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Empirical and Thematic Perspectives

The Outlook for Global Imbalances

- In this essay, we document a marked narrowing in the magnitude of global current account imbalances in the years since the financial crisis erupted. In particular, the U.S. deficit has halved from roughly 6 percent of GDP to 3 percent of GDP, and China's surplus has declined significantly as well. We then consider whether the observed reduction in these imbalances—and in the magnitudes of global imbalances more generally—is only a temporary shift linked to the disruptions associated with the financial crisis or whether these adjustments are likely to be more durable.

- In examining this issue, we first study data for a broad set of G-20 countries. We find evidence that over the past decade, countries with current account deficits have generally seen their currencies depreciate in real terms and this, in turn, has been associated with some closing of their deficits. Conversely, countries with external surpluses have tended to experience real appreciations, and their surpluses have narrowed. These results leave us hopeful that the recent adjustment in imbalances will not be immediately reversed once a stronger global recovery takes hold.

- In the second half of the essay, we build forecasting models to assess the likely path of the U.S. and Chinese balances going forward. For the United States, our conclusion is that under plausible assumptions (flat dollar, moderate growth rates in the U.S. and abroad, and stable oil prices), the current account balance is likely to remain roughly in the neighborhood of 3 percent of GDP. Neither a further deterioration nor a substantial improvement seems to be in the cards over the next several years.

- The outlook for China, however, is more worrisome. Given the significant estimated sensitivity of Chinese exports to foreign GDP growth, our model suggests that an eventual global recovery may bring with it a renewed widening in China's trade surplus. Our work suggests that a further 15 percent real appreciation of the renminbi will be necessary to keep the Chinese trade balance in a range of 3 to 4 percent of GDP through 2015. This analysis should be interpreted as a cautionary tale for the Chinese authorities.

- On balance, this analysis supports three broad conclusions. First, we see evidence that over the medium to long term (i.e., five to ten years), real exchange rates have tended to adjust in a manner consistent with greater global balance. In this important sense, the international monetary system seems to be functioning reasonably efficiently. Second, in light of this observation and the tenor of the evidence more generally, we expect much of the observed adjustment in global current accounts to prove durable, especially given the sharp depreciation of the dollar over the past decade and the step-down in U.S. growth. Third, as our empirical work for China highlights, however, the adjustment process is still incomplete. Further exchange rate realignment in some key countries will be necessary to achieve a pattern of global spending and production that is likely to prove sustainable over the long run.

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The Outlook for Global Imbalances

A Brief History of the Debate

During the years before the financial crisis, a vigorous debate raged about the meaning and significance of the rising magnitudes of global current account imbalances. Observers pointed to an acute lack of national saving in the United States driven by both insufficiently disciplined fiscal policy and low household saving rates. Roubini and Setser (2004) were particularly emphatic in their warnings; they argued that the international monetary system, which depended crucially on "the willingness of Asian central banks to hold enormous amounts of Treasuries," was fragile and unstable and that the U.S. economy was on an unsustainable path.[1] Larry Summers (2004) lamented the increase in the current account deficit and observed that "the most serious problem we have faced in the last five years is that of low national saving, resulting dependence on foreign capital, and fiscal sustainability."[2]

Alan Greenspan (2003, 2005) took a decidedly more sanguine tack.[3] While recognizing eventual limits in the willingness of foreigners to fund U.S. current account deficits, he argued that a decrease in "home bias" was playing a key role in facilitating the funding of U.S. current account deficits. He further observed: "Arguably, however, it has been economic characteristics special to the United States that have permitted our current account deficit to be driven ever higher, in an environment of greater international capital mobility. In particular, the dramatic increase in underlying growth of U.S. productivity over the past decade lifted the rates of real return on dollar investments." As such, even if the large U.S. current account deficits were not a sign of economic strength *per se*, he argued that the ability to finance those deficits on very favorable terms was an indication of investor confidence, which in turn reflected the underlying robustness and efficiency of the U.S. economy.

Bernanke (2005) followed with the global saving glut hypothesis.[4] He argued that a sustained outward shift in the saving preferences of emerging market economies in the aftermath of their balance of payments crises in the 1990s had resulted in a marked increase in capital inflows to the United States. This development, coupled with high saving propensities in some industrial countries in line with the aging of their populations, had resulted in a global saving glut. Given the attractiveness of the United States as an investment destination and the dollar's role as a reserve currency, the United States was a significant recipient of these flows, which boosted U.S. equity values and home prices, thus lowering the U.S. national saving rate and contributing to the nation's mounting current account deficits. The low level of long-term interest rates globally indicated that the principal problem was too much saving abroad rather than too little saving in the United States.

The eventual arrival of the global financial crisis, which proved even more virulent than the most pessimistic of analysts had anticipated, has ironically done little to resolve this debate. Caballero (2009) notes that the most worried observers had envisioned a crisis for the United States similar to those in emerging market economies—in particular, a sharp "sudden stop" of capital inflows and a collapse of the currency.[5] In contrast, during the financial crisis, "net capital inflows to the U.S.

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[1] Nouriel Roubini and Brad Setser, "The U.S. as a Net Debtor: The Sustainability of U.S. External Imbalances," unpublished manuscript, November 2004.

[2] Lawrence Summers, "The United States and the Global Adjustment Process," Stavros S. Niarchos Lecture, Institute for International Economics, March 2004.

[3] Alan Greenspan, "Remarks," November 20, 2003, and February 4, 2005.

[4] Ben Bernanke, "The Global Saving Glut and the U.S. Current Account Deficit," March 10, 2005.

[5] Ricardo Caballero, "Commentary on Global Imbalances and the Financial Crisis: Products of Common Causes" by Obstfeld and Rogoff, Asia Economic Policy Conference, October 2009.

were a stabilizing rather than destabilizing force. The U.S. as a whole never experienced, not even remotely, an external funding problem." Obstfeld (2009) notes, however, that in certain respects the United States did experience a sudden stop during the financial crisis—investors ceased purchasing many classes of U.S. private assets.[6]

As such, a new debate rages about whether and in what ways global imbalances contributed to the recent financial crisis. Bernanke (2009, 2011) has again been a leader in this discussion, observing that the financial crisis must be understood in terms of the "global imbalances in trade and capital flows that began in the latter half of the 1990s."[7] He goes on to note that "like water seeking its level, saving flowed from where it was abundant to where it was deficient." And, in turn, the U.S. financial system did an exceptionally poor job of intermediating those flows. Obstfeld and Rogoff (2009) argue that the crisis reflected the complex interaction between a whole range of factors, including global imbalances but also including rising leverage, overly stimulative macroeconomic policies, and deep imperfections in the global financial system.[8]

However, other commentators have been more skeptical about the linkages between the crisis and global imbalances. Ito (2009) observes that the Japanese housing bubble arose in the face of a current account surplus, so a current account deficit and the associated inflows are clearly not necessary for asset-price bubbles to form.[9] And Johnson (2009) emphasizes that the current account balance is the counterpart to net capital flows into an economy, but it is the gross inflows that must be intermediated by the financial system.[10] And these gross inflows may be large even in the absence of a current account deficit. As such, she argues that in assessing vulnerabilities—and searching for the roots of the crisis—it is more informative to focus on the features of the underlying gross flows. Tackling such an exercise, she shows that the euro area and the United Kingdom, rather than China and Japan, provided the largest gross inflows to the United States in the crisis year of 2007, a somewhat different view of global imbalances than emerges from the analysis of current account positions.

At present, it can be safely said that the channels through which global imbalances may—or may not—have exacerbated the financial vulnerabilities that erupted during the crisis remain far from settled. What is clear, as Caballero notes, is that these channels were not the ones that most observers who expressed concerns about global imbalances in the middle of the decade had highlighted. It is also clear that to the extent that linkages between imbalances and the crisis exist, the relationship is likely to be multifaceted and complex.

In the remainder of this essay, we review some data showing the current status of global imbalances, emphasizing in particular the adjustment in these imbalances since the onset of the financial crisis. We then study data for G-20 countries and assess whether current account imbalances have shown a propensity to adjust in

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[6] Maurice Obstfeld, "General Discussion on Global imbalances and the Financial Crisis: Products of Common Causes" by Obstfeld and Rogoff, Asia Economic Policy Conference, October 2009.

[7] Ben Bernanke, "Financial Reform to Address Systemic Risk," March 10, 2009; and "Global Imbalances: Links to Economic and Financial Stability," February 18, 2011.

[8] Maurice Obstfeld and Kenneth Rogoff, "Global imbalances and the Financial Crisis: Products of Common Causes," Asia Economic Policy Conference, October 2009.

[9] Takatoshi Ito, "General Discussion on Global imbalances and the Financial Crisis: Products of Common Causes" by Obstfeld and Rogoff, Asia Economic Policy Conference, October 2009.

[10] Karen Johnson, "Gross or Net International Financial Flows," Council on Foreign Relations, July 2009. For a related analysis, see Claudio Borio and Piti Disyatat, "Global Imbalances and Financial Crisis: Link or No Link?", BIS, May 2011.

recent years, examining in particular the role of exchange rates in this process. We next look in detail at the external balances of the United States and China, and build simple forecasting models to determine the likely path of these balances going forward. Our results convince us that the recent narrowing of the U.S. current account deficit is likely to be robust, but we are worried that an eventual global recovery may bring with it a renewed widening in China's trade position, at least absent further appreciation of the renminbi.

Some Key Facts

Figure 1 highlights the broad sweep of global imbalances over the past thirty years. A number of observations jump out. During the 1980s and 1990s, global imbalances largely reflected persistent deficits in the United States and a number of (non-Asian) emerging market economies, with offsetting surpluses in Japan and a revolving mix of other countries. Also, through this period the sign of the global current account discrepancy (which we discuss in more detail below) was generally positive, i.e., the sum of observed current account positions was negative.

This picture, however, changed remarkably during the 2000s. As shown in **Figure 2**, in the years before the global financial crisis, the U.S. deficit widened to a gaping 1½ percent of global GDP. As we discuss below, a variety of factors contributed to this outcome, including a decade of exceptionally rapid U.S. GDP growth, a marked appreciation of the dollar from the mid-1990s through early-2002, an upward surge in a range of U.S. asset prices (first equities then housing), and a corresponding deterioration in household saving rates. The counterpart to the rising U.S. deficit was sharply increasing surpluses in China (especially in the years following its accession to the WTO in late-2001), the oil-exporting countries (as oil prices posted large secular gains), and Germany (which, as we have discussed in earlier essays, reaped hefty competitiveness gains from its membership in EMU). In addition, during this period, the global discrepancy swung from positive (more deficits than surpluses) to negative (more surpluses than deficits).

In the years since the eruption of the financial crisis, the overall magnitude of imbalances has again narrowed. The U.S. deficit has closed to about ¾ percent of global GDP, but the deficits of euro-area countries outside of Germany have remained wide. We also are seeing renewed deficits in non-Asian emerging market

Global Current Account Balances

Figure 1. Averages from the 1980s

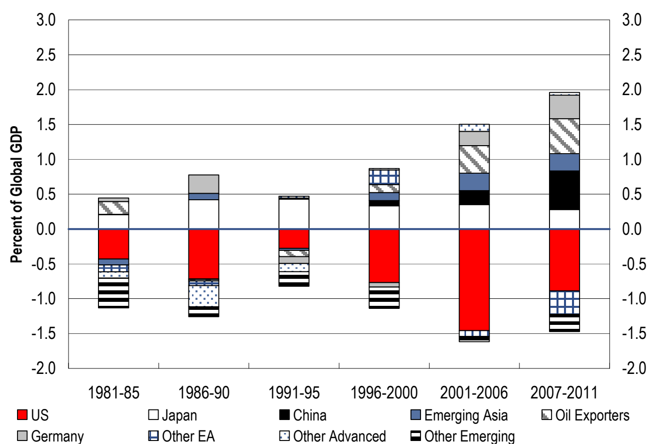
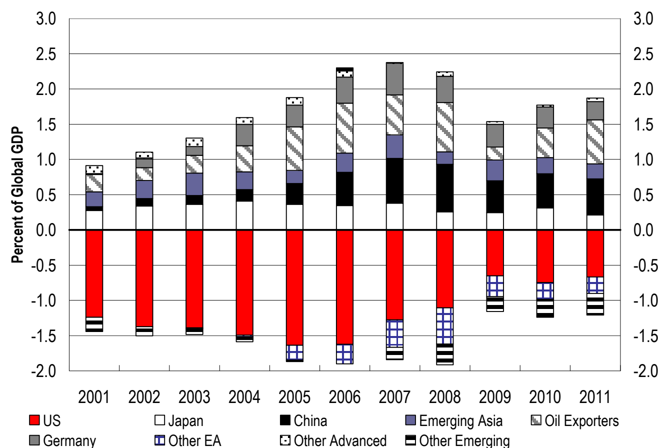


Figure 2. The Past Decade

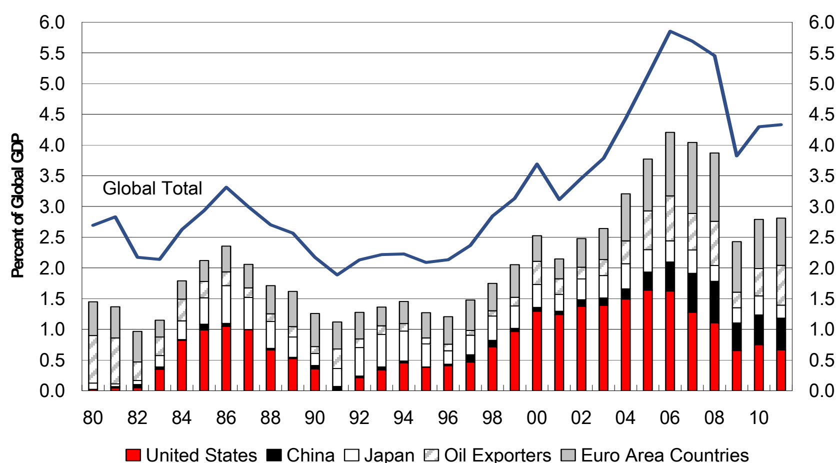


Sources: International Monetary Fund, Haver Analytics, and Citi Investment Research and Analysis.

economies. On the surplus side of the ledger, key countries (particularly China and Japan) have seen some narrowing in their balances since 2007, but the surpluses of the oil exporters now loom particularly large.

Figure 3 assesses global imbalances through a complementary lens: the sum of absolute current account positions across countries. Specifically, if there were two countries in the world and one had a surplus of 1 percent of global GDP and the other had a deficit of 1 percent of global GDP, this measure would be equal to 2 percent of global GDP. From 1980 through the late 1990s, the absolute current account position of the 182 countries for which we have data hovered between 2 and 3 percent of global GDP. However, this measure surged upward during the years before the financial crisis, almost doubling to nearly 6 percent of global GDP. Since the onset of the financial crisis, the sum of absolute current account balances has declined to roughly 4 to 4½ percent of global GDP, still above its levels in the 1980s and 1990s but well off its mid-2000 peak.

Figure 3. Sum of Absolute Current Account Balances



Sources: International Monetary Fund, Haver Analytics, and Citi Investment Research and Analysis.

This brings us to the key question of where global imbalances are likely to head going forward. Is the recent diminution of these imbalances only a temporary phenomenon related to the crisis or something more durable? While the answer to this question remains in doubt, we note that a sizable share of the observed decline has reflected shrinking imbalances in the United States, China, and Japan—as observed in **Figure 3**. To the extent that these countries maintain the lower level of their imbalances going forward, global imbalances more generally are less likely to pose significant problems. In addition, Figure 3 highlights that ongoing efforts to remedy competitiveness imbalances within Europe should also be constructive in helping to reduce the overall magnitude of global imbalances.

An Aside: The Global Current Account Discrepancy

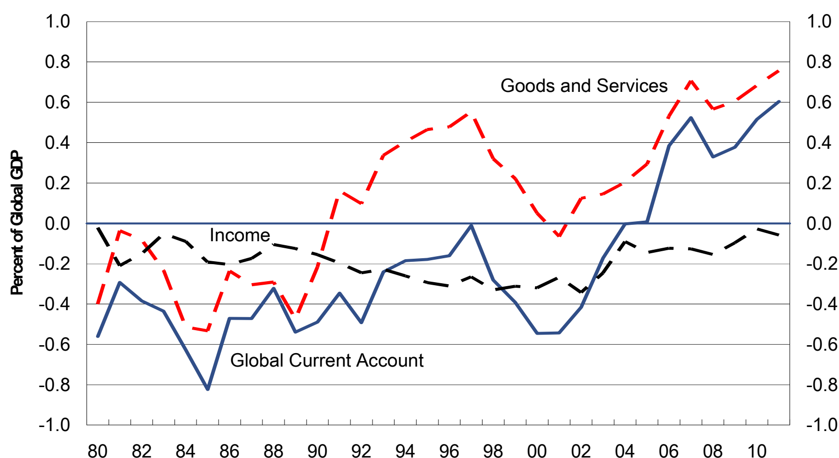
In principle, current account balances across countries should sum to zero—the nature of balance of payments accounting suggests that one country's credit is another country's debit, and these should offset each other. However, as shown in **Figure 4**, this has not been the case in practice. The presence of a global current account discrepancy has historically reflected a whole range of issues including, for example, under-invoicing of imports (to avoid duties), understatement of income receipts (to limit tax liabilities), poorly developed customs infrastructure in some countries, and conceptual difficulties in identifying and measuring services trade.

Notably, from 1980 (when reliable global data first become available) through the mid-2000s, global current account balances summed to a deficit averaging around ¼ percent of global GDP. In other words, countries were understating their surpluses or overstating their deficits by roughly this amount. In the mid-2000s, however, the net global balance moved sharply into positive territory and has been hovering in recent years near a surplus of ½ percent of global GDP, suggesting that current account debits are now missing on net.

An analysis of this issue by the IMF (2009) highlighted that the rising global surplus reflects a discrepancy in the measurement of goods and services trade.[11] The authors argue that transportation creates time lags between the recording of exports and imports. With global trade on an increasing trajectory, exports will tend to run slightly ahead of imports, generating a positive discrepancy that has become more significant as trade has risen relative to global GDP.[12] In addition, the IMF shows that services trade, in particular, has been an important contributor to the increase in the discrepancy. The IMF hypothesizes that the providers of some types of services (e.g., law firms and business-services offshorers) are easily identified, while the importers of these services may be less concentrated or relatively small.

We would complement the IMF's analysis with two further conjectures. First, a key feature of the current global environment is the low level of nominal interest rates across the yield curve. To the extent that interest earnings are recorded at their source as outflows (debits) but are not fully recorded in the recipient countries (due to tax avoidance incentives), the decline in nominal interest rates reduces the size of this net debit in the global balance of payments. Indeed, **Figure 4** shows that the income balance has moved from a deficit of roughly ¼ percent of global GDP through much of the 1990s to near zero over the past year. Second, over time, the IMF and national governments have worked to improve the balance of payments

Figure 4. Global Current Account Balance and Selected Components



Source: OECD, Haver Analytics, and Citi Investment Research and Analysis.

and customs infrastructure in many countries, and it is possible that these efforts have created a deeper structural shift in the behavior of the global current account discrepancy. The bottom line is that the discrepancy reflects the interaction between

[11] See Helbling and Torres, "From Deficit to Surplus: Recent Shifts in Global Current Accounts," IMF World Economic Outlook, October 2009.

[12] The temporary unwinding of this effect also helps to explain why the discrepancy dipped with the contraction in trade during the financial crisis.

a range of practical, conceptual, and economic phenomena and incentives. The relative balance of these factors appears to evolve over time and, in turn, leads to changes in the underlying behavior of the discrepancy.

Imbalances and Exchange Rates: The Experience of G-20 Countries

In this section, we present a series of scatterplots that provide an additional perspective on global current account adjustment over the past decade. We focus on the experience of the G-20 countries, which account for nearly 80 percent of global GDP. The data that we examined above pointed to some recent narrowing of global imbalances. But is this adjustment a temporary phenomenon associated with headwinds from the financial crisis or has it been driven by economic shifts that are likely to prove more enduring? As a related question, has the configuration of exchange rates over the past decade evolved in ways that will contribute to a more sustainable pattern of global spending and production?

With these questions in mind, we first consider whether G-20 countries that had current account deficits at the beginning of the decade tended to see their currencies depreciate during subsequent years, thus helping to close their initial imbalances. And similarly, did countries with current account surpluses at the beginning of the decade tend to see their currencies appreciate?

Figure 5 presents the relevant data.[13] Our expectation is that countries will generally fall in the northeast and southwest quadrants (which we have shaded), i.e., the currencies of countries with initial current account surpluses should tend to appreciate in real terms, and the currencies of countries with initial deficits should tend to depreciate. The results are broadly consistent with this hypothesis. A whole cluster of countries started the period with their current accounts in surplus and

G20 Current Account Balances and Real Exchange Rate Changes

Figure 5. For 2001-2011

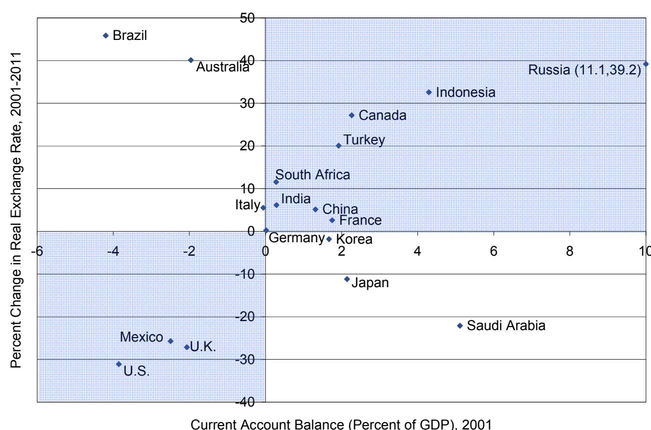
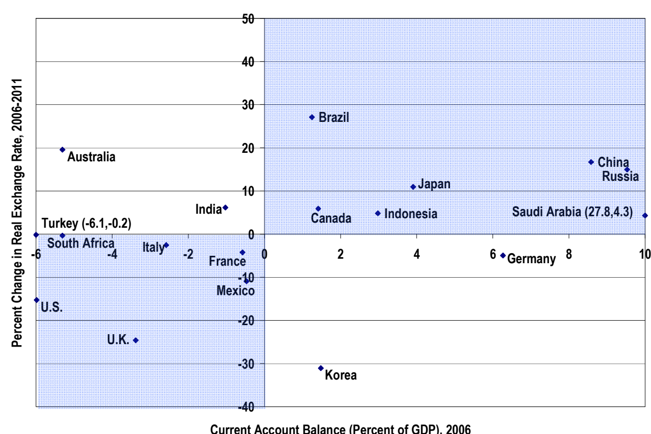


Figure 6. For 2006-2011



Sources: International Monetary Fund, Bank of International Settlements, Haver Analytics, and Citi Investment Research and Analysis.

[13] In this exercise, we choose to use the CPI-based real exchange rate indexes compiled by the BIS (because they provide complete coverage of G-20 countries).

recorded at least some degree of real exchange rate appreciation during the following ten years. Conversely, the United States, the United Kingdom, and Mexico started with deficits, and their real exchange rates subsequently depreciated.[14]

There are, however, four notable outliers. Brazil and Australia—in the northwest quadrant—started with current account deficits and nevertheless saw their currencies appreciate substantially. Both of these countries are commodities exporters and gleaned significant terms of trade benefits as commodity prices marched upward, and their real exchange rates appreciated in response. Consistent with this observation, Brazil's current account balance improved some over the decade, and Australia's was little changed. As such, the exchange rate moves recorded by these countries are well-aligned with the demands of external balance.

The other two notable outliers—in the southeast quadrant—are Japan and Saudi Arabia. These countries began the period with surpluses and their currencies subsequently depreciated. Both of these are admittedly anomalous cases. The Saudi currency is linked to the U.S. dollar and, thus, has declined in lockstep with the dollar over the past decade. Textbook theory suggests that this nominal depreciation should manifest itself in rising inflation, but this has not been observed. As for Japan, the ongoing decline in the aggregate price level has been a source of sustained downward pressure on the country's real exchange rate. That said, in recent years the real exchange rate has appreciated significantly, and Japanese external balances now appear to be on a narrowing trend.

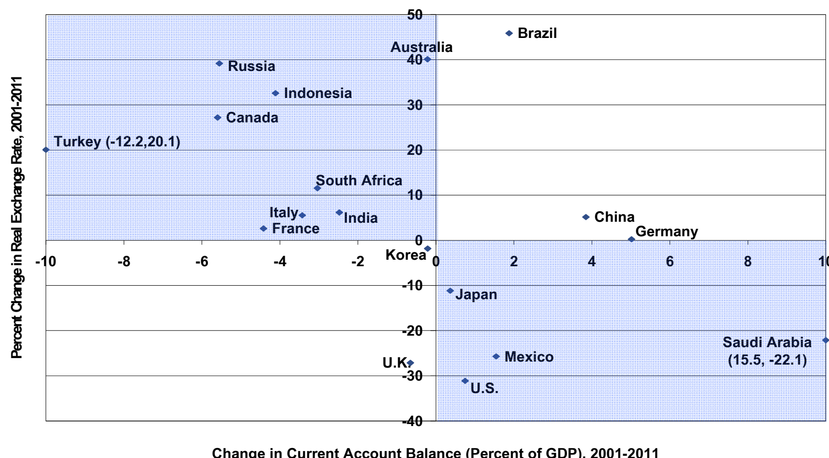
Figure 6 repeats this exercise for 2006-2011, the most recent five-year period. Notably, most countries continue to fall into the anticipated quadrants, suggesting that exchange rates are evolving in ways broadly consistent with sustainable global rebalancing. In particular, the United States and the United Kingdom—two countries which had large deficits at the beginning of the period—saw their currencies depreciate significantly in real terms. Conversely, China and Japan, which began with large surpluses, registered subsequent appreciations. Germany, however, is a notable outlier, recording a small depreciation notwithstanding a sizable initial current account surplus. (We have examined the roots of German competitiveness in detail in previous essays.) Finally, as in **Figure 5**, Australia inhabits the northwest quadrant.

On balance, these data suggest that countries with initial current account deficits tended to see their real exchange rates depreciate through the past decade, while countries with initial surpluses tended to see their real exchange rates appreciate. The next scatterplot **(Figure 7)** considers whether such exchange rate moves were associated with actual current account adjustments. In this case, we expect countries to fall into the northwest and southeast quadrants, i.e., countries that recorded real depreciations over the past decade should have seen their current account balances increase, and countries with real appreciations should have seen their current account balances decline.

Notably, a large group of countries fall into the northwest quadrant, where they experienced some degree of exchange rate appreciation, coupled with a decline in their current account balances. Several other countries, including the United States and Mexico, saw exchange rate depreciation and at least some increase in their current account balances. Brazil and China are the only two countries that fall significantly outside the expected quadrants: Brazil's current account improved

[14] We exclude Argentina from this analysis due to the volatility of the country's data in the aftermath of its debt crisis early in the last decade.

Figure 7. Changes in G20 Current Account Balances and Real Exchange Rates



Sources: International Monetary Fund, Bank of International Settlements, Haver Analytics, and Citi Investment Research and Analysis.

notably notwithstanding a substantial appreciation of its currency (again bearing the imprint of rising commodity prices), and the ongoing growth of China's powerful export sector was little affected by a small appreciation of the real exchange rate.

The upshot of the analysis in this section is a relatively encouraging picture of global adjustment. Countries with current account deficits (surpluses) have generally seen their currencies depreciate (appreciate) and this, in turn, has actually generated a narrowing in their imbalances. This set of results gives us hope that the adjustment in current account balances that we have seen in recent years will not be immediately reversed once the global economy eventually shits to a recovery track, at least to the extent that the underlying reconfiguration of exchange rates proves durable.

Projections for the United States and China

In this section, we construct some simple empirical models describing the external balances of the United States and China, with an eye toward assessing the outlook for global imbalances more generally.

Model of the U.S. current account balance. In an effort to get a more concrete view of where the U.S. external balance may be heading, we regress the country's current account balance as a share of GDP on the following explanatory variables:

- *The broad real effective exchange rate*, which captures the ebb and flow of U.S. price competitiveness in global markets. The specific series that we use is a trade-weighted measure of the U.S. real exchange rate against major advanced-economy and emerging-market trading partners. The weights in this index account for a given country's prominence in U.S. exports, U.S. imports, and third-market competition with U.S. firms.

- *The level of U.S. real GDP*, which is a key determinant of U.S. import demand.

- *The level of real GDP of U.S. trading partners*, which we take as a proxy for the foreign demand for U.S. exports. This variable is constructed by aggregating the same countries (and using the same weights) as is done for the real effective exchange rate.

- *The real price of oil*, which we construct as the price of West Texas Intermediate (WTI) crude relative to the GDP deflator.

Consistent with other work, we find that the lag process on the real exchange is very long; accordingly, we allow twelve lags of the real exchange rate to enter the regression. The other explanatory variables enter with four lags.[15] The estimation window runs from 1976:Q1 through 2011:Q3.

The key results from this exercise are reported in **Table 1**. All of the variables are highly statistically significant and have the anticipated sign. The magnitudes are also plausible: a 10 percent appreciation of the exchange rate reduces the current account balance by roughly ¾ to 1 percentage point; a 1 percentage point rise in U.S. GDP reduces the balance by just less than 0.2 percentage points; and a 1 percentage point increase in foreign GDP raises the balance by about ⅛ percentage point. In addition, we find that a 10 percent decrease in the real price of oil, lifts the balance by just less than 0.1 percent of GDP.

Table 1. Regression Results for the United States

Broad Real Effective Dollar	-0.084*
	-11.9
U.S. GDP Level	-0.191*
	-8.1
U.S. Trading Partners' GDP Level	*0.128**
	6.0
Real Oil Price	*-0.009**
	-7.6
Number of Observations	143
Adjusted R-squared	0.935

Note: Broad real effective dollar coefficient represents sum of 12 lag pdl; GDP and oil measures represent sum of 4 lag pdls; All regressions include an unreported constant; t-statistic reported underneath coefficient; * Indicates significance at the 5% level. Source: Citi Investment Research and Analysis.

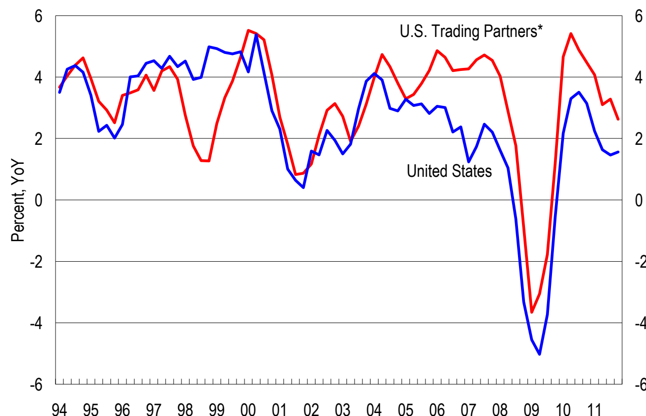
These results bear the clear imprint of the well-known Houthakker-Magee asymmetry, under which the income sensitivity of U.S. imports is notably larger than that of U.S. exports.[16] The upshot of this phenomenon is that if the United States grows at the same pace as its trading partners, the current account balance will tend to deteriorate, holding all else equal. Indeed, consistent with this insight, a key driver of the U.S. current account deficit and, hence, global imbalances more generally, in the run-up to the financial crisis was the remarkably rapid pace of U.S. growth. As shown in **Figure 8**, from the mid-1990s through the mid-2000s, U.S. growth proceeded at a rate roughly similar to that of its trading partners. However, since 2005, foreign growth has significantly outperformed that of the United States and is likely to continue to outperform going forward.

A second major contributor to the marked widening of the U.S. current account deficit was the substantial appreciation of the real effective dollar from the second half of the 1990s through early 2002 **(see Figure 9).** The current account deficit continued to widen for several years after the dollar's peak. This reflected a number

[15] To impose some structure on the results, we estimate the regression using a second-order polynomial distributed lag (PDL) for each of the independent variables.

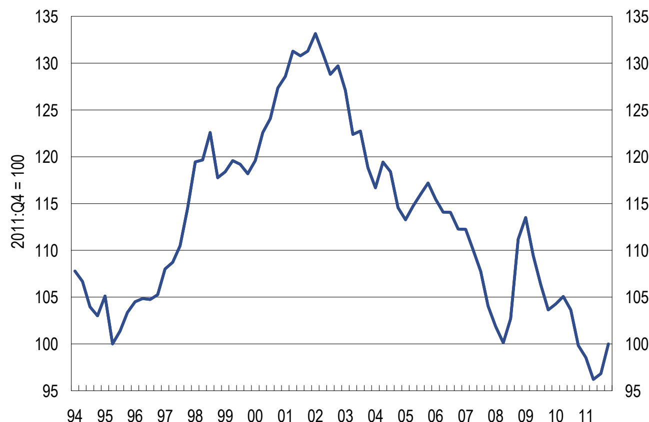
[16] Houthakker and Magee, "Income and Price Elasticities in World Trade," *The Review of Economics and Statistics*, May 1969.

Figure 8. Real GDP Growth



* Constructed using trade weights from the broad real dollar.
Sources: Bureau of Economic Analysis, Macroeconomic Advisers, Haver Analytics, and Citi Investment Research and Analysis.

Figure 9. Broad Real Effective Dollar

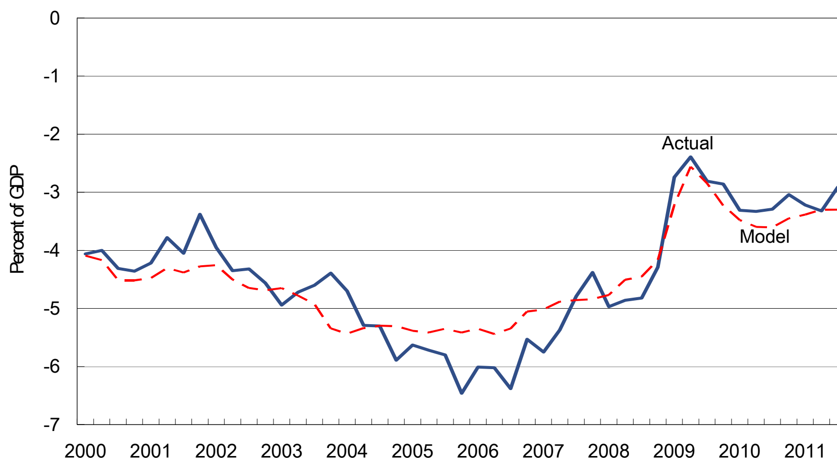


Sources: Federal Reserve Board, Haver Analytics, and Citi Investment Research and Analysis.

of factors including very rapid U.S. growth through much of the period (coupled with powerful Houthakker-Magee effects), a steep secular increase in the price of oil that pushed up the value of U.S. imports, and the long lags through which moves in the exchange rate influence the current account.

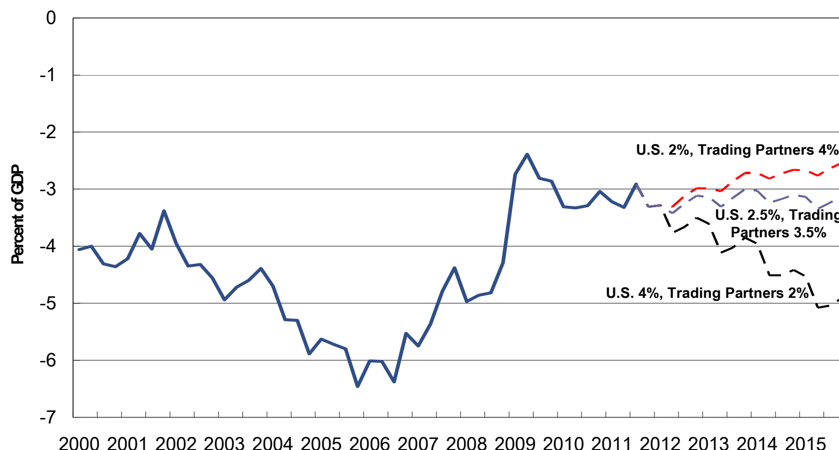
As illustrated in **Figure 10**, the model effectively captures the twists and turns in the deficit over the past decade, with the only notable miss being that the balance deteriorated somewhat more during the middle of the decade than the model expected. As highlighted in **Figure 11**, we use this model to consider three scenarios for U.S. and foreign growth through 2015: (1) the United States grows at a 2½ percent rate (near our current estimates of potential), and its trading partners expand at 3½ percent pace (the average recorded in the decade before the financial crisis); (2) the United States significantly outperforms, growing at a 4 percent clip while its trading partners expand at a 2 percent rate; (3) the foreign economies outperform, recording 4 percent growth while U.S. growth is around 2 percent. All three of these scenarios assume that the exchange rate and oil prices remain roughly constant near current values.

Figure 10. U.S. Current Account Balance



Sources: Bureau of Economic Analysis, Haver Analytics, and Citi Investment Research and Analysis.

Figure 11. U.S. Current Account Balance: Projections



Sources: Bureau of Economic Analysis, Haver Analytics, and Citi Investment Research and Analysis.

Notably, the scenario that incorporates moderate growth in both the United States and its trading partners is likely to be associated with an essentially flat trajectory of the U.S. current account balance going forward. This suggests that a continued closing of the U.S. current account balance will require either a further real depreciation of the dollar or a weaker performance of U.S. growth relative to that abroad. In the event that U.S. growth significantly exceeds that abroad (an unlikely occurrence by our reckoning), the U.S. current account deficit would be vulnerable to renewed widening.

Figure 12 explicitly considers three alternative paths for the broad real dollar, assuming 2½ and 3½ percent growth in the United States and its trading partners, respectively. We find that if the real exchange rate appreciates 10 percent, the current account deficit is likely to deteriorate to around 4 percent of GDP, while a 10 percent appreciation should support a narrowing of the deficit to close to 2 percent of GDP.

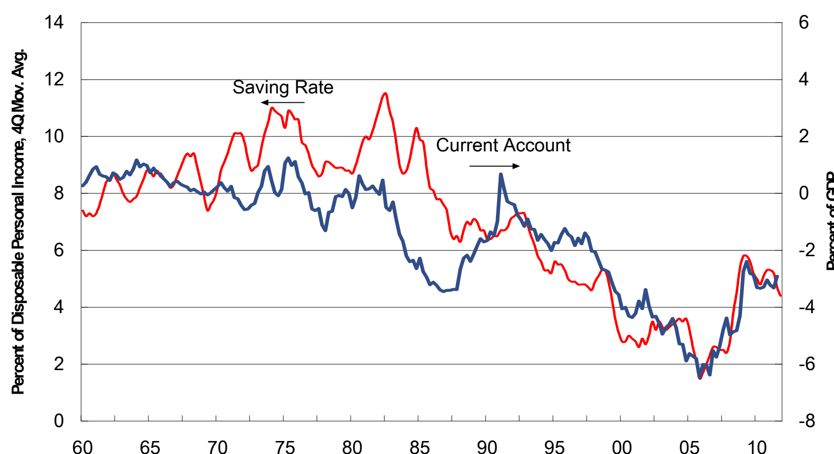
Figure 12. U.S. Current Account Balance: Projections*

* Forecasts assume annual real GDP growth rates of 2.5% and 3.5% for the U.S and the Rest of the World, respectively. Sources: Bureau of Economic Analysis, Haver Analytics, and Citi Investment Research and Analysis.

The key conclusion of this work is that under plausible assumptions (flat dollar, moderate growth rates in the U.S. and abroad, and stable oil prices), the current account balance is likely to remain roughly in the neighborhood of 3 percent of GDP. Neither a further deterioration nor a substantial improvement in the deficit seems to be in the cards over the next several years, at least absent a marked shift in the underlying conditioning variables.

Finally, we conclude this discussion by noting a remarkable long-run relationship between the U.S. current account and the U.S. household saving rate **(Figure 13)**. The household saving rate has rebounded from lows recorded during the previous decade, and other work that we have done suggests that the imperatives of deleveraging are likely to keep the saving rate somewhere in the neighborhood of 4 to 5 percent over the medium term.[17] While other components of national saving will also play a role in determining the path of the current account going forward, the expected evolution of household saving at least does not point to a renewed deterioration in the balance.

Figure 13. U.S. Current Account and Household Saving Rate



Sources: Bureau of Economic Analysis, Haver Analytics, and Citi Investment Research and Analysis.

Model of the Chinese trade balance. We now estimate a broadly similar model for China. Given that the country's current account balance is not available in sufficient time series at a quarterly frequency, we use the goods trade balance as a share of GDP as our dependent variable. The explanatory variables are China's real effective exchange rate, Chinese real GDP, and a proxy for the real GDP of China's trading partners.[18] We construct this foreign GDP variable ourselves, aggregating the GDP of China's nineteen largest trading partners (which account for nearly 80 percent of China's total exports) using rolling trade weights. The model is estimated for the period 1993:Q1 to 2011:Q3, with the limited availability of Chinese GDP data preventing the estimation window from beginning earlier.

The results are reported in **Table 2**. The exchange rate elasticity is much larger than for the United States, suggesting that a 10 percent appreciation of China's currency reduces the trade surplus by nearly 2 percent of GDP. This larger elasticity for China is consistent with the fact that Chinese trade is much larger relative to GDP than is the case for the United States, so a given percentage shift in exports or imports represents a larger share of GDP. Also striking is that the coefficient on

[17] See Nathan Sheets, "U.S. Household Saving and Deleveraging—What's Next?," December 20, 2011.

[18] We allowed the relative price of oil to enter some preliminary specifications, but it was not statistically significant and we dropped it from the regression.

foreign GDP is very large in magnitude. This reflects that the growth of Chinese exports has far outpaced the GDP growth of China's trading partners, suggesting a very large elasticity. Whether this will be sustained going forward is an open issue, but we have little doubt that this coefficient accurately captures the experience of the past two decades.

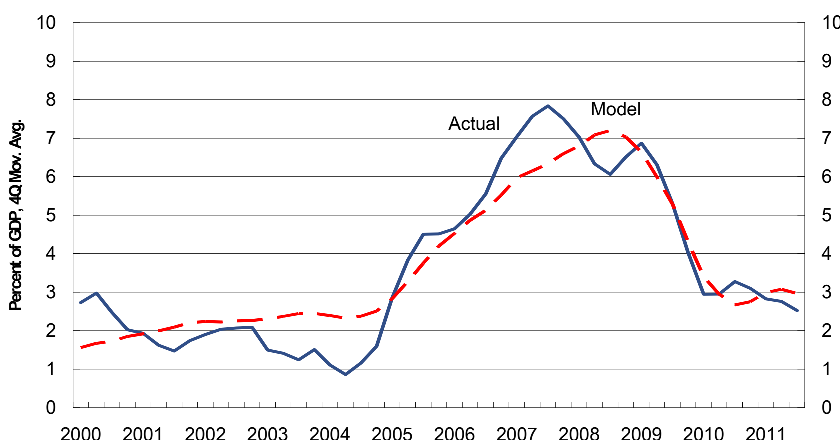
Table 2. Regression Results for China

Real Effective Renminbi	-0.180*
	-4.0
China GDP Level	-0.182*
	-3.8
China Trading Partners' GDP Level	0.729*
	4.7
Number of Observations	75
Adjusted R-squared	0.641

Note: Broad real effective renminbi coefficient represents sum of 12 lag pdl; GDP measures represent sum of 4 lag pdls; All regressions include an unreported constant; t-statistic reported underneath coefficient; * Indicates significance at the 5% level. Source: Citi Investment Research and Analysis.

Figure 14 shows the in-sample fit of this equation. As with the equation for the United States, the model fits the actual data exceptionally well, moving up and down broadly in line with the observed balance, including the most recent narrowing of the surplus to less than 3 percent of GDP. Using this model, we project the evolution of the trade balance under two scenarios. In both scenarios, we assume that the Chinese economy grows at an 8 percent rate through 2015 and that China's trading partners grow at a 3 percent pace (similar to their average during the decade before the financial crisis). The first scenario assumes a flat real exchange rate. The second scenario incorporates a 15 percent real appreciation of the renminbi.

Figure 14. China's Goods Trade Balance



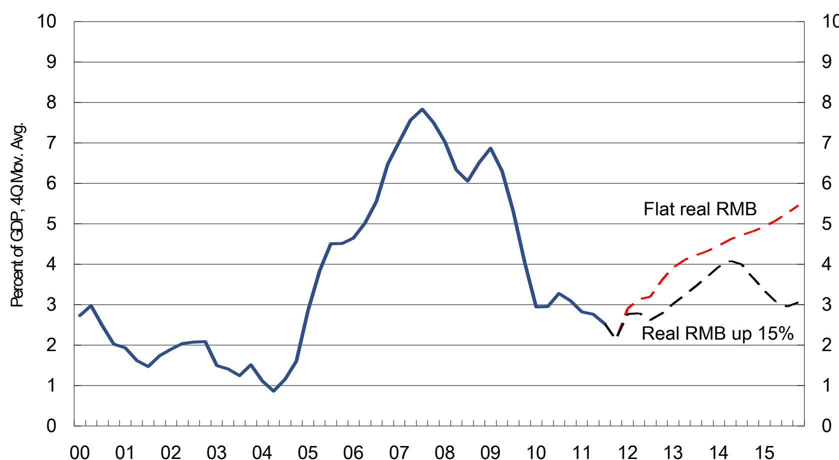
Sources: International Monetary Fund, Haver Analytics, and Citi Investment Research and Analysis.

The notable result—reported in **Figure 15**—is that with our assumed path for growth and a flat exchange rate, China's trade surplus moves significantly upward. The basic intuition is that in the years since the eruption of the global financial crisis, the Chinese economy has grown at a pace of roughly 9½ percent, while its trading partners have grown at just a 1¾ percent rate. The model suggests that this sharp divergence in growth has been instrumental in driving down China's trade surplus. Going forward, we expect Chinese growth to moderate some, while foreign growth eventually rebounds back toward more historically normal rates. This projected narrowing of the gap between Chinese and foreign growth—particularly the recovery

in foreign demand—pushes up Chinese exports relative to Chinese imports, given the high sensitivity of Chinese exports to foreign GDP. Our work suggests that a currency appreciation of roughly 15 percent over the next year would be sufficient to bring the trade surplus back down to 3 percent of GDP by 2015.

This analysis should be interpreted as a cautionary tale for the Chinese authorities. It may be that exports do not rebound as vigorously as history suggests. In previous years, China was rapidly gaining market share in many industries and across export destinations. This expansion may have been particularly dependent on favorable economic growth among its trading partners. Going forward, Chinese exports may grow more in line with the overall expansion of foreign markets, suggesting a much lower elasticity. Such may very well be the case, but it is also the case that our model fits the recent performance of Chinese trade exceptionally well, and there is little evidence that the model has recently gone off track. At a minimum, our work should be seen as highlighting some significant upside risks for China's trade balance going forward.

Figure 15. China's Goods Trade Balance: Projections*



* Forecasts assume annual real GDP growth rates of 8% and 3% for China and the Rest of the World, respectively.
Sources: International Monetary Fund, Haver Analytics, and Citi Investment Research and Analysis.

Some Concluding Thoughts

External imbalances and their implications for the global economy are conceptually rich and multi-faceted topics. In this essay, we have covered much analytical ground, but even so we have addressed these issues primarily from the standpoint of global trade imbalances—considering moves in exchange rates and other key determinants of import and export demand. But the central issues can also be profitably viewed as the product of global capital flows or as resulting from imbalances in global patterns of saving and investment. We have left the insights that can be gleaned from these complementary conceptual approaches for future work. We also have only scratched the surface of an analysis of the external positions of the oil-exporting countries and the resulting implications for global sustainability more generally.

These qualifications noted, the analysis in this essay seems to support three broad conclusions. First, the evidence that we have unearthed indicates that over the medium to long term (i.e., a five to ten year period), real exchange rates have in most cases moved in response to countries' external imbalances and, as such, have served as endogenously correcting mechanisms. In this important sense, the international monetary system seems to be functioning reasonably efficiently. That

said, global policymakers should continue to focus on initiatives that will allow this adjustment process to be more rapid and reliable, particularly through efforts to allow exchange rates and prices to adjust in a fully flexible manner.

Second, in light of this observation and the tenor of the evidence more generally, we expect much of the adjustment in global current account balances that has occurred in recent years to prove durable. In particular, the sharp deprecation of the dollar over the last decade, as well as the starkly weaker outlook for U.S. growth relative to a decade ago, suggests that the U.S. deficit is likely to remain on a lower trajectory than before the crisis. In addition, the appreciation of the yen through the past several years and the aging of the Japanese population mean that Japan's external surpluses going forward should be much smaller than those registered in the years before the global financial crisis.

Third, as our empirical work for China highlights, the global adjustment process is incomplete in some significant respects. Notably, further real exchange rate realignment in some key countries, including China and—as we have argued in previous essays—a number of euro-area countries, is likely to be necessary to achieve a pattern of global spending and production that proves robust over the longer run.

Appendix A-1

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