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Current Account Imbalances Coming Back

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Abstract

This paper finds statistically robust and economically important effects of fiscal policy, external financial policy, net foreign assets, and oil prices on current account balances. The statistical model builds upon and improves previous explanations of current account balances in the academic literature. A key advance is that the model captures the effect of external financial policies, including exchange rate policies, through data on net official financial flows. Based on current and expected future policies, current account imbalances in major G-20 economies are likely to widen much more in the next five years than projected by the International Monetary Fund (IMF). This paper concludes with a discussion of appropriate policies to prevent widening imbalances.

JEL Codes: F4
Keywords: exchange rate, G-20, official financial flows, sterilized intervention

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EXECUTIVE SUMMARY

This paper builds on recent research into the causes of current account imbalances. It obtains new and improved statistical results by using a more comprehensive dataset on fiscal balances and by adding a measure of external financial policies, including exchange rate policy, into the analysis. This new measure is net official financial flows. This paper devotes considerable effort to exploring the conditions under which including net official flows is a valid approach and in determining the likely bias when these conditions do not hold. The results presented here are shown to be a conservative estimate of the effect of external financial policy on the current account.

Fiscal balances are shown to be more important drivers of current account imbalances than previously thought. The current account tends to increase by 20 to 30 percent of any increase in the fiscal balance, whereas previous research found an effect of 10 to 20 percent. This result supports calls for fiscal consolidation in economies with large current account deficits. Fiscal policies are important drivers of current accounts in both industrial and developing economies.

External financial policies are the most important drivers of current account imbalances in developing economies, but they are not significant drivers in advanced economies. These policies include, for example, preventing exchange rate appreciation after positive shocks to net exports by sterilized intervention in foreign exchange markets. Such policies enable current accounts to remain positive indefinitely because they shut off the normal adjustment channel of real exchange rate appreciation. These policies are more common in developing economies than in advanced economies, in part because greater capital mobility in advanced economies makes sterilized intervention less effective. The current account tends to increase by 40 to 50 percent of any increase in net official financial outflows (including reserve accumulation), and the effect may be even larger in some developing economies. This result supports calls for increased exchange rate flexibility (i.e., reduced accumulation of foreign exchange reserves and other official assets) in developing economies with current account surpluses.

Economies with persistent current account surpluses tend to build up their stocks of net foreign assets, and these net asset positions tend to increase current accounts further through positive net income flows. Changes in oil prices and production also have important effects on current account balances. Other factors, such as demographics, stage of development, and financial crises, are not robustly associated with current accounts.

The simple statistical model of this paper explains about two-thirds of the current account imbalances of developing economies, a large improvement over previous studies. The model explains only about half of the current account imbalances of industrial economies, which is comparable to previous studies. Whereas previous studies found the United States to be a puzzling outlier, this paper finds Germany and Japan to be the most prominent outliers. Clearly, more work is needed to understand current account imbalances in the industrial economies.

Based on these statistical results and on policy plans that have been announced to date, current account imbalances are likely to return to record levels over the next five years. This conclusion supports the view that the recent narrowing of imbalances was almost entirely a result of the global recession and that global recovery will unwind this effect. Indeed, recent data suggest that IMF projections for current accounts in 2010 understate the likely imbalances last year in some of the largest G-20 economies. Looking ahead, the underlying driving factors are projected to widen further in many economies over the next five years, suggesting that even larger imbalances are on the way. In particular, fiscal deficits are expected to be larger in the next five years than they were before the financial crisis in many economies with current account deficits; real exchange rates are not expected to adjust significantly despite large differentials in economic growth rates; and stocks of net foreign assets have increased in many economies with current account surpluses. The main exceptions to this conclusion are the oil exporting economies, notably Russia and Saudi Arabia, in which fiscal balances and oil export revenues are projected to be considerably lower in 2011–15 than they were in 2004–08, thus leading to a significant and sustained reduction in the current account surpluses of these economies relative to the period before the crisis.

Greater exchange rate flexibility in developing economies, and thus reduced net official financial flows, would go a long way toward reducing imbalances in developing economies with current account surpluses. The counterpart to this adjustment would be an increase of current account balances in the advanced economies that have been the recipients of official flows from these developing economies. For the United States and the United Kingdom, which have current account deficits, the result would be a reduction in imbalances. But for Germany and Japan, which have current account surpluses already, the result would be a widening of imbalances.

Alternative approaches to projecting current accounts, based either on historical trade elasticities or estimates of the Balassa-Samuelson effect, show that if real exchange rates are held constant over the next five years, current account imbalances are likely to widen considerably.

Although this paper argues that the IMF is too optimistic concerning the prospects for future current account imbalances, the results of this paper strongly support the policy proposals of the IMF through the G-20 Mutual Assessment Process. To avoid a return of large global imbalances, economies with current account deficits should cut fiscal deficits more than is currently projected and economies with current account surpluses should reduce official financial outflows and allow their currencies to appreciate as well as take steps to boost domestic demand. Fiscal consolidation in surplus economies—though necessary in some cases—is detrimental to rebalancing and should proceed at a slower pace and to a lesser degree than in deficit economies. Even in deficit countries, the pace of fiscal consolidation should be slower in economies where the recovery from the crisis remains weak.

Monetary policy should remain accommodative and even ease further in economies where output remains below potential and inflation threatens to fall below desired levels. In developing countries in

which inflationary pressures are rising, a tighter macroeconomic policy stance is indicated. However, the form of the tightening should differ based on country circumstances: Surplus economies should tighten via exchange rate appreciation, whereas deficit economies should tighten via fiscal policy. Structural reforms to boost long-run growth and rebalance domestic saving and investment should be encouraged, but the specifics of these reforms differ across countries and it is difficult to predict the size and timing of their effects.

Reforms at the IMF and other international financial institutions to increase the size of financial safety nets should reduce the incentive for economies to build up large amounts of foreign exchange reserves and other official assets. In principle, this could help to narrow current account imbalances associated with net official financial flows. However, the aggregate size of the safety nets currently under consideration is much smaller than existing holdings of foreign exchange reserves, so these actions are likely to have only a modest restraining effect on reserve accumulation. Moreover, for some countries reserve accumulation is oriented toward maintaining a competitive exchange rate in order to support exports; for these countries, financial safety nets are not likely to have much effect on net official financial flows.

INTRODUCTION

Current account imbalances reached record levels prior to the financial crisis of 2008–09. As economies contracted during the crisis, the imbalances narrowed considerably, but they remain large in historical context. Many observers believe that the large and growing imbalances of the past decade helped to cause the financial crisis.[1] In Pittsburgh, the G-20 leaders tacitly agreed with this view as they launched the G-20 Framework for Strong, Sustainable, and Balanced Growth. Leaders pledged to "promote more balanced current accounts" as part of an overall effort to make growth sustainable and to minimize the risk of future crises. As the global economy recovers, will the announced policies of G-20 governments reduce imbalances further, hold them near last year's levels, or widen them back toward their precrisis levels?

This paper seeks to answer this question by building on recent research into the causes of current account imbalances. The statistical analysis yields a better explanation of past imbalances than previous studies, both because it uses more comprehensive fiscal data and because it adds an important additional variable: official financial flows. For many countries, the official flows data provide a useful measure of the stance of exchange rate policies.

The new statistical estimates are used to project current account balances over the next five years under paths for economic policy and energy prices that are projected by the IMF in the October 2010 *World Economic Outlook* (WEO). The results indicate that current account imbalances for most G-20

1. It is widely agreed that regulatory and supervisory failures and gaps were an important factor behind the crisis. Some have argued that excessively easy monetary policies also contributed.

countries are likely to approach or exceed the record levels reached in the years immediately prior to the financial crisis. The major exceptions are Russia and Saudi Arabia, for which the IMF projects sharp declines in fiscal balances and oil revenues compared to the years before the crisis.

The final section discusses policy options to achieve stronger growth with reduced current account imbalances. The IMF proposals at the Toronto and Seoul G-20 summits are basically correct. Adopting these proposals is all the more important because imbalances appear likely to widen sharply based on current policy projections.

WHAT CAUSED THE IMBALANCES?

This section focuses on the medium-term and long-term factors that give rise to current account imbalances. Understanding these factors is the key to learning whether the recent decline in imbalances is a temporary phenomenon or the harbinger of a lasting change.

The Classic Elasticities Framework

In the elasticities framework, exports are modeled as a function of relative prices between the exporting country and the rest of the world as well as aggregate income in the rest of the world.[2] Imports are modeled in an analogous fashion. The trade balance thus responds positively to foreign income, negatively to domestic income, and negatively to the ratio of domestic to foreign prices. This framework long has been a workhorse for policymakers and short-term forecasters.[3]

However, the elasticities approach is not helpful in answering the question of what causes current account imbalances over a sustained period of time. The estimated income elasticities are not constant over time or across countries.[4] Important factors such as natural resources, productivity growth, demographic changes, and barriers to trade are not included in the elasticities framework.

A Modern Panel Regression Framework

A series of recent papers has examined the medium-term structural factors that are exogenous drivers of current account balances.[5] The papers all use five-year averages of data to minimize the influence of business cycles, transitory factors, and adjustment lags. The panel structure of the analysis combines data

2. See Goldstein and Khan (1985) and Marquez (2002).

3. The elasticities framework provides a model of the trade balance. In most countries, the trade balance dominates movements in the current account and the other components (factor income and transfers) change only slowly.

4. See Krugman (1989).

5. See Chinn and Prasad (2003), Gruber and Kamin (2007, 2009), Chinn and Ito (2008), and Cheung, Furceri, and Rusticelli (2010).

from dozens of industrial and developing economies over the past three or four decades. In these studies, the following variables are robustly associated with the current account balance:

- *General government fiscal balance* (net lending). The secular channel here is through financial markets. Higher fiscal balances (smaller deficits) reduce interest rates, putting downward pressure on the exchange rate and making imports more expensive and exports more competitive.
- *Net foreign assets*. Positive net foreign assets generate positive net investment income—a component of the current account. On a steady-state growth path, an economy with positive net foreign assets has a current account surplus so that nominal assets can grow in line with the economy. Statistical analysis is based on beginning-of-period assets to avoid the endogeneity that arises as current account balances cumulate into net foreign asset positions.
- *Net exports of oil*. Economies can take many years to adjust to changes in oil prices, which tend to be large and persistent. Oil exporters typically run surpluses for several years after an increase in oil prices. Oil prices and oil production are clearly exogenous to current account balances.[6]

Other, less robust factors include the share of elderly (age 65 and older) in the population, the share of young (birth to age 15) in the population, purchasing power parity (PPP) GDP per capita relative to the United States, and the GDP growth rate. These factors often are estimated to have an economically plausible and statistically significant relationship with the current account balance, but the estimates are sensitive to changes in the countries or time periods examined. Some estimates of these effects are reported below. Previous research finds that measures of financial market depth, the quality of a country's institutions, and the share of trade in the economy do not have robustly significant relationships with the current account. I confirmed this lack of strong empirical relationship in some statistical tests that are not reported here.

As in the previous studies, this study does not include relative prices in the regressors because the components of relative prices—the exchange rate and prices at home and abroad—respond endogenously to all the driving factors behind both the current account and the financial account.

An Important Omitted Factor: External Financial Policy

A notable omission of previous studies is external financial policy, which includes all government policies that operate through *net official financial flows*.[7] There are three important classes of external financial

6. Ideally, one would use net exports of all primary commodities, but such data do not exist for a wide range of countries and years.

7. Some readers may be concerned about including official flows in a current account regression because of the identity that current account = private flows + official flows. However, the inclusion in previous studies of government net lending raises equal concerns for the standard regression model because of the identity that current account = private net saving + government net lending. Private behavior prevents either regression from being a simple identity. Moreover, if private behavior

policy. First, there is official borrowing in foreign currency, perhaps to fund a long-term development project. Second, there is the purchase of foreign assets (including foreign exchange reserves) for precautionary motives or for national saving. Third, there is the purchase of foreign exchange reserves to prevent currency appreciation. It is widely accepted that these policies have important effects on current account balances. Indeed, external financial policy is the subject of calls by G-20 Leaders in Pittsburgh for "market-oriented exchange rates" and by the IMF (2010a, p. 2) for greater exchange rate flexibility in developing economies with current account surpluses. Yet, external financial policy is conspicuously absent in the empirical literature on current account balances.

The mechanism for external financial policy to affect the current account is through imperfect substitutability of domestic-currency and foreign-currency assets. Because the regression framework already includes the fiscal balance, external financial policy represents a fiscally neutral swap of domestic-currency for foreign-currency assets. For example, the government may borrow in domestic currency to purchase foreign exchange reserves or to pay off foreign-currency debt. Such operations tend to depreciate the domestic exchange rate, thereby increasing the current account balance. If the central bank (as opposed to the finance ministry) purchases foreign exchange reserves, we assume that the effects on the domestic money supply are sterilized through issuance of central bank liabilities or sales of central bank assets in domestic currency.[8]

The decision to borrow in foreign currency or to build up foreign exchange reserves, in many cases, is exogenous with respect to the current account. When official financial flows are exogenous, they are valid regressors. In other words, under these conditions, the estimated coefficient in a regression of the current account on official flows is an unbiased estimate of the effect of any future change in official flows on the current account balance.

However, in other cases—particularly when governments target the exchange values of their currencies—official flows are not exogenous to developments in the current account. In these cases, shocks to the current account that put upward pressure on the exchange rate will cause the authorities to purchase foreign exchange reserves to defend their exchange rate target.[9] This policy reaction will

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were unimportant in either identity, then we would be able to conclude that government policy was completely and directly responsible for the current account imbalances.

8. Strictly speaking, sterilization must be viewed as relative to the growing stock of domestic assets the central bank would have had in the absence of purchases of foreign exchange reserves. In practice, the medium-term averaging of the data should minimize temporary effects of any nonsterilized interventions, as higher inflation eventually offsets the effects of currency depreciation on the real exchange rate.

9. A similar, but less extreme, form of endogeneity occurs when governments do not target a fixed value of the exchange rate but instead purchase reserves when the exchange rate is appreciating and sell reserves when the exchange rate is depreciating.

contaminate the coefficient in a regression of the current account on official flows. Appendix 1 shows that in a simple model of a credible fixed exchange rate regime, the coefficient is biased downward.

In the regression analysis below, I attempt to separate the data into observations in which the authorities were targeting the exchange rate and observations in which the authorities were not trying to stabilize the exchange rate. The results suggest that the bias in the coefficient on official flows is either small or negative. Thus, the estimated coefficient in the full sample should be interpreted as a conservative estimate of the effect of official financial flows on the current account.

Private Capital Mobility and the Effect of Official Financial Flows

Appendix 1 also shows that private capital mobility has important implications for the coefficient on official flows. As discussed above, external financial policy works through the imperfect substitutability of domestic-currency and foreign-currency assets. When private financial markets view assets denominated in different currencies as perfect substitutes (i.e., when capital is highly mobile) the currency in which a government borrows and lends does not matter. All that matters is the government's overall fiscal position. In that case, a regression of the current account on official financial flows yields a coefficient of zero as long as the fiscal balance is included in the regression.[10] When private financial markets do not view assets denominated in different currencies as substitutes (i.e., when capital is not mobile) the coefficient is one (and the coefficient on the fiscal balance is zero). So at the two extremes of perfect capital mobility and no capital mobility, the regression coefficient is fixed at zero and one, respectively, regardless of whether official flows are endogenous or exogenous to the current account. More generally, when private capital mobility is very low, we would expect to see a strong positive relationship between the current account and official flows regardless of exchange rate regime.

Table 1 presents evidence that private capital mobility is high in industrial economies and low in developing economies.[11] The standard deviation of *gross* private financial flows is twice as large in industrial economies as in developing economies. Thus we would expect private financial flows to be more important for industrial-economy current account balances than for developing-economy balances. In industrial economies, *net* private flows are more variable than current accounts and net official flows are less variable, again suggesting that private flows are a more important driver of current accounts in these economies than official flows. In developing economies, the opposite is true: net private flows are less variable than current accounts and net official flows are more variable. For the developing economies on average, it appears that either current accounts are mainly driven by official flows or official flows are

10. This statement refers to the regression coefficient in a very large sample, also known as the asymptotic coefficient.

11. In this paper, "industrial countries" refers to countries in the former IMF category of that name. The specific countries are listed at the bottom of table 1.

mainly driven by current accounts, and that private financial flows are not driving either current accounts or official flows.

Table 1 also shows that private flows are more highly correlated with industrial-economy current accounts than official flows, whereas official flows are more highly correlated with developing-economy current accounts than private flows. The correlations in table 1 do not tell us whether exogenous official flows drive the current account or exogenous shocks to the current account drive official flows in developing economies. However, the relatively low correlations and standard deviations of net private flows in these economies suggests that private flows are not likely to offset much of any change in the behavior of official flows. *Therefore, should policymakers in most developing economies decide to allow greater exchange rate flexibility by reducing official flows, their current account imbalances are likely to narrow.* Appendix 2 shows that this conclusion is indeed the lesson to be drawn from the experiences of the Republic of Korea and Singapore in 2001–06.

New Panel Regression Estimates

Table 2 presents regression results for the baseline model. Except for the inclusion of official flows, this model is similar in composition to the baseline models of Chinn and Ito (2008) and Cheung, Furceri, and Rusticelli (2010). The data are five-year averages for the nonoverlapping periods 1984–88, 1989–93, 1994–98, 1999–2003, and 2004–08.[12] There are 20 industrial and 92 developing economies, though some of the developing economies are missing data for the earlier periods. Countries with 2008 populations of less than 1 million are not included.

Most data are obtained from the IMF *International Financial Statistics* and World Bank *World Development Indicators* databases. The current account balance, fiscal balance, official financial flows, and net oil exports are all expressed in percent of GDP. Fiscal balances (general government net lending) are from the IMF October 2010 WEO database where available; missing values are filled in from current and older vintages of the *International Financial Statistics* and *World Development Indicators* databases.[13] Missing values of net foreign assets are filled in from Lane and Milesi-Ferretti (2006). Official flows are defined as the sum of "reserves and related items" and general government and monetary authority "other investment" net flows. Official flows data were adjusted to include reserve assets on the liabilities side as well as the asset side.[14] Official flows for Norway (1999–2008) and Saudi Arabia (2004) were adjusted to

12. The net foreign assets data refer to the value in the year before the beginning of each five-year period.

13. Older vintage data were obtained from Chinn and Ito (2008). Thanks to Menzie Chinn and Hiro Ito for sharing their data.

14. In the IMF data, the reserves component of official flows includes only purchases and sales by the country holding the reserves with no offsetting entry for the country whose assets are held as reserves. In other words, China's purchases of dollar assets are included as positive official flows in China but not as negative official flows in the United States. To

include outflows of government-owned assets that are not included in the IMF's official flows data.[15] Other countries with significant government-owned assets that are not included in the IMF data were excluded from the regression for the final period (2004–08) when these flows were economically significant.[16]

The effect of the fiscal balance is robustly positive and moderately larger than in previous studies. The current account tends to increase by about 20 to 30 percent of any increase in the fiscal balance.[17] Limiting the regression to observations that have fiscal data from the October 2010 WEO (column 3) yields an estimate of the effect of the fiscal balance at the low end of this range. Excluding official flows (column 4) leads to a much higher estimated fiscal effect—reflecting the positive correlation of fiscal balances with official financial flows—but the equation fit deteriorates significantly. Column 4 is essentially equivalent to the basic regression of the previous studies. The higher fiscal effect in column 4 relative to previous studies results from excluding data from the 1970s (when capital was less mobile) and including more observations from the 1990s and 2000s.

The effect of official financial flows is robustly positive and even larger than that of the fiscal balance. The current account tends to increase by about 40 to 50 percent (or more) of any increase in the flow of official capital. As shown by the R^2s in columns 5 and 6, official flows by themselves can explain between one-third and two-thirds of the variation in current account imbalances. The regression in column 5 is limited to the same observations as that of column 1. The regression in column 6 adds about 130 observations for which data on the other variables (mainly the fiscal balance) are missing. These are mainly the poorest economies for which private capital mobility is very low. As discussed above, the effect of official financial flows is expected to be particularly important in economies with low capital mobility. Almost all of the explanatory power of official flows for the current account is associated with the developing economies; official flows by themselves explain only about 15 percent of the variation in current accounts among the industrial economies (not shown).

The effect of net foreign assets is robustly positive, and it is larger in industrial economies than in developing economies. For convenience, the coefficient on net foreign assets is multiplied by 100 in tables 2, 3, and 4. The value of 2.63 in the first column of table 2 implies that an increase in net foreign assets

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correct this asymmetric treatment, I allocated reserve transactions to recipient countries in proportion to the currency shares reported by the IMF (*Currency Composition of Official Foreign Exchange Reserves* data) for 2007. The results are not sensitive to the choice of base year. Euro area official inflows are allocated according to 2008 nominal GDP shares.

15. Data are from the Finance Ministry of Norway's annual budgets and the Saudi Arabian Monetary Authority's annual reports. Beginning in 2005, all Saudi government foreign investments are included in official reserves.

16. These countries are Azerbaijan, Brunei Darussalam, Kazakhstan, Kuwait, Malaysia, Qatar, Singapore, Trinidad and Tobago, United Arab Emirates, and Venezuela. See IMF (2007).

17. Chinn and Ito (2008) and Cheung, Furceri, and Rusticelli (2010) found values of 10 to 20 percent, which seem implausibly low. Abbas et al. (2010) focus solely on fiscal effects on the current account and estimate effects of 20 to 30 percent.

equal to 100 percent of GDP would be expected to increase the current account balance by 2.63 percent of GDP. In steady state, this coefficient should equal the rate of return on net foreign assets.

Net exports of oil have a strong positive effect on the current account in developing economies and an insignificant negative effect in industrial economies. The coefficients on the remaining variables have the expected signs and plausible values in the basic regression (column 1), but these coefficients are sensitive to outliers and they are not robustly significant as can be seen in column 2. Their magnitudes and signs change noticeably over time and across country groupings.

Overall, the regression model provides a good explanation of the data, as implied by the high R^2s. But the fit is notably better for the developing economies than for the industrial economies. The fit is also notably better than in previous studies, which did not include official financial flows.[18] The improvement in fit is greatest for the developing economies. A test of parameter stability found that the coefficient on net foreign assets increased significantly in the last 10 years relative to the first 15, but the other coefficients did not change by an amount that was either statistically or economically significant.[19]

Table 3 explores the importance of exchange rate regimes for the coefficient on official flows. The table focuses on developing economies, for which official flows seem to be most important. The two regressors of table 2, column 8 (developing economies) with the lowest t-statistics, PPP GDP per capita and GDP growth, are dropped. Column 1 presents the results using all available observations. Columns 2 through 4 present results based on observed variability of nominal exchange rates. Column 2 includes observations for which the standard deviation of the nominal exchange rate (within the five-year period) against either the dollar or the euro was less than 3 percent. These correspond to episodes in which a country pegged its currency to either the dollar or the euro. Column 4 includes observations for which the standard deviation of the nominal exchange rate (within the five-year period) against both the dollar and the euro exceeded 10 percent. These correspond to a floating exchange rate regime. Column 3 includes observations that fall in between these extremes. Differences in the estimated official flows coefficients across these regressions are not statistically significant, and the coefficient from the most freely floating regime (column 4) is essentially identical to that from the overall sample.

Columns 5 through 8 of table 3 exploit the categorization of exchange rate regimes in Ilzetzki, Reinhart, and Rogoff (2008). Observations in which the regime changed during the five-year period were dropped. Column 5 reports results for observations with either a fixed or crawling peg. Column 6 reports results for observations with a managed float, a free float, or a free fall. Column 7 reports results for observations with either a free float or a free fall. Very few developing economies experienced five-year periods of continuously freely floating or falling exchange rates according to these data, leaving only

18. For example, Cheung, Furceri, and Rusticelli (2010) obtain an R^2 of 0.48 in their baseline full-sample regression.

19. The net foreign asset coefficient was 1.85 in the first 15 years and 4.11 in the last 10 years.

6 degrees of freedom. The only significant coefficient in column 7 is that on official flows. Column 8 includes only the official flows variable, which yields a very large and highly significant coefficient with 15 degrees of freedom.[20] Columns 6, 7, and 8 of table 3 show that restricting the regression to the most freely floating exchange rate regimes leads to a substantially larger coefficient on official flows, as predicted by the model in appendix 1. Thus the potential endogeneity of official flows in the full sample means that the full-sample coefficient is a conservative estimate of the effect of official financial flows on the current account. In light of the relatively low mobility of private capital flows in developing economies (as displayed in table 1), these results suggest that greater exchange rate flexibility and reduced official financial flows would reduce current account imbalances by a very large amount, at least in developing economies.

Not shown in table 3 are regressions that split the data into three subsamples based on the Chinn and Ito (2006) measure of international capital mobility by country. The coefficient on official flows is not significantly different across the three sub-samples, but the t-statistic is higher in the samples with lower capital mobility. However, even in the subsample with greatest capital mobility, the coefficient remains statistically significant at the 5 percent level.

Table 4 examines the most robust elements of the standard model by region, dropping the four variables that were not significant in column 2 of table 2. The coefficients in column 1 of table 4 are fairly close to those of column 1 of table 2, although the coefficient on net foreign assets is somewhat higher in table 4. Column 2 includes a full set of country fixed effects, and thus its results are based only on changes over time rather than differences across countries. The fiscal balance and official flows effects are similar both over time and across countries, leading to similar estimated coefficients in columns 1 and 2. However, the net foreign assets effect is knocked out by the country effects, probably because net foreign assets are quite stable over time in each country. The net oil exports coefficient is larger in column 2 than in column 1, which suggests that oil shocks have an effect on current accounts that varies strongly over time—in particular, the effect of an oil shock appears to be larger in the first five years than it is over the very long run.

The fiscal balance is a statistically significant factor in the industrial and most developing regions. Net foreign assets are relatively more important in the industrial economies, whereas official flows and net oil exports are relatively more important in most developing regions. The coefficients generally are similar across developing regions, although their statistical significance varies. The main exceptions are the effect of net exports of oil, which is much larger in Latin America, and the fiscal effect, which is much smaller

20. The countries and periods (denoted by final year) included in this regression are Albania (1998), Belarus (1998), Brazil (1988, 1993), Ghana (1988), Haiti (1998), Kyrgyz Republic (1998), Malawi (1988, 1993), Nicaragua (1988), Peru (1988), Romania (1998), South Africa (2003, 2008), Turkey (1988, 1993, 2008), Uruguay (1988), and Zambia (1993, 2003, 2008).

in the transition economies. Finally, the model does a poor job of explaining current accounts in the transition economies and a very good job in the other developing regions, as shown by the R^2s.

Explaining Past Imbalances

The first column in table 5 displays the average current account balances of G-20 economies over the period 2004–08. Column 2 displays fitted values from the simplified model estimates in the first column of table 4. The model does reasonably well overall, but it completely fails to explain the large surpluses of Japan and Germany and the large deficit of South Africa.[21] Previous studies found that the United States was an outlier, but this paper obtains a good fit of the US current account balance because much of the developing-economy official financial outflows are attributed as official inflows to the United States. Some of these flows are also attributed to Germany and Japan, which increases the model error for these economies.

The remaining columns break down the fitted values into components associated with deviations of each of the explanatory variables relative to their cross-country means and an intercept that equals the average value of the current accounts in 2004–08. The intercept is negative because the sample does not include several countries with large unreported outflows of official assets. These countries, which are listed in footnote 16, had large current account surpluses, and their removal implies that the remaining countries had deficits on average.

The US deficit is largely attributed to the fiscal deficit and the inflows of official assets. For Japan and Germany, however, fiscal deficits, official inflows, and net oil imports—although somewhat smaller on balance than in the United States—are difficult to reconcile with large current account surpluses. The only variable that provides even a partial explanation of Japanese and German surpluses is their positive net foreign asset positions. Official outflows and net foreign assets jointly explain about three-quarters of the People's Republic of China's current account surplus.[22] The model explains the Russian and Saudi Arabian surpluses very well, with notable contributions from all four explanatory variables.

WHAT IS THE OUTLOOK FOR IMBALANCES?

The Effect of the Global Financial Crisis

Figure 1 displays aggregates of current account surpluses and deficits in G-20 countries relative to world GDP. The widening imbalances in the mid-2000s are readily apparent. There is a modest narrowing of the imbalances in 2008 and a sharper narrowing in 2009. This narrowing coincides with "the steepest drop in global activity and trade since World War II," according to the IMF (2009). A narrowing of imbalances

21. The poor fit for Japan and Germany is not improved by including the auxiliary variables, in particular the estimates from the first column of table 2.

22. Net official outflows in this period exceeded China's current account surplus. Given the strict controls on private capital flows in China, it is plausible that the regression coefficient understates the effect of external financial policy in China, which would account for the model's underprediction.

is not unusual during economic slowdowns. As can be seen in figure 1, a smaller narrowing occurred in 2001, when global growth slowed from 4.8 to 2.3 percent. The slowdown in 2008–09 was much more dramatic, with global growth slowing from 5.3 in 2007 to 2.8 in 2008 and –0.6 in 2009.[23] The narrowing of imbalances during these years accordingly was more pronounced than in 2001.[24] According to the European Central Bank (2010, p. 100) "The narrowing of [current account] imbalances during the crisis has been only partial and is likely to be largely temporary, assuming no fundamental changes in policies."

IMF Forecast Already Off Track for 2010 in Some Countries

As recovery took hold in 2010, this cyclical narrowing of the imbalances began to unwind. Indeed, in the first three quarters of 2010, the US current account deficit was 29 percent larger than in the same period of 2009. In the first 10 months of 2010 the German current account surplus increased by 15 percent and the Japanese surplus increased by 32 percent compared to the same period last year. Data on China's current account surplus are released with a long lag. China's merchandise trade surplus continued to fall in the first four months of 2010, but in the eight months from May to December it was 39 percent larger than in the same period of 2009.

The IMF's latest current account forecast for 2010 appears to correctly reflect the recent widening of the US and German current account imbalances. However, its projections of an essentially flat Japanese surplus and a further large fall in the Chinese surplus (as shares of GDP) are not consistent with the latest available data. On current trends, Japan's surplus is likely to rise by about 1 percent of GDP this year and China's surplus is likely to decline only slightly from last year's level of 6 percent of GDP.

2011–15 Could Break New Records for Key G-20 Countries

What are the medium-term prospects for current account imbalances? The most intense effects of the global recession should be concentrated in 2009 and 2010, with global recovery well established by 2011. Statistical estimates from the previous section can be used to project whether average imbalances in 2011–15 will be larger or smaller than those prior to the crisis in 2004–08.

The first column of table 6 presents the average current account balances over the period 2004–08. Column 2 presents the changes in current account balances projected by the IMF in its October 2010 WEO forecast for the years 2011–15 relative to the historical balances shown in column one. For 11 of the 19 countries, and for 6 of the 8 countries with initial imbalances in excess of 5 percent of GDP,

23. Global GDP data are from IMF, *World Economic Outlook*, October 2010.

24. Cheung, Furceri, and Rusticelli (2010, p. 27) attribute most of the narrowing of the US, UK, and Japanese current account balances in 2009 to the recession. They are not able to explain most of the narrowing of the Chinese and German current account balances.

the IMF projects a narrowing of imbalances.[25] The dashed lines in figure 1 are the sums of IMF current account projections for G-20 surplus and deficit countries. Roughly speaking, the IMF expects current account imbalances to remain close to their 2009 levels over the next 5 years, a moderate reduction from the wide imbalances of 2004–08.

Column 3 presents estimates of the changes in current account balances between the same two periods using the estimated coefficients from the first column of table 4. Column 3 is constructed using the following assumptions:

- Fiscal balances are as projected in the IMF October 2010 WEO.
- Official financial flows are assumed to be the same in 2011–15 as in 2004–08. This assumption reflects the view that developing economies are likely to continue to resist currency appreciation by accumulating foreign exchange reserves.[26] Consistent with this view, the IMF forecast also assumes little change in real exchange rates.[27] (Column 4 considers the alternative extreme assumption that official financial flows drop to zero in 2011–15 as developing economies move to freely floating exchange rates.)
- I assume that net foreign asset positions in 2010 are equal to those in 2008. This assumption may lead to an underprediction of imbalances because surplus economies tend to have growing positive net foreign assets and deficit economies tend to have increasingly negative net positions. On the other hand, the decline in asset prices in 2009 tended to narrow net creditor and net debtor positions, and this decline has been only partially reversed so far in 2010.
- I use the US Energy Information Administration's projections of petroleum production and consumption by country and region through 2015.[28] I extrapolate the IMF's projected average crude oil price of $79 per barrel in 2011 at an average nominal growth rate of 3 percent per year.

As shown in column 3, the estimated model projects narrowing imbalances for only 7 of the 19 countries, and for only 2 of the 8 countries with the largest initial imbalances. In particular, imbalances

25. De Mello and Padoan (2010, p. 16) project baseline current account surpluses in 2011–15 for the euro area and Japan that are about 1 percent of GDP larger than projected by the IMF. They project a US deficit about 0.5 percent of GDP larger than does the IMF. However, they project a Chinese surplus that is about 3.5 percent of GDP smaller than does the IMF.

26. Note that Indonesia, Korea, South Africa, and Turkey did not accumulate substantial quantities of foreign exchange reserves in 2004–08 (consistent with column 4 of table 5); whereas Cline and Williamson (2010) state that these countries intervened to resist appreciation in 2010. If this behavior continues, the current account balances for these countries are likely to exceed the projections shown in table 6.

27. The IMF projects somewhat lower official flows from developing economies in 2010 and 2011 than the average over 2004–08; the IMF does not project such flows in 2012–15.

28. See US Energy Information Administration, *International Energy Outlook 2010*, tables A5 and G1.

in China and the United States over the period 2011–15 are projected to be even larger than they were in 2004–08. The two countries with substantial projected narrowing of imbalances are Russia and Saudi Arabia, primarily reflecting large declines in fiscal balances and moderate declines in oil revenues projected for these countries. The dotted lines in figure 1 display the sums of G-20 current account surpluses and deficits implied by column 3.

Persistent Effects of the Financial Crisis?

Abiad, Mishra, and Topalova (2010) present evidence that banking crises and public debt crises tend to depress a country's imports for a long time. Could such an effect following the 2008 financial crisis help to prevent G-20 current account imbalances from widening as much as projected in column 3 of table 6? To answer this question, the regression in column 1 of table 4 was rerun after including a country-specific indicator variable that equals one for six consecutive years starting in the year of a banking or debt crisis as employed by Abiad, Mishra, and Topalova.[29] The results suggest that a country's current account balance is higher by just over 1 percent of GDP in the six years during and after a crisis. This effect is significant at the 5 percent, but not the 1 percent, level.[30] Including this variable in the forecast of column 3 of table 6 would raise the current account balances of the United States, Germany, and the United Kingdom by 0.6 percent of GDP and the current account balances of France and Russia by 0.3 percent of GDP. Current account balances of the remaining countries would decline less than 0.1 percent of GDP. Overall, the projected imbalances for 2011–15 would remain much wider than those projected by the IMF.

Exchange Rate Flexibility Can Make a Big Difference

Column 4 projects the changes in current accounts implied by the estimates in the first column of table 4 and the elimination of all official financial flows. This scenario would likely imply significant currency appreciation in those economies that previously had large official outflows and currency depreciation in those economies that previously had large official inflows. Thus, this scenario is at odds with the IMF assumption that real exchange rates will remain constant over the next five years. But it is consistent with the call by G-20 leaders for market-oriented exchange rates. Column 4 shows that the elimination of official financial flows is likely to reduce imbalances for 11 of 19 countries, including 5 of the 8 countries

29. Crisis episodes that are labeled as "borderline" are given a value of 0.5. For the United States and the United Kingdom, the recent financial crisis is dated as starting in 2007. For France, Germany, and Russia the recent crisis is dated to 2008, with France and Russia as borderline cases. Because the crisis had little macroeconomic effect in 2007, and to allow for the largest possible spillovers into 2011–15, I set the US and UK crisis start dates at 2008.

30. It is not significant at any level in a minimum absolute deviation regression, suggesting that it is sensitive to outliers in the data.

with the largest imbalances. Current accounts are projected to increase in all of the industrial economies, which are the recipients of official flows. Current accounts are projected to decrease most notably in China, Russia, and Saudi Arabia.[31]

Other Approaches Do Not Point to Rebalancing (without Exchange Rate Flexibility)

Column 5 projects changes in current accounts using calibrated trade elasticities and an assumed rate of return on net foreign assets. The trade income elasticities are calibrated over the period 1996–2006 under the assumption that trade price elasticities equal one.[32] The projected changes in current accounts are the sum of projected changes in nominal trade balances and investment income balances. Labor income balances and unilateral transfers are assumed to remain constant as a share of GDP. The change in investment income is projected as a fixed 4 percent rate of return times the change in net foreign asset position between 2003 and 2008.

Nominal trade balances are projected using the calibrated elasticities and the IMF WEO forecast of GDP growth. The projections are based on 2008 trade data in order to remove the cyclical effect of the sharp decline in trade in 2009 and the sharp increase in 2010. Trade is assumed to respond to the net change in each country's real effective exchange rate between its average value in 2006–08 and its value as of September 2010, after which the real exchange rates are assumed to remain constant.[33] Countries with notable real appreciations over this period include Australia (13 percent), Brazil (24 percent), China (12 percent), Indonesia (10 percent), Japan (19 percent), Saudi Arabia (11 percent), and South Africa (15 percent). Countries with notable real depreciations over this period include Argentina (12 percent), Korea (18 percent), Mexico (9 percent), and the United Kingdom (16 percent). The standard elasticities approach models imports as a function of domestic GDP and exports as a function of foreign GDP. The "Krugman elasticities" approach incorporates a supply effect in exports that is proportional to the ratio between domestic and foreign GDP.[34] The Krugman model is motivated by the observation that

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31. A sharp drop in official outflows in Russia and Saudi Arabia would be consistent with the large projected declines in fiscal balances in these two economies.

32. The import income elasticity equals the ratio of nominal import growth to nominal domestic GDP growth. The standard export income elasticity equals the ratio of nominal export growth to nominal foreign GDP growth. The Krugman export income elasticity equals the ratio of nominal export growth to the product of the change in the real exchange rate and nominal domestic GDP growth. All nominal variables are expressed in US dollars. Results are not qualitatively affected by using a longer calibration period (1993–2008).

33. The use of a 2006–08 average exchange rate implicitly allows for a distributed lag in the effect of the exchange rate on the 2008 current account balance. Broad real effective exchange rates are taken from the Bank for International Settlements.

34. See Krugman (1989) and Gagnon (2008).

fast-growing economies are able to increase their share of world exports without a deterioration in their terms of trade.

Under the Krugman elasticities approach (column 5) current account imbalances are projected to widen in most countries, in some cases to an implausible extent. Even more extreme results (not shown) result from the standard elasticities approach. These results suggest that the assumptions of a constant real exchange rate or constant income elasticities may not be appropriate. Assuming a trade price elasticity of one, the historically calibrated trade income elasticities, and WEO forecast GDP growth, the United States requires a steady 4 percent annual rate of real depreciation to hold its current account constant and China requires a steady 10 percent annual rate of real appreciation to hold its current account constant. For a rapidly developing economy such as China, nonconstant trade income elasticities are quite likely, suggesting that the 10 percent required rate of real appreciation should not be taken as a serious estimate. At a minimum, however, the elasticities approach provides no grounds for projecting a narrowing of global current account imbalances without significant further movements in real exchange rates.

Column 6 presents results of an alternative approach to forecasting current account balances. Projections in this column are based on the assumption that income elasticities will adjust continuously to keep current accounts in balance as long as real exchange rates move to offset differentials in productivity growth, as implied by Balassa (1964) and Samuelson (1964). The relationship between the real exchange rate and productivity is estimated by regressing the PPP real exchange rate on PPP GDP per capita over the period 1995–2008.[35] Because the regression covers all countries and years—for which the current account is close to balanced on average—the coefficient implicitly captures the relationship between per capita income and the real exchange rate for a country with a current account near zero. If PPP GDP per capita continues to grow at its 1995–2008 rate in each country, the United States would require a trend real depreciation of 0.1 percent to keep the current account constant and China would require a trend real appreciation of 1.3 percent to keep the current account constant. If, instead, the real exchange rates of all economies are held constant, current account balances would move (relative to their 2004–08 averages) as shown in column 6. This approach projects a small narrowing of the US current account deficit and a small widening of the Chinese surplus. It predicts large increases in the Korean and UK current accounts, reflecting the sharp depreciation of the Korean and UK real exchange rates over the past few years. Overall the approach of column 6 also does not provide support for narrowing of current account imbalances in the absence of further movements in real exchange rates. Only 4 of 17 economies covered are projected to have smaller current accounts in 2011–15 than in 2004–08.

35. The real exchange rate and GDP per capita are expressed relative to the world average.

WHAT ARE THE IMPLICATIONS FOR POLICY?

At the time of the November 2010 G-20 summit in Seoul, the IMF (2010b, p. 1) reported that "limited progress is being made toward external rebalancing." In Seoul, G-20 Leaders (2010, para. 9) renewed their commitment to "reducing excessive imbalances and maintaining current account imbalances at sustainable levels." Leaders called on their finance ministers and central bank governors to work with the IMF to develop "indicative guidelines … to facilitate timely identification of large imbalances that require preventive and corrective actions to be taken." They charged the IMF with assessing whether G-20 countries' policies are consistent with making progress toward external sustainability. The IMF has yet to complete this assessment, but the results of this paper suggest that the progress toward rebalancing in 2009 and 2010 has now shifted into reverse and renewed large imbalances are likely in the near future unless policies change substantially.

Prior to the Seoul summit, as part of the G-20 Mutual Assessment Process, the IMF (2010a) proposed additional policy actions for G-20 countries to boost growth and reduce imbalances. These policies were divided into three "layers":

1. Industrial economies should undertake more rapid fiscal consolidation than currently planned, with elements designed to support long-run growth, such as switching from labor and capital income taxes to consumption-based taxes and broadening the tax base rather than raising tax rates. Because consolidation tends to increase imbalances in economies that are already in surplus, the IMF recommends that surplus economies implement consolidation less rapidly than deficit economies.
2. Developing economies with surpluses should take steps to reduce precautionary saving (such as by strengthening social safety nets) and boost infrastructure investment while allowing greater exchange rate flexibility. These actions would support global demand to offset the reduction in demand caused by fiscal consolidation in industrial economies.
3. Encourage growth of domestic demand by eliminating constraints on the growth of potential output, particularly in industrial economies with current account surpluses. These constraints differ across countries; proposed actions include reforms of labor and product markets to increase competition, reduce barriers to entry, and spur innovation, as well as reforms to strengthen financial systems.

The IMF proposals under the G-20 Mutual Assessment Process are sensible and appropriate, as far as they go, but the fragility of the global recovery suggests that policies that increase aggregate demand should be implemented before policies that reduce demand. In industrial economies especially, monetary authorities should be ready to support growth and augment demand wherever output threatens to remain below potential and inflation falls below desired levels. In economies with large fiscal deficits, multiyear fiscal consolidation plans should be adopted as soon as possible to boost confidence and reassure financial

markets, but these plans should not load too much consolidation in the first two years, especially in economies with current account surpluses. Structural policies to increase long-run growth should be implemented as soon as possible, but it must be recognized that such policies may take years to deliver stronger growth.

In developing economies with surpluses, reducing net official outflows and allowing substantial real exchange rate appreciations would greatly help to narrow imbalances. The results of this paper suggest that a good indicator of increased exchange rate flexibility is a reduction in official financial flows, especially the accumulation of foreign exchange reserves. For surplus economies that are approaching full capacity utilization, macroeconomic restraint through currency appreciation is more beneficial than restraint through higher interest rates or tighter fiscal policy, as currency appreciation helps to rebalance global demand toward economies in which recovery is progressing more slowly.

The appropriate structural reforms in the second and third policy layers are unique to each country and there is tremendous uncertainty about the benefits of each specific reform.[36] It is beyond the scope of this paper to assess all of these policies individually. But, taken as a group, these actions clearly will help to boost sustainable growth in the G-20 economies and most of them also should help to narrow current account imbalances.

Independently of the G-20 Mutual Assessment Process, the IMF recently increased the credit available under the Flexible Credit Line and established a new Precautionary Credit Line. Depending on a country's qualifications, these tools enable the IMF to lend up to 10 times quota (or even more on a discretionary basis) to countries facing sudden financial outflows. In principle, this expanded financial safety net should reduce the need for countries to amass large war chests of foreign exchange reserves for precautionary purposes. However, given that many countries have accumulated foreign exchange reserves and other foreign assets in excess of 50 times quota (in some cases more than 100 times quota), it is not clear that the IMF's new safety net will make a substantial difference to net official financial flows and foreign exchange reserve accumulation in particular. For example, Korea's quota is $4.3 billion, so it can now borrow around or somewhat more than $43 billion from the IMF, but its foreign exchange reserves are already $270 billion. Moreover, for countries that accumulate reserves for nonprecautionary purposes, such as to prevent exchange rate appreciation, financial safety nets are irrelevant.

CONCLUSIONS

This paper documents statistically robust and economically important effects of fiscal policy, external financial policy, net foreign assets, and oil prices on current account balances. The statistical model

36. Since 2005, the OECD has published annual volumes titled *Going for Growth*, which focus on the effects of these and other growth-enhancing policies.

builds upon and improves previous explanations of current account balances in the academic literature. A key advance is that the model captures the effect of external financial policies, including exchange rate policies, through data on net official financial flows.

On currently projected policies for the years 2011–15, current account imbalances are likely to return to—and even exceed—their elevated levels of the years before the financial crisis. The main exceptions to this conclusion are the large oil exporters, who are expected to have smaller fiscal surpluses and reduced official financial outflows as they ramp up domestic spending of their oil revenues. The aftermath of the financial crisis may help to restrain current account imbalances in the United States and the United Kingdom to a modest extent, but this effect is minor compared to the underlying forces pushing toward wider imbalances.

The two most important policy levers for narrowing global imbalances are fiscal consolidation in deficit economies and a reduction in official financial outflows (sometimes referred to as increased exchange rate flexibility) in surplus economies. To avoid a return of large global imbalances, economies with current account deficits should cut fiscal deficits more than is currently projected and economies with current account surpluses should dramatically reduce official financial outflows and allow their currencies to appreciate as well as take steps to boost domestic demand. Of course, the timing of these actions needs to take into consideration economic conditions in each country. In countries that were hit hard by the financial crisis and in which economic recovery is proceeding slowly, fiscal consolidation should be delayed until recovery is on a firmer footing.

Monetary policy should remain accommodative and even ease further in economies where output remains below potential and inflation threatens to fall below desired levels. In surplus economies where output has recovered strongly and inflation threatens to rise above desired levels, exchange rate appreciation is a better tool for stabilization than interest rate increases or fiscal tightening. Structural reforms to boost long-run growth and rebalance domestic saving and investment should be encouraged, but the specifics of these reforms differ across countries and it is difficult to predict the size and timing of their effects.

Table 1 Capital mobility and current accounts, 1984–2008 (annual)

	Correlation			Standard deviation (percent of GDP)
	Industrial			
Current account	1.00			4.9
Net official flows	0.28	1.00		3.3
Net private flows	0.49	–0.41	1.00	5.9
Gross private flows	—	—	—	40.6
	Developing			
Current account	1.00			10.6
Net official flows	0.73	1.00		10.9
Net private flows	0.46	–0.13	1.00	6.7
Gross private flows	—	—	—	21.1

Note: This table is based on pooled annual panel data, with 538 observations for industrial economies and 2,529 observations for developing economies. All variables are expressed in percent of GDP. Industrial economies include Australia, Austria, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States. All other available countries are included as developing.

Source: Author's calculations based on data from *International Financial Statistics*.

Table 2 Baseline model of current account balances, 1984–2008

		Robust[1]	Limited fiscal data[2]	No official	Only official[3]	Only official all observations[3]	Industrial economies[4]	Developing economies[4]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fiscal	0.28**	0.19*	0.18*	0.57**			0.24	0.28**
balance	(.05)	(.08)	(.08)	(.15)			(.14)	(.05)
Official	0.45**	0.44**	0.38**		0.63**	0.91**	0.52	0.46**
flows	(.05)	(.07)	(.08)		(.10)	(.11)	(.31)	(.05)
Net foreign assets	2.61**	3.25**	4.12**	2.43**			6.58**	2.12**
(× 100)	(.47)	(.65)	(.55)	(.91)			(1.38)	(.48)
Net oil exports	0.09**	0.09**	0.12**	0.12**			–0.05	0.09**
	(.03)	(.03)	(.03)	(.03)			(.14)	(.03)
Elderly ratio	–0.18**	–0.14	–0.13	–0.17*			0.28*	–0.40**
	(.07)	(.09)	(.09)	(.08)			(.12)	(.08)
Youth ratio	–0.02	–0.03	0.03	–0.04*			0.12	–0.07**
	(.02)	(.03)	(.03)	(.02)			(.11)	(.02)
PPP GDP per capita	4.43**	2.78	5.78**	2.57			4.48	2.46
(× 100)	(1.35)	(1.89)	(2.07)	(1.56)			(4.12)	(1.91)
GDP growth	–0.24*	–0.16	–0.00	–0.22*			0.43	–0.25*
	(.10)	(.14)	(.13)	(.10)			(.31)	(.10)
R^2	0.63	0.58	0.64	0.54	0.36	0.71	0.55	0.68
R^2 (net of fixed effects)	0.60	0.58	0.62	0.50	0.30	0.67	0.54	0.64
Number of observations	435	435	274	435	435	564	100	335

Note: This table presents panel regressions using nonoverlapping five-year averages of all data, except for net foreign assets, which are values from the end of the previous period. There are 112 countries and 5 time periods. Some data are missing for developing countries, especially for the earlier time periods. A full set of time effects is included. No country effects are included. Variables are in percent of GDP except: elderly and youth ratios are in percent of population; PPP GDP is in percent of US values; GDP growth is an average annual rate in percent. Robust standard errors are shown in parentheses.

* and ** denote significance at 5 and 1 percent levels, respectively.

1. Minimum absolute deviation regression, which is robust to data outliers.
2. Uses fiscal data from October 2010 *World Economic Outlook* database only.
3. Column 5 uses the same sample as column 1. Column 6 uses all observations for which current account and official flows data are available.
4. Industrial economies are listed in Table 1. All other countries are in the developing category.

Source: Author's calculations.

Table 3 Implications of exchange rate regime for modeling current account balances in developing economies, 1984–2008

	All developing economies	Exchange rate variance low[1]	Exchange rate variance medium[1]	Exchange rate variance high[1]	IRR Fixed + Crawl[2]	IRR Float[2]	IRR Strict Float[2]	IRR Strict Float[2]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fiscal	0.25**	0.36**	0.18	0.09	0.22*	0.25*	0.50	
balance	(.05)	(0.11)	(.12)	(.08)	(.08)	(.12)	(.25)	
Official	0.48**	0.44**	0.51**	0.47**	0.55**	0.71**	0.67**	0.93**
flows	(.04)	(.07)	(.13)	(.09)	(.07)	(.09)	(.15)	(.05)
Net foreign assets	2.77**	3.11	4.36**	2.54**	3.38**	2.35**	–1.19	
(× 100)	(.41)	(.78)	(1.11)	(.61)	(.66)	(.89)	(2.55)	
Net oil exports	0.10**	0.07	0.14**	0.08**	0.09*	0.11**	0.27	
	(.02)	(.04)	(.04)	(.03)	(.04)	(.04)	(.33)	
Elderly ratio	–0.34**	–0.47*	–0.48**	–0.06	–0.47**	–0.43**	–0.72	
	(.08)	(.19)	(.11)	(.10)	(.12)	(.15)	(.45)	
Youth ratio	–0.06**	–0.07	–0.06	–0.06*	–0.05	–0.04	–0.15	
	(.02)	(.05)	(.03)	(.03)	(.03)	(.04)	(.12)	
R^2	.69	.76	.73	.69	.71	.79	.97	.92
R^2 (net of fixed effects)	.65	.71	.69	.60	.64	.76	.95	.85
Number of observations	352	86	125	141	171	86	17	21

Note: This table presents panel regressions using nonoverlapping five-year averages of all data, except for net foreign assets, which are values from the end of the previous period. There are 92 developing countries and 5 time periods. Some data are missing, especially for the earlier time periods. A full set of time effects is included. No country effects are included. Variables are in percent of GDP except for elderly and youth ratios, which are in percent of population. Robust standard errors are shown in parentheses.

* and ** denote significance at 5 and 1 percent levels, respectively.

1. An observation is considered to be in a low variance regime if the annual standard deviation of either the dollar or the euro nominal exchange rate in that five-year period is less than 3 percent. It is classified as a medium variance regime if the lower of the two standard deviations is between 3 and 10 percent and a high variance regime if both standard deviations are above 10 percent.

2. Observations are classified according to Ilzetzki, Reinhart, and Rogoff (2008). "Fixed+Crawl" denotes observations in which all years in the five-year period were classified as either fixed or crawling. "Float" denotes observations in which all years in the five-year period were classified as managed floating, freely floating, or freely falling. "Strict Float" denotes observations in which all years in the five-year period were classified as either freely floating or freely falling. Classifications for 2008 are assumed to be the same as 2007.

Source: Author's calculations.

Table 4 Simplified model of current account balances, 1984–2008

	All observations	Country effects	Industrial economies[1]	Developing Asia	Africa	Latin America	Middle East	Transition economies
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fiscal	0.30**	0.27**	0.30*	0.35*	0.28**	0.21	0.41**	–0.01
balance	(.05)	(.06)	(.13)	(.14)	(.09)	(.13)	(.11)	(.34)
Official	0.44**	0.37**	0.40	0.44**	0.42**	0.46**	0.43**	0.30
flows	(.05)	(.07)	(.29)	(.15)	(.09)	(.11)	(.08)	(.27)
Net foreign assets	3.71**	0.13	7.07**	3.19**	3.65**	3.35*	3.68**	3.18
(× 100)	(.38)	(1.11)	(.94)	(.50)	(.79)	(1.31)	(.75)	(3.25)
Net oil exports	0.12**	0.33**	0.04	0.08	0.13**	0.20**	0.05	0.03
	(.02)	(.05)	(.11)	(.08)	(.04)	(.04)	(.04)	(.08)
R^2	0.63	0.82	0.52	0.65	0.76	0.75	0.88	0.58
R^2 (net of fixed effects)	0.59	0.54	0.51	0.60	0.69	0.64	0.86	0.10
Number of observations	452	452	100	69	84	100	43	56

Note: This table presents panel regressions using nonoverlapping five-year averages of all data, except for net foreign assets, which are values from the end of the previous period. The regions are as defined by the IMF; transition economies include formerly socialist economies in central and eastern Europe and the Commonwealth of Independent States. There are 112 countries and 5 time periods. Some data are missing for developing countries, especially for the earlier time periods. A full set of time effects is included. No country effects are included except in column 2. Variables are in percent of GDP. Robust standard errors are shown in parentheses.

* and ** denote significance at 5 and 1 percent levels, respectively.

1. Industrial economies are listed in table 1.

Source: Author's calculations.

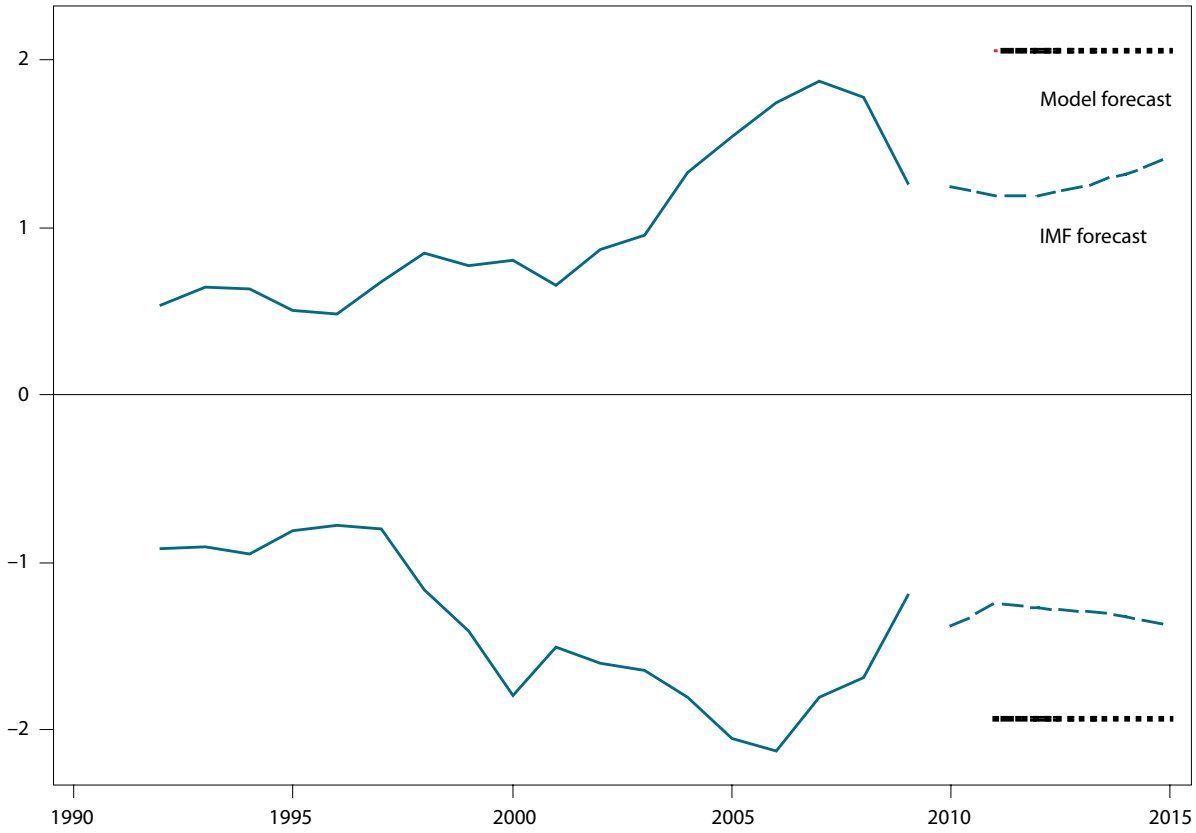
Table 5 Estimated causal factors for 2004–08 average current account balances (percent of GDP)

	Actual current account	Predicted current account	Fiscal	Official	Net foreign assets	Net oil	Intercept
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Industrial							
United States	–5.4	–5.1	–1.0	–2.4	0.7	–0.3	–2.0
Japan	3.9	–1.8	–1.2	–0.9	2.8	–0.6	–2.0
Germany	6.1	–2.6	–0.4	–1.5	1.7	–0.4	–2.0
France	–0.7	–4.6	–0.8	–2.9	1.4	–0.3	–2.0
United Kingdom	–2.4	–3.7	–0.9	–1.6	1.0	–0.1	–2.0
Italy	–2.2	–4.0	–0.8	–1.5	0.8	–0.5	–2.0
Canada	2.3	–1.3	0.5	–1.1	0.7	0.6	–2.0
Australia	–5.5	–2.6	0.6	–1.5	–0.8	1.1	–2.0
Developing							
China	8.1	3.5	–0.1	4.3	1.5	–0.3	–2.0
India	–1.2	–2.9	–1.7	0.4	1.1	–0.8	–2.0
Russia	8.6	7.1	2.1	2.6	1.4	2.9	–2.0
Brazil	0.6	–2.9	–0.7	0.4	–0.4	–0.1	–2.0
Korea	1.2	–1.8	0.9	–0.5	0.9	–1.1	–2.0
Mexico	–0.8	–2.7	–0.3	–0.7	–0.1	0.4	–2.0
Indonesia	1.2	–0.5	0.0	–0.1	–0.3	1.8	–2.0
Turkey	–5.2	–3.0	–0.4	–0.0	0.1	–0.7	–2.0
Argentina	2.7	–0.4	–0.4	0.2	1.4	0.3	–2.0
Saudi Arabia	25.8	22.6	6.8	8.1	3.2	6.5	–2.0
South Africa	–5.2	–0.3	0.1	–0.1	1.1	0.6	–2.0

Note: This table is based on the regression results of the first column of table 4.

Figure 1 G-20 current account imbalances

percent of world GDP



Note: The upper solid line is the sum of current account balances in G-20 countries that are in surplus and the lower solid line is the sum of current account balances in G-20 countries that are in deficit. The dashed lines are the IMF October 2010 *WEO* projections of G-20 surpluses and deficits. The dotted lines are forecasts of G-20 surpluses and deficits based on the sum of columns 1 and 3 of table 6.

Table 6 Predicted changes in current accounts 2011–15 relative to 2004–08 (percent of GDP)

	2004–08 Current account level	2011–15 (predicted change from 2004–08)				
		IMF *World Economic Outlook*	Table 4 (constant official)	Table 4 (no official)	Krugman elasticities + WEO GDP[1]	Trend Balassa-Samuelson[2]
	(1)	(2)	(3)	(4)	(5)	(6)
Industrial						
United States	–5.4	2.5	–1.5	0.9	–0.7	0.9
Japan	3.9	–1.7	–1.0	–0.1	3.7	–3.7
Germany	6.1	–1.3	0.0	1.5	1.3	3.7
France	–0.7	–1.1	–1.2	1.7	0.2	–0.7
United Kingdom	–2.4	1.0	–0.7	1.0	4.0	5.7
Italy	–2.2	–0.3	–0.7	0.8	1.6	0.2
Canada	2.3	–3.6	–0.3	0.8	1.3	–1.1
Australia	–5.5	1.1	–0.7	0.7	–0.1	–1.2
Developing						
China	8.1	–1.8	0.3	–4.1	24.1	0.9
India	–1.2	–1.7	–0.7	–1.2	5.9	–2.8
Russia	8.6	–6.3	–4.0	–6.6	na[3]	na[3]
Brazil	0.6	–3.8	1.3	1.0	16.1	–3.8
Korea	1.2	1.0	–0.6	–0.1	14.9	10.9
Mexico	–0.8	–0.6	–1.3	–0.6	1.0	2.2
Indonesia	1.2	–1.9	–1.4	–1.3	16.5	–4.0
Turkey	–5.2	–0.6	–0.3	–0.3	–2.5	–2.1
Argentina	2.7	–1.1	–0.1	–0.3	5.1	2.5
Saudi Arabia	25.8	–18.5	–4.0	–12.0	na[3]	na[3]
South Africa	–5.2	–0.9	–1.0	–0.9	–8.5	–5.9

1. This column is based on projected exports and imports using calibrated income elasticities from 1996–2006, domestic GDP growth rates from the October 2010 *World Economic Outlook*, assumed price elasticities of 1, and constant real exchange rates at their September 2010 values. (The Krugman elasticities allow for a supply effect in trade so that exports tend to grow in line with domestic output rather than world output.) Net factor income is projected to increase by 4 percent of the change in net foreign assets between 2003 and 2008.

2. This column is based on an estimate of the Balassa-Samuelson effect on the real exchange rate over the period 1995–2008. For the projection period, the real exchange rate is assumed to be held constant at its September 2010 value and relative per capita GDP is assumed to grow at its 1995–2008 average. The trade balance responds to the implied deviation between actual and trend real exchange rate assuming a price elasticity of 1. Net factor income is projected to increase by 4 percent of the change in net foreign assets between 2003 and 2008.

3. The elasticity and trend Balassa-Samuelson methods are not appropriate for economies in which primary commodities comprise almost all exports.

APPENDIX 1

OFFICIAL FLOWS AND THE CURRENT ACCOUNT BALANCE IN A SIMPLE MODEL

The following model abstracts from cyclical factors and dynamics, consistent with the five-year averaged data used in tables 2 through 6. Economic variables are denoted in capital letters; unobserved shocks are denoted by lowercase letters; parameters are denoted by Greek letters.

(1) $CAB = \alpha\ RER + u,\ \alpha > 0$

(2) $RR = \beta\ CAB + v,\ \beta > 0$

(3) $PFF = \gamma\ (RR^* - RR - \rho\ RER) + w,\ \gamma \geq 0,\ \rho \geq 0$

(4) $CAB = OFF + PFF$

(5a) Floating Exchange Rate: $OFF = z$

(5b) Fixed Exchange Rate: $RER = z$

The current account balance (CAB) responds positively to the real exchange rate (RER), which is defined so that an increase is a real depreciation. The real rate of interest (RR) responds positively to the CAB because monetary policy tightens to restrain domestic demand and stabilize output when the CAB increases. Private financial flows (PFF) respond positively to the difference between foreign and domestic real rates of interest ($RR^* - RR$). An increase in PFF is an outflow of capital. PFF may respond negatively to the RER to the extent that a depreciated exchange rate is expected to appreciate in the future, as in the standard overshooting model of exchange rates. The case in which $\rho = 0$ corresponds to random-walk expectations in which the future RER is expected to remain at its present value. The CAB equals PFF plus official financial flows (OFF) by identity.

Equations (5a) and (5b) represent external financial policy. In a pure floating exchange rate regime, OFF is an exogenous policy choice. In a pure fixed exchange rate regime, the RER is an exogenous policy choice. In the real world, it is possible to have an intermediate regime, such as a managed float, but analyzing the two extreme cases will provide natural benchmarks that should encompass intermediate behavior.

Shocks to the CAB (u) include explicit and implicit trade barriers, natural resource discoveries, global commodity prices, and a country's relative productivity in tradables versus nontradables. Shocks to the RR (v) include monetary and fiscal policy and animal spirits of consumers and businesses. Shocks to PFF (w) reflect poorly understood risk premiums in financial markets (including currency markets) and perceived excess returns on direct investment flows. Shocks to external financial policy (z) include building war chests of foreign exchange reserves, official development lending, and changes in the target exchange rate.

In general, it can be shown that all variables respond to all shocks in the model.[37] The standard approach has been to regress the CAB on observable variables that are elements of the shocks and that are plausibly viewed as exogenous to the CAB. Thus, the fiscal balance, the demographic ratios, per capita income, and growth are elements of the shock v. Net exports of oil and per capita income (through the Balassa-Samuelson effect) are elements of the shock u. In the pure floating exchange rate regime, OFF is exogenous and equal to the shock z. In this case, regressing the CAB on OFF is appropriate for identifying the effect of a shock to external financial policy.

Table A1 displays the asymptotic values of the coefficient of a regression of the CAB on OFF under both floating and fixed exchange rate regimes. These asymptotic values are bounded strictly between zero and one. The term σ_u^2 denotes the variance of u; the variances of the other shocks are denoted similarly. Under a floating exchange rate, the asymptotic coefficient does not depend on the relative variances of the shocks. Under a fixed exchange rate, the asymptotic coefficient does depend on the relative variances of the shocks. When the CAB shocks (u) dominate (technically, as the ratios of σ_u^2 to the variances of all the other shocks approach infinity) then the asymptotic coefficient under a fixed exchange is larger than under a floating rate.[38] However, this difference shrinks to zero in the case of random-walk exchange rate expectations ($\rho = 0$), which are an implication of a credible fixed exchange rate regime. When the policy shocks (z) dominate, the asymptotic coefficients are identical under both fixed and floating exchange rates. When any of the other shocks dominate, the asymptotic coefficient under a fixed rate is zero, and thus is smaller than under a floating rate.

The second row of the table presents the asymptotic coefficients when PFF does not respond to the interest rate differential ($\gamma = 0$). In this case, the asymptotic coefficient under fixed exchange rates is always less than or equal to that under floating rates. The combination of very low values of γ and σ_w^2 describes circumstances of very low capital mobility. As shown in the third row of the table, when these parameters equal zero the asymptotic coefficient equals one under either floating or fixed exchange rates. Finally, in the case of perfect capital mobility, the asymptotic coefficient equals zero under either floating or fixed exchange rates.

Under a pure floating exchange rate regime, the coefficient in a regression of the CAB on OFF is an unbiased estimate of the effect of an exogenous policy change in OFF on the CAB. Under a managed float or fixed exchange rate, this coefficient may be biased, but under most plausible circumstances the

37. Regressing the CAB on the RER yields a biased estimate of α because RER responds endogenously to u except under a pure fixed exchange rate regime. Cross-country studies typically do not use RER as a regressor because of the difficulty of finding valid instruments.

38. This result is calculated by setting all variances equal to zero except σ_u^2.

bias will be downward. In other words, the coefficient will be a conservative estimate of the effect of an exogenous policy change in OFF on the CAB.

The coefficient will be biased upward under a fixed exchange rate only if direct shocks to the current account (u) are very large relative to other shocks, capital is highly mobile, and expectations of the future real exchange rate are highly mean reverting. With random-walk expectations of real exchange rates, which are an implication of a credible fixed exchange rate regime, the bias is never upward for any combination of shocks and parameters.

Table A1 Asymptotic regression coefficients for CAB on OFF

	Floating: equation (5a)	**Fixed: equation (5b)**
general case	$\frac{\alpha}{\alpha + \gamma\ \rho + \alpha\ \beta}$	$\frac{(1+\beta\ \gamma)\sigma_u^2 + \alpha(\alpha+\gamma\ \rho+\alpha\ \beta\ \gamma)\sigma_z^2}{(1+\beta\ \gamma)^2\sigma_u^2+(\alpha+\gamma\ \rho+\alpha\ \beta\ \gamma)^2\sigma_z^2+\gamma^2\sigma_v^2+\sigma_w^2+\gamma^2\sigma_{RR^*}^2}$
PFF unresponsive to RR* – RR: ($\gamma = 0$)	1	$\frac{\sigma_u^2 + \alpha^2\sigma_z^2}{\sigma_u^2 + \alpha^2\sigma_z^2 + \sigma_w^2}$
No capital mobility: ($\gamma = 0$ and $\sigma_w^2 = 0$)	1	1
Perfect capital mobility: ($\gamma = \infty$)	0	0

Source: Author's calculations.

APPENDIX 2

CASE STUDY OF KOREA AND SINGAPORE IN 2001–06

Current account developments in Korea and Singapore over the past decade support the view that reductions in net official flows do lead to narrowing of current account imbalances.

Figure A1 displays data for Korea from 2001 through 2006. In 2003 and 2004, strong demand for Korean exports boosted the Korean current account balance and put upward pressure on the Korean-US real exchange rate.[39] The Korean authorities initially resisted this upward pressure by increasing their purchases of foreign exchange reserves and boosting net official outflows to almost 6 percent of GDP in 2004. The authorities reversed this policy in 2005; official flows dropped by 50 percent and the current account balance declined nearly as much.

As shown by the increase in the current account balance in figure A2, Singapore faced rising demand for its exports in 2003 and 2004.[40] The Singaporean authorities resisted the upward pressure on the Singaporean-US real exchange rate even more strongly than the Korean authorities, with net official outflows jumping to nearly 12 percent of GDP in 2004. The result was a much smaller cumulative appreciation than in the case of Korea and a much larger increase in the current account balance. Official outflows remained high in 2005 and 2006 and the current account also remained elevated.

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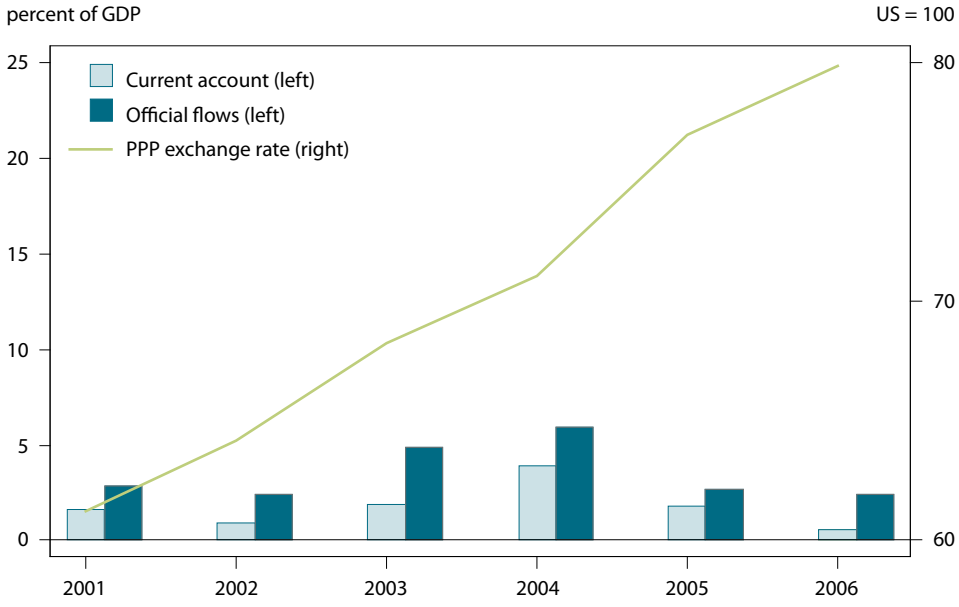
39. This was a period in which many currencies appreciated against the US dollar, but, as is shown in figure A2, some countries were more aggressive than Korea in resisting the pressure to appreciate. The exchange rate is from the World Bank's *World Development Indicators* database and is defined in terms of purchasing power parity versus the United States.

40. The current account surplus was high in Singapore even before the period of large official outflows, reflecting the large fiscal surplus (averaging 6 percent of GDP in 2001–06) and the large stock of net foreign assets (169 percent of GDP in 2001).

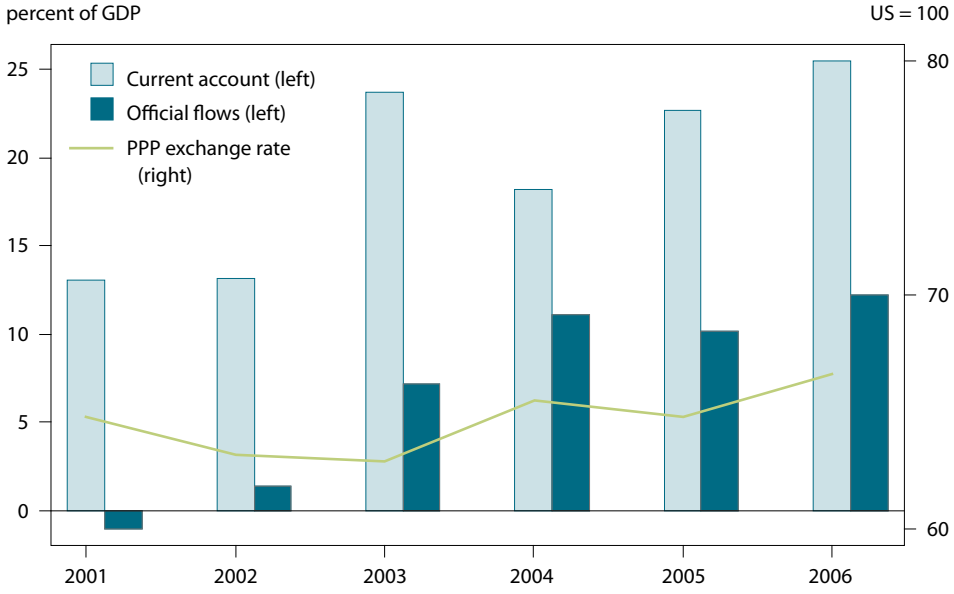
Figure A1 Current account developments in Korea



PPP = purchasing power parity

Source: IMF, *International Financial Statistics* and World Bank, *World Development Indicators*.

Figure A2 Current account developments in Singapore



PPP = purchasing power parity

Source: IMF, *International Financial Statistics* and World Bank, *World Development Indicators*.

REFERENCES

Abbas, S. M. Ali, Jacques Bouhga-Hagbe, Antonio Fatás, Paolo Mauro, and Ricardo Velloso. 2010. *Fiscal Policy and the Current Account.* IMF Working Paper No. WP/10/121. Washington: International Monetary Fund.

Abiad, Abdul, Prachi Mishra, and Petia Topalova. 2010. Do Financial Crises Have Lasting Effects on Trade? Chapter 4 in IMF *World Economic Outlook*. Washington: International Monetary Fund (October).

Balassa, Béla. 1964. The Purchasing Power Parity Doctrine: A Reappraisal. *Journal of Political Economy* 72: 584–596.

Cheung, Calista, Davide Furceri, and Elena Rusticelli. 2010. *Structural and Cyclical Factors Behind Current Account Balances*. OECD Economics Department Working Paper No. 775. Paris: Organization for Economic Cooperation and Development.

Chinn, Menzie, and Hiro Ito. 2006. What Matters for Financial Development? Capital Controls, Institutions, and Interactions. *Journal of Development Economics* 81: 163–192.

Chinn, Menzie, and Hiro Ito. 2008. Global Current Account Imbalances: American Fiscal Policy versus East Asian Savings. *Review of International Economics* 16, no. 3: 479–498.

Chinn, Menzie, and Eswar Prasad. 2003. Medium-term Determinants of Current Accounts in Industrial and Developing Countries: An Empirical Exploration. *Journal of International Economics* 59: 47–76.

Chinn, Menzie, and Shang-Jin Wei. 2008. A Faith-Based Initiative: Does a Flexible Exchange Rate Regime Really Facilitate Current Account Adjustment? NBER Working Paper No. 14420. Cambridge, MA: National Bureau of Economic Research.

Cline, William, and John Williamson. 2010. *Currency Wars?* PIIE Policy Brief No. PB10-26. Washington: Peterson Institute for International Economics.

De Mello, Luiz, and Pier Carlo Padoan. 2010. *Are Global Imbalances Sustainable? Post-Crisis Scenarios*. OECD Economics Department Working Paper No. 795. Paris: Organization for Economic Cooperation and Development.

European Central Bank. 2010. Prospects for Real and Financial Imbalances and a Global Rebalancing. *ECB Monthly Bulletin* (April): 91–100.

G-20 Leaders. 2010. *The G-20 Seoul Summit Leaders' Declaration*. Available at http://media.seoulsummit.kr.

Gagnon, Joseph. 2008. Growth-Led Exports: Implications for the Cross-Country Effects of Shocks to Potential Output. *The Berkeley Electronic Journal of Macroeconomics* 8: (issue 1, article 2).

Goldstein, Morris, and Mohsin Khan. 1985. Income and Price Elasticities in Trade. In *Handbook of International Economics, Vol. II*, eds. Ronald Jones and Peter Kenen. Amsterdam: North Holland.

Gruber, Joseph, and Steven Kamin. 2007. Explaining the Global Pattern of Current Account Imbalances. *Journal of International Money and Finance* 26: 500–522.

Gruber, Joseph, and Steven Kamin. 2009. Do Differences in Financial Development Explain the Global Pattern of Current Account Imbalances? *Review of International Economics* 17, no. 4: 667–688.

Ilzetzki, Ethan, Carmen Reinhart, and Kenneth Rogoff. 2008. *The Country Chronologies and Background Material to Exchange Rate Arrangements in the 21st Century: Which Anchor Will Hold?* Available at http://terpconnect.umd.edu.

IMF (International Monetary Fund). 2007. *Sovereign Wealth Funds and Reserve Assets: A Statistical Perspective.* Twentieth Meeting of the IMF Committee on Balance of Payments Statistics. Available at http://www.imf.org.

IMF (International Monetary Fund). 2009. *World Economic Outlook* (October) p. 1.

IMF (International Monetary Fund). 2010a. G-20 Mutual Assessment Process—Alternative Policy Scenarios (June). Available at http://www.imf.org.

IMF (International Monetary Fund). 2010b. G-20 Mutual Assessment Process—IMF Staff Assessment of G-20 Policies (October). Available at http://www.imf.org.

Krugman, Paul. 1989. Differences in Income Elasticities and Trends in Real Exchange Rates. *European Economic Review* 33: 1,055–1,085.

Lane, Philip, and Gian Maria Milesi-Ferretti. 2006. *The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970-2004*. IMF Working Paper WP/06/69. Washington: International Monetary Fund.

Marquez, Jaime. 2002. *Estimating Trade Elasticities*. Boston: Kluwer Academic.

Samuelson, Paul. 1964. Theoretical Notes on Trade Problems. *Review of Economics and Statistics* (May): 145–154.