative to what it would otherwise have been, consistent with a positive effect on the current account balance of a magnitude comparable to that shown in table 2.1 (Adler, Lisack, and Mano 2015; Blanchard, Adler, and de Carvalho Filho 2015; Saborowski and Nedeljkovic 2017).

21. The capital mobility variable equals 1 for Japan and the United States.

Box 2.2 Sterilized and unsterilized intervention

Most intervention is "sterilized," meaning that the central bank takes steps to insulate domestic monetary conditions, typically short-term interest rates, from any effect of intervention. Most central banks use the short-term interest rate as their monetary policy instrument; sterilization of foreign exchange transactions is thus automatic.

Other types of official flows tend to be conducted by agencies other than central banks. Because these agencies typically obtain the funds for their net official outflows from sources other than money creation, these flows are effectively a form of sterilized intervention.

Unsterilized intervention implies a sustained expansion of the monetary base to purchase the reserves. This expansion drives down domestic interest rates. Unsterilized intervention can be viewed as a combination of sterilized intervention and a loosening of monetary policy. Unless otherwise specified, our discussion of the effects of intervention and other official flows is based on the assumption that these flows are sterilized.

Under the assumption (widely but not universally held) that monetary policy has a small and ambiguous effect on the current account (because of opposing exchange rate and domestic spending effects), the effect of unsterilized intervention on the current account should be roughly similar to the effect of sterilized intervention. Sterilized intervention operates entirely through the exchange rate and thus unambiguously increases the trade balance.

Over time unsterilized intervention (loose monetary policy) leads to higher inflation. Given that central banks in the advanced economies and most emerging-market economies have achieved low and stable inflation for many years, monetary policy appears to have been focused on domestic stabilization and thus has not been excessively loose. In these circumstances foreign exchange intervention cannot be viewed as having been unsterilized in the long run.

These relatively recent results on the effects of foreign exchange intervention are only beginning to come to the attention of academic economists and policymakers. The conventional wisdom within the profession has long been that intervention has only a small and temporary effect on exchange rates and thus little effect on current accounts. This view reflects the results of studies in the 1990s that found small effects of intervention that were often not statistically significant (Edison 1993, Dominguez 2003). However, the interventions covered by these studies were much smaller than those after 2000, and their effects are difficult to distinguish from random variation in the data. The apparent success of the Plaza Accord probably reflects the change in market expectations about future policies and the possibility of future intervention rather than the actual intervention conducted, which was rather small. The much larger interventions since 2000 provide much more statistical information, or signals, which stand out among the noise.

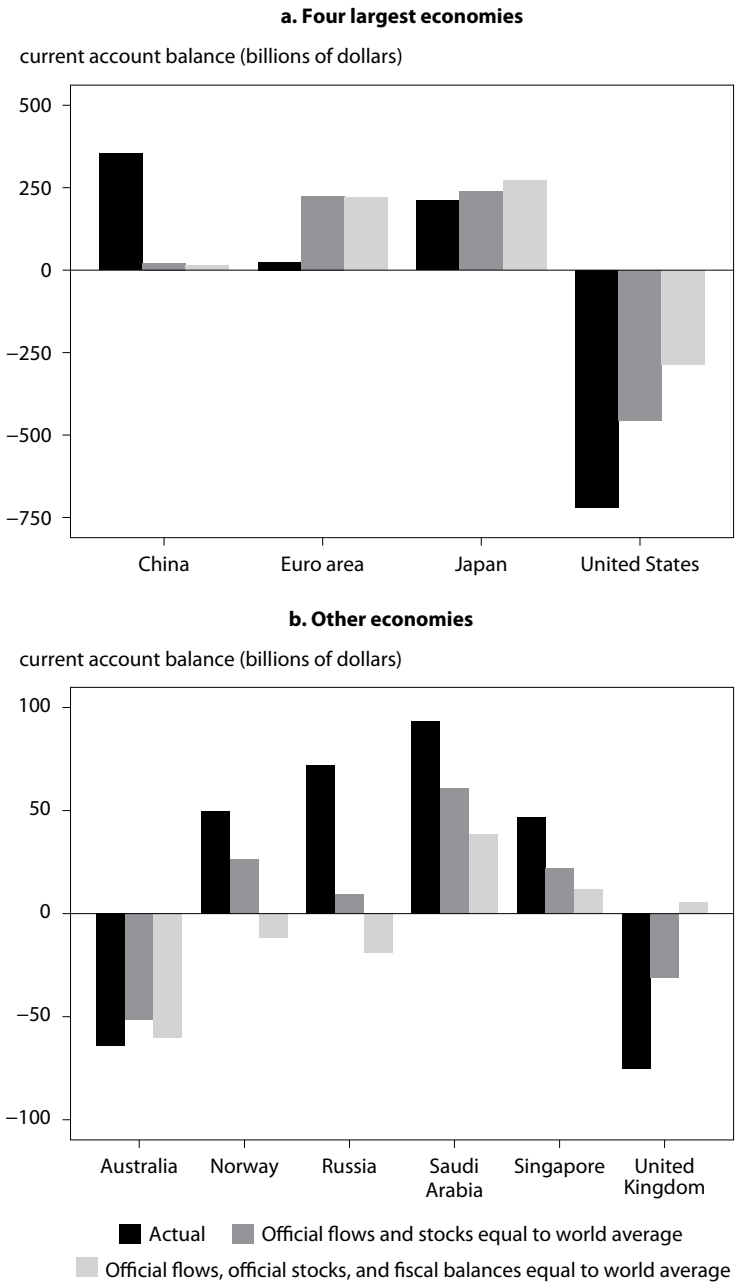
When they are determined to fix the exchange rate, as China was during the 2000s, policymakers must choose between using interest rates or net official flows to achieve that objective. As long as the exchange rate is fixed, interest rates or net official flows respond endogenously to shocks to the current account and net private flows. The regression of table 2.1 uses instruments to remove the effects of this endogeneity. In particular, China, which has the world's foremost tightly managed exchange rate policy, has essentially no influence on the regression coefficients. The interpretation of the coefficients for a country like China is that if the exchange rate had been allowed to float before 2015 and net official flows had been reduced, the exchange rate would have appreciated and the current account would have declined. For commodity-intensive countries with fixed exchange rates, such as Saudi Arabia, the effects of domestic spending on imports are very large. A decision not to send money abroad as official flows but instead to spend it domestically directly increases imports and reduces the current account, even with a fixed exchange rate.

Official financial flows and fiscal balances constitute two of the most important policy factors behind the large current account imbalances of the first decade of the 21st century. Panel A of figure 2.3 displays the current account balances of the four largest economies and panel B displays the current accounts of other countries with large surpluses or deficits. The dark bars are the actual current account balances in 2007, the year of peak imbalances. For the world as a whole, net official flows in 2007 equaled 2.5 percent of world GDP; total net official stocks equaled 14 percent of world GDP; and total fiscal deficits equaled 0.6 percent of world GDP. One way to show the effect of policy differences across countries is to calculate what current account balances would have been if all countries had had official flows, official stocks, and fiscal balances equal to the world average in 2007. This exercise is motivated by the symmetry of current account balances, which add up to zero across all countries; differences in underlying economic factors and policies thus drive imbalances.

The medium grey bars display the current accounts that would be predicted if all countries had equal net official flows and stocks of net official assets as a percent of GDP, based on the coefficients in table 2.1.[22] The light grey bars display the current accounts that would be predicted if all coun-

22. Because the countries with small official flows tend to have more open capital markets, the direct effect of raising their official flows on their current account balances is somewhat smaller than the direct effect of reducing official flows for countries with large official flows. To maintain the global current account identity, we allocated half the aggregate discrepancy between rising and falling current accounts in proportion to nominal GDP and half in proportion to the reported currency denomination of foreign exchange reserves as of 2010 (IMF COFER database).

Figure 2.3 Actual and hypothetical current account balances, 2007



Source: Authors' calculations based on data from sources listed in appendix A.

tries had equal fiscal deficits (as percent of GDP) in addition to equal official flows and stocks.[23]

For China a reduction in net official flows and stocks to the global average would have reduced the current account surplus from $350 billion to $20 billion. For the United States, an increase in net official flows and stocks to the global average would have reduced the deficit by about $235 billion.[24] Because the euro area and Japan had very low net official flows in 2007, raising them to the global average would have increased their current accounts by about $180 billion and $25 billion, respectively. For the next-largest deficit countries, the United Kingdom and Australia, moving to average net official flows and stock would have reduced their deficits. For most of the next-largest surplus countries—Saudi Arabia, Russia, Norway, and Singapore—moving to average net official flows and stocks would have reduced their surpluses. The main exception is Switzerland (not shown), which had the sixth-largest surplus in 2007 but did not have large official flows that year and would have seen little change.

Figure 2.3, panel A, indicates that the fiscal deficit contributed about $190 billion to the US current account deficit in 2007. Both China and the euro area had fiscal balances close to the world average in 2007, so there was little impact on their current accounts. In contrast, Japan had a modestly above-average fiscal deficit that year; its current account surplus would have been even larger if the fiscal balance had been at the world average. The fiscal deficit contributed significantly to the UK current account deficit. Fiscal surpluses contributed importantly to the Saudi, Russian, Norwegian, and Singaporean current account surpluses. If Norway and Russia had had net official flows and fiscal balances at the world average in 2007, their surpluses would have turned into small deficits.

Capital Flow Measures

Restrictions on capital mobility range from outright prohibitions or quotas on purchases of specific assets to taxes on certain categories of transactions. Once anathema in discussions of sound economic policy, capital flow measures have achieved a measure of respectability in recent years. Staff at the IMF have described how such measures may be useful in limited and specific circumstances (IMF 2012b, Ostry et al. 2011).

---

23. We allocated the small additional discrepancy between rising and falling current account balances from fiscal adjustment across countries in proportion to nominal GDP.

24. Historically, the United States has had very small net official flows. One interpretation of this alternative scenario with significant US net official flows is that it might reflect a US policy of countervailing currency intervention, discussed in chapters 5 and 6.

Many large imbalances arise from private financial flows. Another source of unsustainable imbalance is government policies, in the form of fiscal balances, official external borrowing, and foreign exchange intervention. Government borrowing in domestic markets tends to increase net financial inflows and reduce the current account balance; this effect is larger when capital markets are more open (see table 2.1). Governments sometimes borrow externally in foreign currencies, as they did in Mexico before 1994 and Argentina before 2001. Such borrowing is a negative net official flow that reduces the current account. Foreign exchange intervention is a form of financial outflow that increases the current account balance. In the pursuit of export-led growth, countries may pile up excessive stocks of foreign exchange reserves. In the pursuit of exchange rate stability, they may run these stocks down to dangerously low levels. In addition, large fiscal deficits and official external borrowing are not sustainable indefinitely. Like imbalances caused by overexuberance in private financial flows, unsustainable imbalances caused by official policies are costly. Indeed, there is a greater presumption that policymakers who do not have to face a market test of profitability may waste taxpayers' resources.

Financial crises provide the most vivid examples of the costs of unsustainable imbalances, but such imbalances have serious economic costs even when they are resolved without a crash. These costs arise from the need to shift economic resources across industries as the imbalances grow and then shift back again as the imbalances shrink. The record global imbalances of the early 2000s had far-reaching costs that go beyond any role they may have had played in the global financial crisis, as we discuss in chapter 4.

Norms for Imbalances

Current account deficits become unsustainable when a country's net international investment position (NIIP) becomes negative enough that markets question the country's ability to bear the burden of net debt or the domestic political response to the deficits threatens an outbreak of protectionism. There is often no corresponding pressure on large surplus positions, an asymmetry that has dogged the international system for generations and that is a central theme of this book. Here we focus on financing issues and the NIIP (although for the United States the domestic political response has typically been the more important limiting factor, a fact confirmed by the backlash against globalization, manifest by the opposition to the TPP in Congress and more broadly in the antitrade rhetoric of the 2016 US presidential election).

The IMF began to publish a set of normative current account balances for most large and some medium-size economies in its *External Sector Reports*

in 2011. It considers both the secular and the cyclical factors discussed here and applies a common globally consistent framework to obtain a set of current account targets. In principle, the IMF approach should lead to a plausible and consistent set of norms for current accounts. Unfortunately, the IMF often shades its norms to be closer to recently realized current accounts than can be justified by fundamentals. Moreover, the sustainability of NIIPs does not appear prominently in the determination of the IMF norms, a critical drawback.

The 2016 *External Sector Report* calls for a current account deficit of 1 percent of GDP in the United States and current account surpluses of 1 percent in China, 2 percent in Japan, and 4 percent in Germany. These figures compare with actual 2015 figures of a 2.5 percent deficit in the United States and surpluses of 3 percent in China, 3 percent in Japan, and more than 8 percent in Germany. Thus, according to the IMF, the US balance is too low and the Chinese, German, and Japanese balances too high.

In the 2015 *External Sector Report*, the norms for China, Germany, and Japan were all closer to zero (indeed, China's norm was zero). As actual imbalances have widened, the IMF has moved the goalposts in the same direction for no justifiable reason. As wealthy economies with relatively old populations, Germany and Japan arguably should run modest surpluses, but 4 percent stretches the limit. It is even harder to understand why the United States, even richer and with a population that is almost as old as Germany's, should have a negative norm or China, which is far poorer and still growing rapidly, should have a positive norm (somewhat more rapid population aging in China is one factor in that direction). The real reason behind these changes appears to be pressure inside the IMF not to criticize countries for deviating from a consistent benchmark and rather to ratify the outcomes countries have implicitly chosen.

The IMF norms are even less appealing for some smaller economies with large imbalances. For these economies the IMF includes ad hoc factors and judgmental adjustments that have the effect of ratifying very large imbalances, especially large surpluses. For example, in its 2016 *External Sector Report*, the IMF lists norms for current account surpluses of 14 percent of GDP in Singapore, 12 percent in Switzerland, and 7 percent in the Netherlands. These large surpluses are said to reflect in part the status of these economies as "financial centers," but these countries almost exclusively comprise the dummy variable used to estimate the financial center effect, which does not include the world's largest financial centers (London, New York, and Tokyo).[5] The IMF analysis thus appears to be a case of ex post

5. The IMF also points to a measurement issue concerning the reporting of retained earnings on portfolio investment that has a particularly large effect on Swiss data. Adjustment

rationalization of the observed imbalances rather than a serious attempt to assess country circumstances by rigorously imposed common standards.

The IMF norms factor in a cyclical effect on the current account. In the data underlying table 2.1, the standard deviation of the output gap (the difference between actual and potential GDP) is about +/–5 percent of potential GDP. If about half of this gap were to spill over into the current account, cyclical swings in the current account would be on the order of +/–2.5 percent of GDP. For a large country such as the United States, output gaps are typically smaller than +/–5 percent, and spillovers to the current account are proportionally smaller (a typical cyclical swing in the current account would be about +/–1 percent of GDP).

Cyclical differences across major regions are currently fairly small, with the United States in a modestly stronger position than Europe. The IMF estimates output gaps for 2016 of –0.5 percent of potential GDP for the United States, –1.2 percent for the euro area, and –1.5 percent for Japan (IMF 2016). These small cyclical differences should be associated with current account deviations of much less than 1 percent of GDP from any secular norm. The IMF does not publish output gaps for China, but China is widely viewed to be coming out of a modest slump and operating close to potential.

A large body of literature on early warning indicators of crises generally supports the view that large current account deficits are a source of risk for currency or financial crises (Berg et al. 2000; Goldstein, Kaminsky, and Reinhart 2000). Goldstein, Kaminsky, and Reinhart find that a trigger for concern was a current account deficit above the 80th percentile of observations in a panel of countries over time. In the data underlying table 2.1, the 80th percentile would be a current account deficit of 6 percent of GDP. Freund (2000, 2005) finds that a current account deficit of more than 5 percent of GDP has often triggered currency depreciation and an economic slowdown. For large economies, which tend to be less exposed to trade, it is possible that the trigger may be smaller than 5 percent of GDP, because they may have greater difficulty in adjusting (the United States may be a special case, as discussed below).

In principle, long-lived imbalances associated with demographics and development might be expected to be large, given the huge differences in growth rates and wealth across countries. A country with one-tenth of the capital per worker of the United States (Thailand, for example) could in principle borrow in excess of its initial GDP on a path to catching up with

for this issue would raise the norm for the Swiss current account by about 2 percent of GDP (Gagnon 2014).

US productivity.[6] Its NIIP would become more negative, but its GDP would grow rapidly, keeping net financing costs at a bearable level. However, domestic saving rates tend to be high in rapidly growing economies, reducing the need to borrow. Rapidly growing economies also face bottlenecks to investment and rapid transformation. Thus, estimated imbalances arising from demographics and development are not likely to exceed 2 to 3 percentage points of GDP.

The ultimate determining factor for sustainable current accounts in most countries is a country's ability to finance them. Financing, in turn, requires that the burden of net investment payments be manageable. Net investment payments reflect a return (interest, dividends, retained earnings) on the NIIP (total domestic holdings of foreign assets minus total foreign holdings of domestic assets). In particular, the ratio of the NIIP to GDP must not decline indefinitely.[7]

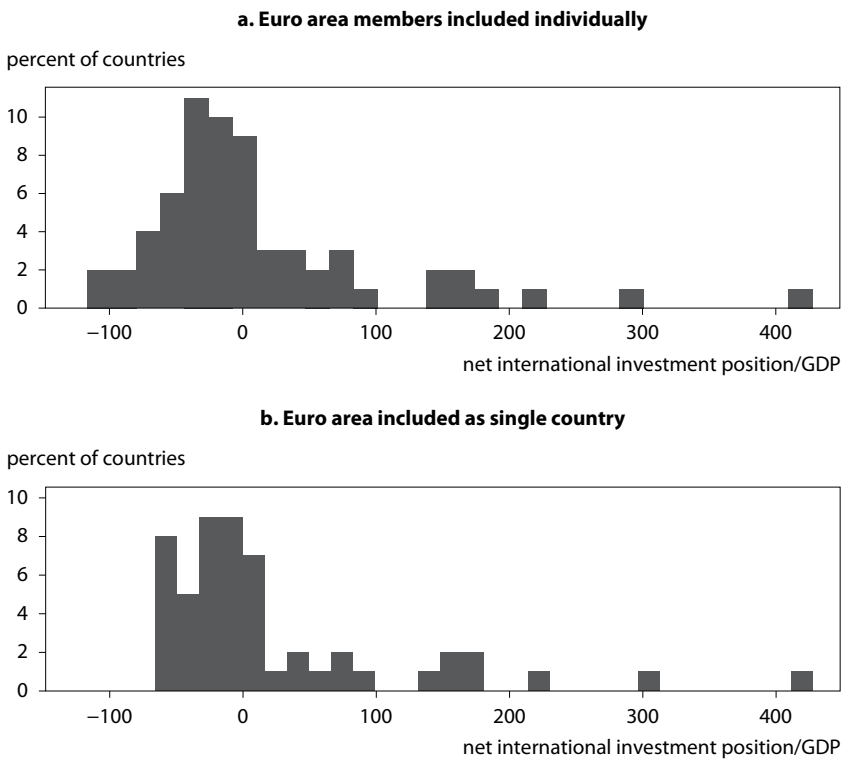
The top panel of figure 3.1 displays the distribution of NIIPs (in percent of GDP) of the 65 countries with nominal GDP greater than $100 billion in 2014. The asymmetry of the figure is striking, with a long tail of countries with extremely large positive NIIPs and no countries with NIIPs much less than –100 percent of GDP. All four countries with NIIPs below –70 percent of GDP (Spain, Greece, Portugal, and Ireland) are in the euro area. These countries almost surely would not have been able to borrow so much if they had not been in an economic and currency union. Even within that union, their huge net debts led to a major crisis in 2010–12 that has forced them to maintain fiscal austerity and switch from current account deficits to current account surpluses.

This asymmetry becomes even starker in the bottom panel of figure 3.1, which includes the euro area as a single entity. The country with the largest negative NIIP is Hungary at –66 percent of GDP, followed by Vietnam, Poland, Morocco, New Zealand, and Turkey between –60 and –65 percent. Romania and Australia have NIIPs between –50 and –60 percent. Out of 54 countries, none has a NIIP below –70 percent of GDP, and 11 have NIIPs greater than 70 percent, ranging up to 420 percent of GDP. These results confirm a pattern that many observers have long noticed: Financial markets

6. Data on national capital stocks are scarce. According to the World Bank's Atlas measure, Thailand's per capita national income is about 1/10th the US level. Depending on labor force participation, labor quality, and parameters of the production function, capital per worker in Thailand may be about 1/10th the US level.

7. To the extent that holders of foreign assets differ from issuers of liabilities to foreigners, financing could become a problem even with the net position close to balance. What matters in that case is the total debt burden of any given sector, not merely its cross-border debts.

Figure 3.1 Frequency distribution of net international investment position/GDP, 2014



Note: Includes only economies with nominal GDP of at least $100 billion.
Source: Authors' calculations based on data from sources listed in appendix A.

limit the ability of countries to incur debts but not the ability of countries to accumulate assets.

Because a country's NIIP is essentially the cumulation of its past current account balances, focus on sustainability typically concerns the size and persistence of a country's current account balance. However, two other factors also enter the analysis. The first are valuation adjustments on the assets a country holds and on the liabilities it owes to foreigners, which may arise from changes in exchange rates or stock prices, for example. The second is the growth rate of the economy, the denominator in the *NIIP/GDP* ratio. At the end of any year, the ratio of the NIIP to GDP is equal to last year's ratio divided by the gross growth rate of this year's GDP plus the ratio of the current account and valuation adjustments to GDP.

$$(NIIP/GDP)_t = (NIIP/GDP)_{t-1} / (GDP_t/GDP_{t-1}) + (CAB_t + NVA_t)/GDP_t$$

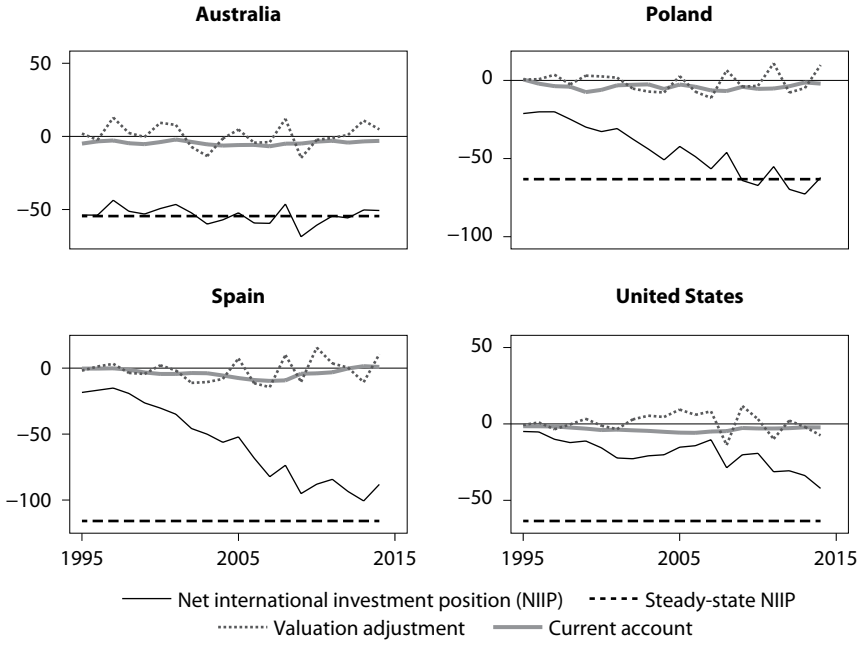
where *CAB* is the current account balance and *NVA* the net valuation adjustment. For any fixed ratio of *CAB* + *NVA* to GDP, *NIIP*/*GDP* will stabilize at a constant value as long as GDP is growing steadily.

In their work on sustainable current accounts, Cline and Williamson (2008, 2012) use a range of +/–3 percent for the current account as a ratio to GDP. If one assumes that valuation adjustments are close to zero on average and nominal GDP growth is 5 percent per year (as used to be common), the above equation implies that a 3 percent current account deficit is consistent with a stable NIIP/GDP ratio of –60 percent. With trend nominal GDP growth of 4 percent per year (consistent with the Federal Reserve's long-run forecast for the United States), a stable NIIP/GDP ratio of –60 requires a current account deficit of only 2.4 percent. As can be seen in figure 3.1, a NIIP/GDP ratio of –60 percent appears to be close to the sustainable limit, at least if one excludes countries in the euro area. Thus we find the Cline-Williamson ranges for sustainable current accounts to be reasonable, or perhaps even a bit too wide, under plausible assumptions. For large economies another argument for limits to imbalances less than +/–3 percent of GDP is the larger spillovers of imbalances in these economies to the rest of the world. Clearly, surplus countries have little trouble running even larger surpluses than 3 percent of GDP, but we agree with Cline and Williamson in their normative judgment that a symmetric standard should be applied.

Figure 3.2 displays elements of the equation for four important deficit countries. Australia ran an average current account deficit of 4.4 percent of GDP between 1995 and 2014. Its (volatile) net valuation adjustments (a positive offset to the current account) averaged 0.8 percent of GDP. In addition, it had a relatively high annual growth rate of 7.0 percent in terms of US dollars. Our NIIP arithmetic suggests a steady-state NIIP/GDP of –54 percent. It appears that Australia has been in steady state over this period. However, if Australia's trend growth rate declines or net valuation adjustments do not continue to be positive on average, the steady-state NIIP/GDP would become more negative and raise issues of sustainability. If, for example, future valuation adjustments average close to zero, the steady-state NIIP/GDP ratio would decline to –67 percent of GDP, outside the range of non-euro-area countries in figure 3.1.

Spain presents a more extreme example. Although its average current account deficit was somewhat smaller than Australia's (3.6 percent), it had a slower growth rate (4.8 percent) and suffered negative average valuation adjustments (–1.7 percent). These numbers imply a steady-state NIIP of –116 percent of GDP. Actual NIIP moved down steadily toward this value. Despite Spain's membership in the euro area and European Union, financial markets became unwilling to support its large debt, and Spain was hit by the euro crisis in 2010. Massive fiscal austerity and a grinding recession

Figure 3.2 Sustainability analysis for four debtor countries, 1995–2014 (percent of GDP)



Source: Authors' calculations based on data from sources listed in appendix A.

pushed the current account into balance, which should ultimately raise NIIP/GDP if Spain can resume steady growth.

Poland is a member of the European Union but not the euro area. Its average current account plus valuation adjustments were similar to Spain's, but its GDP grew much faster, leading to a less extreme steady-state NIIP of –63 percent of GDP. Although Poland was not hit by the euro crisis, markets did begin to question the sustainability of its net borrowing, much of which was in foreign currencies, which created risky currency mismatches. The depreciation of the zloty and rapid underlying productivity growth as Poland catches up to its more advanced neighbors have brought the current account back into balance without requiring the massive recession Spain endured.

The United States had an average current account deficit of 3.4 percent of GDP, which was offset to a modest extent by average valuation adjustments of 0.8 percent of GDP. Average nominal GDP growth was 4.3 percent. Together, these data imply a steady-state NIIP of –64 percent of GDP, close to the apparent limit on debtor countries. Assuming 4 percent nominal GDP growth, a 4 percent current account deficit (Cline 2016), and

continued average valuation adjustments of 0.8 percent, the United States would reach a NIIP of –60 percent of GDP in roughly 20 years. If the deficit widens to 5 percent of GDP, as may be likely under the Trump administration's policies (Prakken and Varvares 2016), or valuation adjustments average close to zero, the United States would reach a NIIP of –60 percent of GDP in about 10 years.

Is the –60 percent limit on NIIP/GDP relevant for the United States? The main arguments in favor of a potentially larger net debt are the unique role of the US dollar as the world's reserve currency and its dominant share in financial transactions. In addition, US Treasury securities are the world's principal safe asset, and US institutional governance is viewed favorably (though not notably more so than many other advanced economies). The disproportionately large size of the US economy makes it risky for investors to concentrate so much of their holdings in dollars, however, especially as a more negative US NIIP/GDP ratio increases the possibility of a substantial fall in the value of the dollar. The United States has already far exceeded all previous records for the size of any one country's net liabilities to the rest of the world relative to world GDP.

Another concern is that the true NIIP limit for most countries may not extend as far below zero as 60 percent of GDP. Of the eight countries with NIIP/GDP below –50 percent, two (Australia and New Zealand) have large natural resource sectors to service the debt; one (Vietnam) is a rapidly growing developing economy building its export capacity; three (Hungary, Romania, and Turkey) have had recent or ongoing IMF adjustment programs; and two (Morocco and Poland) have already experienced market-driven pressures to narrow the current account deficit. It is not clear that even –50 percent is a safe level for NIIP/GDP in a slow-growing, non-resource-focused economy like the United States.

Much has been made of the fact that the total reported payments on US foreign liabilities are less than the reported earnings on US foreign assets, implying that the negative US NIIP does not impose a net financing burden on the US economy. Much of this outcome reflects measurement error, however, and much of the part that is not measurement error stems from ultra-low interest rates on debt, which are not likely to last much longer. The mismeasurement arises from the incentive for US corporations to report profits in their overseas activities, where they are not taxed unless the earnings are repatriated. Because US corporate tax rates are among the highest in the world, US companies and foreign companies operating in the United States have an incentive to book profits outside the United States, in low-tax jurisdictions such as Ireland.

A component that may be persistent arises from the larger proportion of high-grade debt in foreign claims on the United States relative to high-

grade debt in US claims on foreigners. To some extent, the United States is a "banker to the world," taking in cheap deposits and lending them out profitably abroad—or more accurately, issuing low-yield bonds and investing the proceeds in foreign equity and foreign direct investment (FDI) (Gourinchas and Rey 2007). This financial arbitrage does not require a negative NIIP, however, as it implies equal claims on, and liabilities to, the rest of the world.

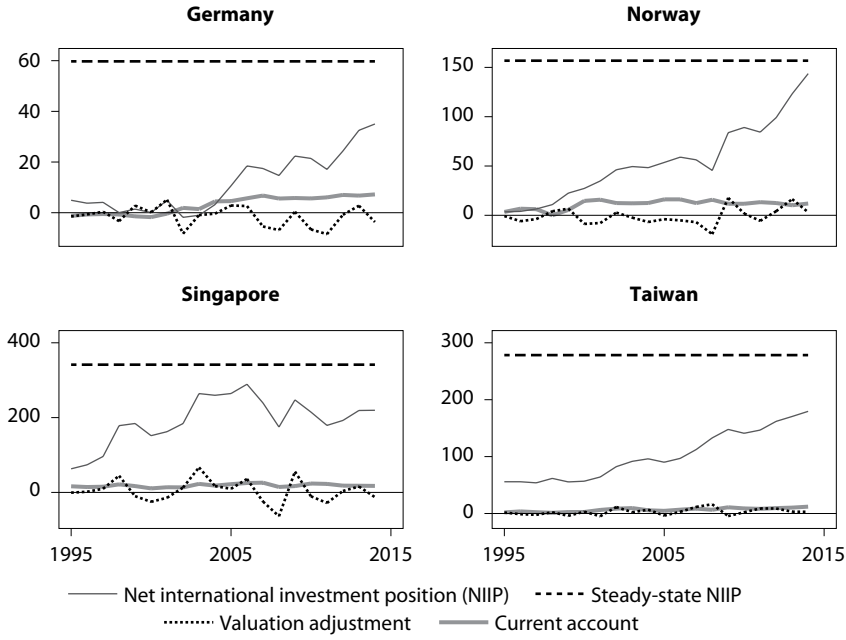
If profits on FDI in the United States had been reported at the same rate (relative to the stock of FDI) as profits on US FDI abroad, and the average interest rates on US debt held by foreigners and foreign debt held by Americans had been higher by 3 percentage points (retaining the same spread), US net investment income in 2015 would have been –$275 billion instead of the reported $182 billion (authors' calculations based on annual data from the US Bureau of Economic Analysis, assuming no change in portfolio equity income or payments).

Rising interest rates increase the current account deficit directly, through higher net interest payments to foreigners. An increase in US and foreign interest rates of 3 percentage points would leave interest rates still somewhat below their average of the past 30 years. Such an increase would widen the US current account deficit by $250 billion. In order to keep the current account at its previous level, the dollar would have to depreciate by roughly 8 percent. If US interest rates were to rise more rapidly or by more than foreign interest rates, as now seems likely, the net effect would be even larger.

Figure 3.3 displays the NIIP sustainability exercise for four surplus economies. Germany ran an average current account surplus of 3.1 percent of GDP between 1995 and 2014, which was offset by average valuation adjustments of –1.5 percent. With moderately slow nominal GDP growth (2.8 percent), the implied steady-state NIIP was 60 percent of GDP. Most of the surpluses occurred in the second half of the sample, and German NIIP is now rising rapidly. Norway had an even larger average current account, of 11.1 percent of GDP, offset modestly by valuation adjustments of –1.0 percent. (The much larger scale on some of these panels makes the current account surpluses look smaller than they are.) Norway had relatively rapid nominal annual GDP growth of 6.9 percent. The implied steady-state NIIP is 157 percent of GDP, and actual NIIP is almost there.

Singapore ran an average current account surplus of 18.4 percent of GDP and had positive average valuation adjustments of 4.3 percent. It had relatively rapid nominal annual GDP growth of 7.1 percent. It made rapid progress toward its steady-state NIIP of 342 percent of GDP in the first half of the period. Average valuation adjustments turned negative in the second

Figure 3.3 Sustainability analysis for four creditor countries, 1995–2014 (percent of GDP)



Source: Authors' calculations based on data from sources listed in appendix A.

half, and nominal GDP growth sped up considerably, preventing a further rise in NIIP/GDP.

Taiwan had an average current account of 6.6 percent but large positive valuation adjustments, averaging 3.2 percent of GDP. With modest nominal annual GDP growth of 3.6 percent, its steady-state NIIP was 278 percent of GDP.

A key message from figure 3.3 is that surplus countries do not face external pressure to adjust. Their actual and steady-state NIIP ratios can thus be much larger than those of deficit countries. In three of the four economies, NIIP/GDP rose steadily. In Singapore internal factors halted this rise. Nevertheless, Singapore's NIIP remained an astonishing 200 percent of GDP.

As with current account balances, NIIPs must add up to zero across all countries (in dollar terms); a positive NIIP for one country thus requires a negative NIIP for another. The ability of some surplus countries to pile up massive amounts of net foreign assets raises a key threat to the global economy, because it makes adjustment in deficit countries more difficult to achieve. After all, for debtor countries to reduce their net debts, creditor

countries must relinquish their net claims. As currently constituted, the international system does not impose pressures on surplus countries to adjust. Such pressures would be helpful to ease debtor adjustment.

This analysis strongly supports the Cline-Williamson range for sustainable current account imbalances of +/–3 percent of GDP for most countries. Indeed, with prospects for long-run nominal GDP growth in many advanced economies having declined to well below 5 percent, an even narrower range of sustainable imbalances might be indicated. The primary exception is exporters of nonrenewable natural resources, which should be allowed to run larger surpluses in some cases, as discussed in chapter 4.

Currency Policies: Legitimate and Illegitimate

Legitimate Intervention

IMF Article IV encourages countries to intervene in foreign exchange markets to counteract disorderly movements in exchange rates.[8] Such intervention should be symmetric with respect to appreciations and depreciations.[9] Intervention to counter disorderly market conditions should not lead to a trend change in reserve holdings.

For a country with less than adequate foreign exchange reserves, acquiring more reserves is a legitimate ground for intervention in most circumstances. (We discuss how to determine what is adequate in the next chapter.) An adequate level of reserves enables a country to more effectively use intervention to counter disorderly market conditions.

Intervention can be useful for stabilizing current account balances in the face of unsustainable swings in private capital flows or illegitimate intervention by other countries. The IMF Articles of Agreement articles suggest that countries are allowed, and even encouraged, to use foreign exchange intervention to counteract unsustainable imbalances. The idea of using in-

8. Official statements issued during or after foreign exchange intervention often mention the goal of countering disorderly market conditions. After the Japanese earthquake and tsunami of 2011, for example, the G-7 finance ministers and central bank governors agreed on concerted intervention, stating "As we have long stated, excess volatility and disorderly movements in exchange rates have adverse implications for economic and financial stability. We will monitor exchange markets closely and will cooperate as appropriate" (G7 Statement on Currencies, March 18, 2011, www.smh.com.au/business/markets/g7-statement-on-currencies-20110318-1bzsj.html).

9. Many financial asset prices, such as stock prices, move asymmetrically, tending to fall more rapidly than they rise, which might justify an asymmetric policy response. However, exchange rates are by definition symmetric (they are the price of one currency in terms of another), so that falls are not more rapid than rises.