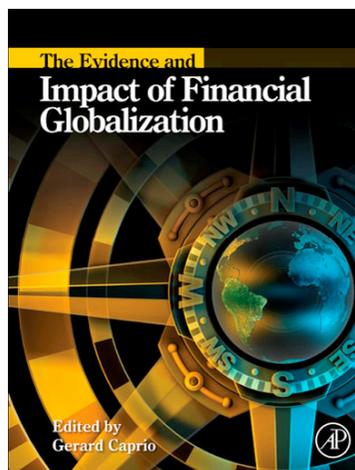


Provided for non-commercial research and educational use.  
Not for reproduction, distribution or commercial use.

This chapter was originally published in *The Evidence and Impact of Financial Globalization* published by Elsevier, and the attached copy is provided by Elsevier for the author's benefit and for the benefit of the author's institution, for noncommercial research and educational use including without limitation use in instruction at your institution, sending it to specific colleagues who you know, and providing a copy to your institution's administrator.



All other uses, reproduction and distribution, including without limitation commercial reprints, selling or licensing copies or access, or posting on open internet sites, your personal or institution's website or repository, are prohibited.

For exceptions, permission may be sought for such use through Elsevier's permissions site at:

<http://www.elsevier.com/locate/permissionusematerial>

Chinn M.D. (2013) Global Imbalances. In: Gerard Caprio (ed.) *The Evidence and Impact of Financial Globalization*, Vol. 3, pp. 67-79. Oxford: Elsevier Inc.

© 2013 Elsevier Inc. All rights reserved.

# Global Imbalances

M.D. Chinn

University of Wisconsin, Madison, WI, USA  
NBER, Cambridge, MA, USA

## OUTLINE

The Contested Landscape of Global Imbalances	67	East Asian Mercantilism and Bretton Woods II	
Global Imbalances Defined	68	Versus Self-Protection	72
Spendthrift America and the Saving–Investment Approach	70	A Global Saving Glut?	73
A US Productivity Surge and the Intertemporal Approach	71	Imbalances and the Financial Crisis	77
		<i>Acknowledgments</i>	78
		<i>Glossary</i>	78
		<i>References</i>	78

## THE CONTESTED LANDSCAPE OF GLOBAL IMBALANCES

In the years from 1998 to 2008, economists focused their attention on the causes and consequences of the expanding current account deficits and surpluses. The pattern of current account balances was interesting from an economic standpoint, in that it did not appear to conform to what would be predicted by standard economic theories. They were troubling from a policy standpoint in that they were unprecedentedly large by postwar standards.

Throughout the first decade after 2000, the United States ran enormous current account deficits. China, the rest of East Asia, and the oil-exporting countries ran correspondingly large current account surpluses. In 2008–09, these current account balances drastically reversed, albeit incompletely, as a global financial crisis engulfed the world economy. The proximity of the two events naturally leads to the question whether the two phenomena are related, or causal in nature.

In this chapter, the various explanations for the rise of global imbalances, defined as large current account

balances, are reviewed. These explanations include (1) trends in saving and investment balances, (2) a US productivity surge, (3) East Asian mercantilist behavior, (4) the global saving glut, and (5) distortions in financial markets. Note that the explanations are not mutually exclusive.

The first approach relies upon the definition of the current account as the difference between national saving and investment, driven by fiscal and demographic effects. The second interpretation imbeds a productivity surge into the standard economist's explanation for lending and borrowing, namely, the tendency to smooth consumption in the face of time variation in output. The third view focuses upon the export-oriented development path undertaken by East Asian countries as an explanation for the pattern of deficits and surpluses. The fourth interpretation assumes there is a distortion in the financial markets of less developed countries (LDCs), in so far as they are not able to channel capital from savers to borrowers domestically. The financial intermediation activity is thus outsourced to developed countries. The fifth perspective locates the key distortion in financial markets of the United States, and to a lesser

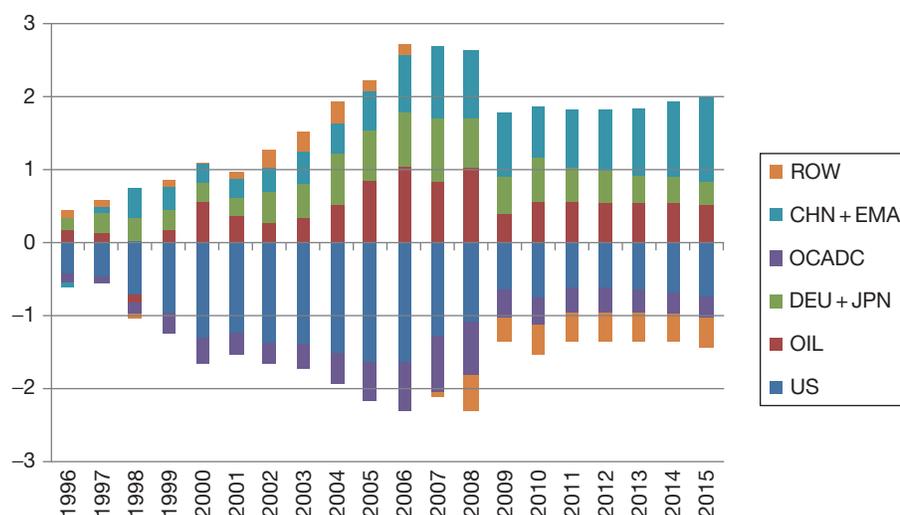


FIGURE 5.1 Current account surpluses and deficits, as a share of world GDP, in percentage points. CHN+EMA is China plus emerging Asia, OCADC is other advanced countries, DEU+JPN is Germany and Japan, OIL is oil exporters, US is United States, and ROW is Rest of World. Forecasts for 2010–2014. Source: IMF, World Economic Outlook, October 2010.

extent, other developed countries. Different implications regarding the nature of the crisis of 2008–09 flow from each approach.

## GLOBAL IMBALANCES DEFINED

Global imbalances can be defined in a number of ways. In this chapter, they are interpreted as pertaining to international relationships, including the current account, the private financial account, or official reserves transactions. These variables are linked by the balance of payments accounting identity.

$$CA + KA + ORT \equiv 0$$

where CA is the current account, KA is the private financial account, and ORT is official reserves transactions. Usually global imbalances are equated with the first term, current account imbalances.

However, global imbalances presumably do not refer to current account deficits and surpluses per se. Rather, the term refers to the relatively large magnitude (in absolute value) of those current account balances. This pattern of increasing imbalances is illustrated in Figure 5.1.

Figure 5.1 highlights the fact that the United States began running increasingly large deficits starting in 1998, in the wake of the East Asian financial crisis. The trend continued largely unabated until 2006 (the only year it shrank was in the US recession year of 2001).

One interesting observation is that through 2005, Germany and Japan accounted for a larger combined current account surplus than China and emerging Asia. Another observation is that oil exporters accounted for a

larger share than China and emerging Asia until 2006. These points are worth highlighting if only to remind readers that China has not always been the sole economy running a large current account surplus.

The changing pattern of current account balances can also be examined from the perspective of each individual country. Here too one sees the widening of the distribution of current account to gross domestic product (GDP) balances, as illustrated in the histogram, from Faruqee and Lee (2009).

The distribution is the tightest in 1960, while the flattest distribution applies to 2004.<sup>1</sup> Clearly, over time, some very large current account balances (expressed as a share of world GDP) have developed. At the same time, current account balances normalized by GDP have also increased in dispersion (Figure 5.2).

One interpretation for this increased dispersion in current account balances is increasing capital mobility across borders (see Greenspan, 2005). According to several measures, capital openness has indeed increased over time. For instance, the Chinn and Ito (2006) index of capital openness indicates a steady upward movement over time (Figure 5.3).

The Chinn and Ito (2006) capital openness index is a *de jure* measure, based on the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* (AREAER). Other indicators of *de jure* capital openness are highly correlated with this index, so one can be fairly confident that these trends in KAOPEN are representative.<sup>2</sup>

An alternative perspective looks at private financial account balances as the proper measure of global imbalances. To the extent that the model in question focuses on capital flows as the central variable of interest, such an

<sup>1</sup> Interestingly, the distribution in 1980 is fairly flat as well.

<sup>2</sup> See Chinn and Ito (2008).

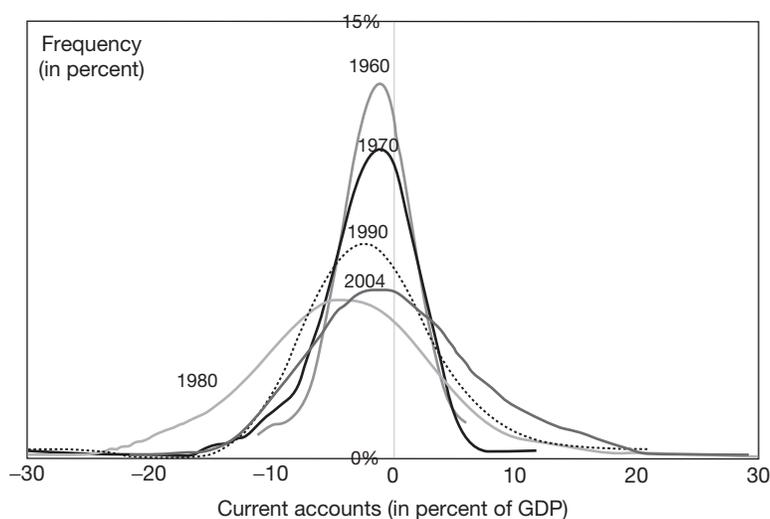


FIGURE 5.2 Current account balances as a share of GDP. Reproduced from Faruqee, H., Lee, J., 2009. *Global dispersion of current accounts: is the universe expanding?* IMF Staff Papers 56(3), 573–595.

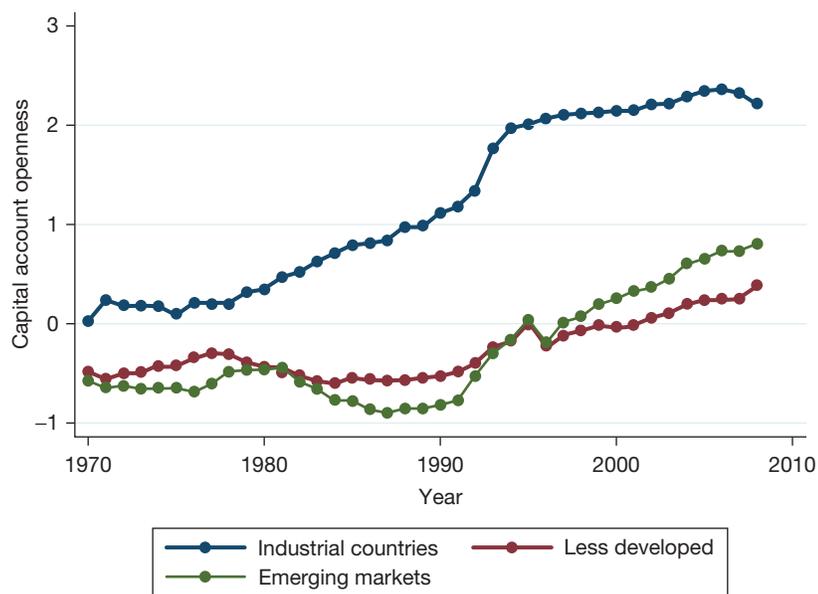


FIGURE 5.3 Chinn-Ito capital openness indices (KAOPEN) for industrial countries, emerging market countries, and LDCs (Chinn and Ito, 2006). Source: [http://web.pdx.edu/~ito/Chinn-Ito\\_website.htm](http://web.pdx.edu/~ito/Chinn-Ito_website.htm)

approach makes sense. However, in practice, it is not clear that there is much of a distinction, empirically. In a sample over the 1970–2004 period, each 1 percentage point increase in the current account is associated with a 0.91 percentage point decrease in the private financial account (i.e., increase in private capital inflows), suggesting that on average countries do not intervene extensively.<sup>3</sup> Of course, certain countries do intervene

extensively; for the emerging market economies, current account balances are correlated with reserve accumulation with a coefficient of 0.9.<sup>4</sup> For the emerging market economies, the private capital flows and the current account do diverge substantially.

For the remainder of the discussion, imbalances will be interpreted as pertaining to current account balances.

<sup>3</sup> Regression estimated over the 1970–2004 period, with the private financial account estimated using the current account and the change in foreign exchange reserves excluding reserves. The adjusted  $R^2$  is 0.80.

<sup>4</sup> This correlation coefficient is based on IMF, *World Economic Outlook* data, over the 1996–2008 period. Note that official flows from developing to advanced economies are recorded as private flows in advanced country data. For each country, official refers to its government only, not other governments.

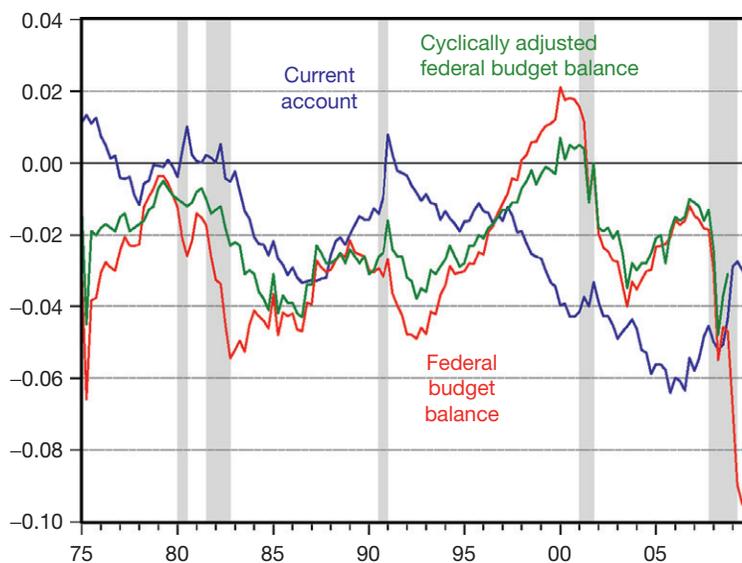


FIGURE 5.4 US current account to GDP, federal budget balance to GDP, and cyclically adjusted federal budget balance. NBER-defined recession dates shaded gray. Source: BEA, CBO (September 2009), and NBER.

## SPENDTHRIFT AMERICA AND THE SAVING-INVESTMENT APPROACH

The saving–investment approach takes the perspective from the national saving identity.

$$CA \equiv (T - G) + (S - I)$$

where the  $T$  is tax receipts net of transfer payments,  $G$  is government spending,  $S$  is private saving, and  $I$  is private investment;  $(T - G)$  is the budget balance, and  $(S - I)$  is the private sector saving–investment balance.

Hence, the current account is, by an accounting identity, equal to the budget balance and the private saving–investment gap. This is a tautology, unless one imposes some structure and causality.

One particularly simple variant of this approach relies upon assuming that the shocks primarily hit the government sector. Then changes in the budget balance are quasi-exogenous, and the current account consequently responds. The inspiration for this perspective is the mid-1980s experience with the Reagan era tax cuts and defense buildup. During that episode, the budget deficit and current account deficits both yawned to unprecedentedly large magnitudes, inspiring the term ‘the twin deficits.’

Figure 5.4 plots the two deficits, the current account and budget.

Upon inspection, the simple interpretation of the twin deficits clearly does not hold, beyond the mid-1980s, and

2001–04. Of course, other types of shocks perturb the economy, and once one allows for shocks to the other components of aggregate demand, or to the supply side, then no such positive correlation need hold at all times. However, that does not deny the validity of that view during the last decade.<sup>5</sup>

One way in which to account for the endogeneity of the budget balance is to focus on the cyclically adjusted budget balance. Figure 5.4 also displays the Congressional Budget Office (2009) series. The correlation between the current account and budget balance is now more pronounced. A more formal approach requires an econometric evaluation. Even then, this approach would only explain the behavior of the US current account, and not current account balances in general.

A more systematic approach models the current account explicitly, focusing on the determinants of private investment and saving, and adds those variables to the budget balance. Chinn and Prasad (2003) is one early example of this approach.<sup>6</sup> Chinn and Prasad analyze a sample encompassing 18 industrial and 71 developing countries over the period 1971–95, using nonoverlapping 5-year averages of the data. The analysis includes a number of explanatory variables to account for private saving and investment behavior, including demographic variables, per capita income,<sup>7</sup> trade openness, as well as variability of terms of trade shocks and GDP growth. In addition, the budget balance enters in as a key macroeconomic policy variable. Additional

<sup>5</sup> See, for instance, Chinn (2005). A somewhat dissenting view is Truman (2005).

<sup>6</sup> This line of research is closely related to the voluminous savings retention regression literature of Feldstein and Horioka (1980); see also Dooley et al. (1987).

<sup>7</sup> One reason the pattern of capital flows has been so puzzling is that capital seems to be flowing from poor to rich countries (Alfaro et al., 2008).

explanatory variables include net foreign assets and capital controls.

Chinn and Prasad find that government budget balances, initial net foreign asset positions, and, for developing countries, indicators of financial deepening are positively correlated with current account balances. Among developing countries, they also find that higher terms of trade volatility are associated with larger current account surpluses (or smaller deficits). Greater macroeconomic uncertainty apparently increases domestic saving and also has a slightly negative impact on investment. The degree of openness to international trade appears to be weakly associated with larger current account deficits among developing countries.<sup>8</sup> Note that because they include average GDP growth and initial net foreign assets<sup>9</sup> in the regressions, the saving–investment approach is consistent with some aspects of the intertemporal approach (discussed later).

Gruber and Kamin (2007) obtain similar results for a smaller panel of 61 countries spanning the 1982–2003 period. They find that including a crisis dummy for the East Asian countries statistically explains those countries' current account balances. However, their results do not shed light on the source of US deficits. Hence, while the stylized facts are relevant to the question at hand, they pertain to the period before the appearance of global imbalances.

Chinn and Ito (2007, 2008) expand the sample period to 1971–2004. In this analysis, the goal was to determine whether American and East Asian current account balances were evolving in a manner inconsistent with historical correlations. The regression analysis controls for a similar set of variables as used in Chinn and Prasad (2003), but focuses on the role of budget balances, financial development, and institutions.

Chinn and Ito's key findings include the following. First, the budget balance is an important determinant of the current account balance for industrial countries; the coefficient for the budget balance variable is 0.15 in a model controlling for institutional variables. A series of robustness checks yield the results that a 1 percentage point increase in the budget balance leads to a 0.1–0.5 percentage point increase in the current account

balance.<sup>10</sup> For the United States, Chinn and Ito's analysis confirms the view that it is a saving drought – not investment boom – that is contributing to the enlargement of current account deficits, although there is some evidence of anomalous behavior in the 2001–04 period. For the East Asian countries, Chinn and Ito find some evidence that the budget balances are somewhat larger than predicted by their empirical models.

Chinn and Ito extend their analysis by accounting for endogeneity in two ways. First, they use an instrumental variables approach, and second they replace the budget balance with the cyclically adjusted budget balance.<sup>11</sup> In both cases, the coefficient on the budget balance rises considerably, ranging from 0.45 to 0.49. The US current account deficit in 2001–04 was significantly different from that predicted by the model, but just barely. China's current account was within the 95% prediction band.

Fiscal, structural, and demographic factors account for a large portion of the variation in current account balances across countries and across time. However, the current account balances of the United States and China are not entirely explained by these factors, particularly during the period of pronounced global imbalances.

## A US PRODUCTIVITY SURGE AND THE INTERTEMPORAL APPROACH

The intertemporal approach is the mainstay of the rigorous approach to explaining current account imbalances. Suppose one maximizes an intertemporal utility function subject to a budget constraint. If agents are not constrained by borrowing restrictions, and if they have rational expectations, then the agents should smooth consumption. In order to smooth consumption, they borrow and save accordingly.

In this perspective, consumption today is to equal a share of the present discounted value of future expected net output or net wealth. Hence, changes in consumption are due solely to changes in either the interest rate, or changes in expectations about future net output due to

<sup>8</sup> They also find limited evidence to support the patterns of evolutions in current accounts predicted by the stages-of-development hypothesis. Other potentially important variables such as indicators of capital controls and average GDP growth, however, appear to bear little systematic relationship with current account balances.

<sup>9</sup> The initial net foreign assets variable is expressed as a share of GDP, and pertains to the beginning of each panel. The data are from Sinn (1990) and various versions of the Lane and Milesi-Ferretti (2006) database.

<sup>10</sup> Smaller estimates of the fiscal impact are reported by Bussière et al., (2005), Corsetti and Müller (2006), and Gruber and Kamin (2007). In regressions extending up to 2008, Chinn et al. (2010) obtain corresponding estimates for industrial countries of 0.29.

<sup>11</sup> For the IV approach, they use a dummy for the left-wing government, political constraint (democracy) index, military spending as a ratio to GDP, yearly changes in unemployment rates, and regional dummies. The 'trend' budget balance is estimated using the Hodrick–Prescott (HP) filter.

productivity shocks or reductions in investment and government spending.

What does this mean in the context of the question at hand? Suppose that in the early 2000s, Americans thought that productivity would boom in the future. Then rather than waiting for that anticipated productivity boom in the future to increase consumption, it makes sense for them to start consuming more now, so as to smooth consumption as much as possible.<sup>12</sup> In the context of America in the 2000s, to consume more now means to import more and export less.

In this perspective, deficits signal future economic strength. For the United States, deficits could result from the relative attractiveness as a place to invest due to relatively high rates of return. This argument would be more convincing if GDP growth were being maintained by investment rather than consumption and, more importantly, if the lending to the United States took the form of purchases of stock and direct investment. Instead, a large proportion of capital flowing to the United States takes place in the form of purchases of US government securities – not purchases of American stocks or direct investment in its factories, as it did in the years leading up to 2000.<sup>13</sup> Moreover, the heavy involvement of foreign central banks in purchasing US assets suggests that the profit motive is not behind the ongoing flows to the United States.

There are numerous ways in which to account for intertemporal effects in current account dynamics. Chinn and Lee (2009) apply a structural VAR approach, which allows for transitory and permanent shocks to drive the current account and the real exchange rate. The key identifying assumption is that the current account is stationary, while the real exchange rate is integrated of order 1. Using the same approach as in Chinn and Lee (2006), they examine the United States, the euro area, and Japan, and find that a large share of the 2004–07 US current account is inexplicable using their model.

Some early formal analyses of the present value approach were conducted by Sheffrin and Woo (1990a,b). These studies were applied to small countries, which fit the theoretical framework. A formal test of the intertemporal approach, as applied to the United States, was conducted by Engel and Rogers (2006). They model the current account as a function of the expected discounted present value of its future share of world GDP relative to

its current share of world GDP (where the world is the advanced economies). The key difficulty in testing this approach is in modeling expected output growth; using a Markov-switching approach, they find that the United States is not staying on a long-run sustainable path.<sup>14,15</sup> However, using survey data on forecasted GDP growth in the G-7, Engel and Rogers' empirical model appears to explain the evolution of the US current account remarkably well.

These contrasting findings suggest that, while expectations regarding future output do explain in part the pattern of advanced country current account balances, those expectations do not appear unbiased.

### EAST ASIAN MERCANTILISM AND BRETTON WOODS II VERSUS SELF-PROTECTION

One view attributes the East Asian surpluses to explicitly mercantilist behavior. From this perspective, the developing countries of East Asia have followed an export-led development strategy. That export-led strategy resulted in rapid growth; however, starting in the mid-1990s, current account surpluses evolved into current account deficits, as investment boomed.

In the wake of the 1997 financial crisis, investment levels collapsed, while saving rates remained relatively high. Currencies depreciated sharply in the region; however, over time, East Asian central banks maintained their currencies at fairly weak levels. For some observers, this observation is sufficient to explain the relatively large and persistent current account surpluses in the region. One difficulty with this explanation is that the export-led development path has been in place for decades; the explanation for the sharp break post-1997 is missing.

In addition, in the traditional monetarist approach to the balance of payments, pegging the nominal exchange rate at a weak level is no guarantee that the real exchange rate will be commensurately weak. Over time, with reserve accumulation, the money supply will increase thereby inducing an increase in the price level which undoes the exchange rate undervaluation. In the short run, price stickiness and sterilization of the impact of the reserve accumulation on the money base can prevent the

<sup>12</sup> See Pakko (1999) for an early interpretation in this vein. Note that the empirical evidence for the theoretical model underpinning this argument is weak (Nason and Rogers, 2006).

<sup>13</sup> It is possible for consumption to jump immediately in response to anticipated future higher income. See, for instance, Erceg et al. (2006).

<sup>14</sup> Engel and Rogers use data over the 1790–2004 period for one of their sustainability tests. The survey-based tests rely upon a shorter sample, 1994–2004.

<sup>15</sup> Choi et al. (2008) allow for different rates of discount, and can replicate the pattern of imbalances in a two-country model.

adjustment process. However, in standard interpretations, one cannot maintain this undervaluation by way of the foreign exchange intervention over many years (see Council of Economic Advisers, 2007, Chapter 7).

Note that while the model explains one half of the current account imbalances, it does not explain the other side – namely, why it is that the United States, the United Kingdom, and specific other developed countries ran substantial deficits.

In a series of papers, Dooley et al. (2003, 2008) interpret the US current account deficit as the outcome of concerted mercantilist efforts by East Asian state actors. In this context, the financing of America's trade (and budget) deficit is an explicit quid pro quo for continued access to American markets. Their explanation argues that the entire panoply of government interventions is aimed at supporting exporting industries.

There are also problems with this thesis. Most notable is the mysterious aspect of timing: East Asian savings began flowing to the United States in 2003. Why not earlier, if the mercantilist impetus had been there all along? For a thorough critique, see Prasad and Wei (2005).

An alternative interpretation for the large-scale reserve accumulation has been attributed to the self-insurance or precautionary demand. Foreign exchange reserves can reduce the probability of an output drop induced by capital flight or sudden stop. This self-insurance motivation rose substantially in the wake of the East Asian crises; this point was verified by Aizenman and Marion (2003).<sup>16</sup> Aizenman and Lee (2007) evaluated the relative importance of these of the various motivations by augmenting the conventional specifications for reserve holdings with proxy variables associated with the mercantilism and self-insurance/precautionary demand approaches. While variables associated with both approaches are statistically significant, the self-insurance variables play a greater economic role in accounting for recent trends. In results that are consistent with both the mercantilist and self-insurance motives, Gagnon (2010) finds that a 1 percentage point of GDP increase in *official* financial outflows (including reserve accumulation) causes a 0.4–0.5 percentage point of GDP increase in current account.<sup>17</sup>

<sup>16</sup> See also Aizenman and Lee (2007) and Jeanne and Ranciere (2006).

<sup>17</sup> On the other hand, it is not clear why the greater exchange rate flexibility that comes with less intervention would necessarily lead to more rapid current account adjustment (Chinn and Wei, forthcoming).

<sup>18</sup> In practice, the real interest rate is not necessarily equalized; capital controls, risk premia, and expected real depreciation would be expected to drive a wedge between real rates of different countries.

<sup>19</sup> The 'world' in this model can be considered as one small closed economy composed of two large open economies, East Asia and the United States. Hence, the world real interest rate ( $R$ ) is the real interest rate that equilibrates cross-border lending and borrowing between the two economies such that the world current account will be in balance. In this model, when shocks arise as they do in the text, the world real interest rate would vary so as to keep the absolute values of the current account balances of the two economies equal to each other (Obstfeld and Rogoff, 1996).

## A GLOBAL SAVING GLUT?

The 'global saving glut' explanation has been expounded by Bernanke (2005), Clarida (2005a,b). This argument views excess saving from Asian emerging market countries, driven by rising savings and collapsing investment in the aftermath of the financial crisis (and to a lesser extent, Europe), as the cause of the US current account deficit. More recently, the burgeoning surpluses of the oil exporters, ranging from the Persian Gulf countries to Russia, have moved to the fore as sources of excess saving. From this perspective, the US external imbalance is a problem made abroad; the lack of well-developed and open financial markets encourages countries with excess savings to seek financial intermediation in well-developed financial systems such as the United States. Hence, a solution may only arise in the longer term, as better-developed financial systems mitigate this excess savings problem.

Caballero et al. (2008a,b) model the saving glut explanation as a shortage of assets in the developing world. Mendoza et al. (2009) model financial development as the increase in the degree of enforcement of financial contracts.

The strongest point in favor of the saving glut hypothesis is the observation of a widening current account deficit in the United States, combined with low real world interest rates. However, the saving glut versus twin deficits view is not an either-or proposition. Figure 5.5 depicts how it is possible for both motivations to coexist. Two regions are graphed – East Asia and the United States. The National Savings ( $NS$ ) schedules are functions of fiscal policy, demographics, and the real interest rate. The Investment schedules ( $I$ ) are functions of the interest rate and many other factors. In this model, the real interest rate is assumed to be equalized, such that international capital markets would clear, that is, the current account imbalances between the two economies balance out each other.<sup>18</sup>

In period 0, the world interest rate is  $r_0$ , and the United States runs a current account deficit, while East Asia runs a corresponding current account surplus.<sup>19</sup> In period 1, the United States undertakes an expansionary

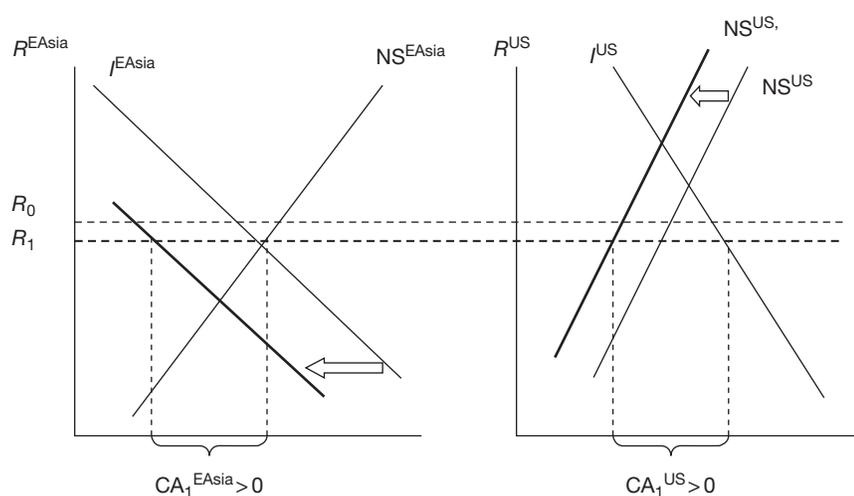


FIGURE 5.5 National Saving, Investment, and Current Account Balances.

fiscal policy that pulls in the NS schedule. At the same time, the investment schedule shifts inward in East Asia (e.g., as a result of a financial crisis).<sup>20</sup> This confluence of events drives down the real world interest rate to  $r_1$ . Thus, using a simple open macro model, one can explain the recent rise in US current account deficits, East Asian current account surpluses, and the recent fall in global interest rates by both deficit spending by the United States and investment drought in East Asia. However, also note that in the absence of a change in fiscal policy, the US current account imbalance would have been much smaller.

In order to formally test the financial underdevelopment interpretation of the saving glut hypothesis, one can evaluate whether financial development and institutional development explain the pattern of imbalances, using the framework laid out in section 'Spendthrift America and the Saving-Investment Approach.' The estimation results are reported in Table 5.1, extracted from Chinn and Ito (2008).<sup>21</sup> One interesting result shown in the table is the significantly positive relationship (with the  $p$ -value of  $<10\%$ ) between current account and government budget balances found for the industrialized countries group. This result differs from the results obtained in Chinn and Prasad (2003), who examined a shorter sample from 1971 to 1995. A 1 percentage point increase in the budget balance would lead to a 0.16 percentage point increase in the current account balance for industrialized countries and 0.24 for LDCs except for African countries.

One noteworthy aspect of Table 5.1 relates to the financial deepening variable. Only in the industrial countries' current account regressions does it exhibit a negative coefficient, though statistically insignificantly. With these results, one may not be able to conclude that more developed financial markets lead to decreased current account balances, as posited by the adherents of the global saving glut thesis.

Because the economic environmental factors may affect the way in which financial development might affect saving and investment, interaction involving these variables have been included – interactions between the financial development and legal variables (PCGDP times LEGAL), interactions between the financial development and financial openness variables (PCGDP times KAOPEN), and interactions between legal development and financial openness (LEGAL times KAOPEN). The financial and legal interaction effect is motivated by the conjecture that deepening financial markets might lead to higher saving rates, but the effect might be magnified under conditions of better-developed legal institutions. Alternatively, if greater financial deepening leads to a lower saving rate or a lower investment rate, that effect could be mitigated when financial markets are equipped with highly developed legal systems. A similar argument can be applied to the effect of financial openness on current account balances.

In order to examine the importance of institutions, Chinn and Ito augment their basic model specification with variables aimed at capturing institutional factors,

<sup>20</sup> For simplicity, the United States and East Asia are focused upon, since the behavior of the two regions are the most difficult to explain. Obviously, part of the global saving glut arose from the windfall received by commodity (particularly, oil) exporting countries.

<sup>21</sup> Since these results are sensitive to the inclusion of the African countries, separate sets of results have been reported with and without the African countries included, for the developing country sample. Separate results have also been reported for an emerging market group that differs somewhat from the developing country sample.

TABLE 5.1 Current Account Regressions

	Dependent variable: 5-year average of current account (% of GDP): 1971–2004				
	(1) Full	(2) IDC	(3) LDC	(4) LDC w/o Africa	(5) EMG
Government budget balance	0.15 [0.068]**	0.16 [0.086]*	0.15 [0.081]*	0.242 [0.092]***	0.219 [0.076]***
Lane's NFA (initial)	0.049 [0.005]***	0.063 [0.011]***	0.047 [0.005]***	0.05 [0.006]***	0.043 [0.009]***
Relative income	0.027 [0.019]	0.059 [0.025]**	0.032 [0.085]	0.09 [0.090]	0.1 [0.082]
Relative income squared	0.016 [0.029]	−0.212 [0.080]***	0.008 [0.096]	0.118 [0.105]	0.073 [0.092]
Relative dependency ratio (young)	−0.06 [0.020]***	0.021 [0.073]	−0.071 [0.025]***	−0.075 [0.025]***	−0.013 [0.022]
Relative dependency ratio (old)	−0.205 [0.061]***	0.001 [0.081]	−0.313 [0.093]***	−0.241 [0.098]**	−0.347 [0.106]***
Financial deepening (PCGDP)	0.001 [0.008]	−0.006 [0.010]	0.005 [0.013]	0.013 [0.014]	0.003 [0.013]
TOT volatility	−0.013 [0.019]	0.063 [0.058]	−0.017 [0.020]	−0.006 [0.018]	−0.016 [0.019]
Average GDP growth	−0.151 [0.141]	−0.101 [0.207]	−0.161 [0.155]	−0.145 [0.117]	−0.187 [0.115]
Trade openness	0.003 [0.009]	0.037 [0.011]***	−0.003 [0.010]	−0.008 [0.011]	−0.005 [0.010]
Oil-exporting countries	0.046 [0.013]***	– –	0.047 [0.013]***	0.039 [0.011]***	0.028 [0.013]**
Observations	502	132	370	235	210
Adjusted R-squared	0.42	0.50	0.39	0.53	0.49

Full, full sample; IDC, industrial and developed countries; LDC, less developed countries; EMG, emerging market group countries; NFA, net foreign assets. Robust standard errors in brackets. \*Significant at 10%; \*\*significant at 5%; \*\*\*significant at 1%. The estimated coefficients for the time-fixed dummies and constant are not shown.

namely the legal development variable (LEGAL), financial openness (KAOPEN), and associated interaction terms (including those with PCGDP). Table 5.2 displays results from panel OLS regressions with institutional variables. They obtain several notable results.

Despite the inclusion of institutional variables and their interactions, the significantly positive relationship between current account and government budget balances is detected in almost all sample groups like in Table 5.1 from the previous analysis. The point estimate on budget balances is a statistically significant 0.15 for the industrialized countries group, about the same as

in the previous estimates, implying that the coefficient on the budget balance for the industrial and developed country (IDC) group is robust to inclusion of institutional variables (note that a  $\pm 2$  standard error confidence interval encompasses values as high as 0.34). The estimated coefficients on budget balances remain close to that reported in Table 5.1 and the other sample groups.<sup>22</sup>

Second, financial development is found to have different, and nonlinear, effects on saving and investment. Chinn and Ito use the estimates from Table 5.2 to identify the countries for which financial development would reduce the current account. With only Hong Kong and

<sup>22</sup> Gruber and Kamin (2007) report similar results.

TABLE 5.2 Current Account Regressions with Institutional Factors

Dependent variable: 5-year average of current account (% of GDP): 1971–2004					
	(1) Full	(2) IDC	(3) LDC	(4) LDC w/o Africa	(5) EMG
Government budget balance	0.159 [0.065]**	0.154 [0.095]*	0.168 [0.079]**	0.251 [0.091]***	0.23 [0.075]***
Lane's NFA (initial)	0.049 [0.005]***	0.069 [0.011]***	0.047 [0.005]***	0.051 [0.006]***	0.041 [0.009]***
Relative income	0.062 [0.028]**	0.058 [0.028]**	0.115 [0.096]	0.16 [0.106]	0.216 [0.103]**
Relative income squared	0.032 [0.038]	−0.097 [0.120]	0.057 [0.102]	0.157 [0.121]	0.166 [0.111]
Relative dependency ratio (young)	−0.061 [0.018]***	−0.027 [0.082]	−0.076 [0.022]***	−0.099 [0.030]***	−0.044 [0.023]*
Relative dependency ratio (old)	−0.2 [0.058]***	0.099 [0.098]	−0.368 [0.096]***	−0.331 [0.114]***	−0.529 [0.127]***
Financial development (PCGDP)	−0.008 [0.009]	0.01 [0.012]	−0.043 [0.032]	−0.038 [0.040]	−0.082 [0.038]**
Legal development (LEGAL)	−0.003 [0.004]	0.002 [0.007]	−0.017 [0.008]**	−0.02 [0.009]**	−0.018 [0.010]*
PCGDP × LEGAL	−0.003 [0.004]	−0.035 [0.015]**	−0.021 [0.011]*	−0.025 [0.012]**	−0.037 [0.016]**
Financial openness (KAOPEN)	−0.001 [0.003]	−0.002 [0.003]	0.002 [0.007]	0.005 [0.008]	0.008 [0.010]
KAOPEN × LEGAL	0.002 [0.001]*	0.012 [0.003]***	0.002 [0.002]	0.002 [0.002]	0.005 [0.003]
KAOPEN × PCGDP	−0.003 [0.005]	0.002 [0.009]	0 [0.007]	0.002 [0.008]	−0.002 [0.009]
TOT volatility	−0.013 [0.017]	0.1 [0.054]*	−0.015 [0.018]	−0.002 [0.019]	−0.003 [0.022]
Average GDP growth	−0.123 [0.087]	−0.036 [0.243]	−0.09 [0.096]	−0.107 [0.124]	−0.132 [0.118]
Trade openness	0.006 [0.009]	0.046 [0.014]***	0.005 [0.013]	0 [0.014]	0.004 [0.014]
Oil-exporting countries	0.041 [0.013]***	– –	0.04 [0.013]***	0.035 [0.012]***	0.025 [0.013]*
Observations	471	126	345	234	203
Adjusted R-squared	0.47	0.55	0.46	0.54	0.51

Full, full sample; IDC, industrial and developed countries; LDC, less developed countries; EMG, emerging market group countries; NFA, net foreign assets. Robust standard errors in brackets. \*Significant at 10%; \*\*significant at 5%; \*\*\*significant at 1%.

The estimated coefficients for the time-fixed dummies and constant are not shown.

Singapore categorized as countries in East Asia at the highest tenth percentile in legal development and highest tenth percentile in financial openness, only they would experience a reduction in their current account balances as financial development proceeds. For the majority of Asian emerging market countries that are categorized as middle or lower level in terms of legal development and financial openness, they will experience an *increase* in the ratio of national savings to GDP if financial markets develop further. Given these results, Chinn and Ito conclude that financial development reduces the level of current account balances, especially for Asian emerging market countries, but that effect is achieved, not through a reduction in savings rates, but through increased levels of investment.

Overall, Chinn and Ito's results present evidence against the argument that emerging market countries, especially those in East Asia, will experience lower rates of saving once these countries achieve higher levels of financial development and better-developed legal infrastructure. In addition, more open financial markets do not appear to have any impact on current account balances for this group of countries (see also [Gruber and Kamin, 2009](#)).

One key challenge in this type of empirical exercise involves the proper measurement of financial development. Ito and Chinn (2009) pursue this issue by using alternative indicators of financial development, namely measures of equity, bond, and insurance market activity, as well as different aspects of financial development such as the cost performance, size, and activeness of the industry. The drawback of using these types of data is that the sample size is shortened; their sample includes the 1986–2005 period.<sup>23</sup>

Ito and Chinn obtained the following results. First, they confirm a role for budget balances in industrial countries when bond markets are incorporated. Second, empirically, both credit to the private sector and stock market capitalization appear to be equally important determinants of current account behavior. Third, while increases in the size of financial markets induce a decline in the current account balance in industrial countries, the reverse is more often the case for developing countries, especially when other measures of financial development are included. However, because of nonlinearities incorporated into the specifications, this characterization is conditional. Fourth, a greater degree of financial openness is typically associated with a smaller current account balance in developing countries.

## IMBALANCES AND THE FINANCIAL CRISIS

Some observers have taken to claiming that the saving glut caused the crisis, by inducing a search for yield and excessive leverage, and/or risk taking. This view is succinctly summarized in Council of Economic Advisers (2009, pp. 22–23):

- The roots of the current global financial crisis began in the late 1990s. A rapid increase in saving by developing countries (sometimes called the 'global saving glut') resulted in a large influx of capital to the United States and other industrialized countries, driving down the return on safe assets. The relatively low yield on safe assets likely encouraged investors to look for higher yields from riskier assets, whose yields also went down. What turned out to be an underpricing of risk across a number of markets (housing, commercial real estate, and leveraged buyouts, among others) in the United States and abroad, and an uncertainty about how this risk was distributed throughout the global financial system, set the stage for subsequent financial distress.
- The influx of inexpensive capital helped finance a housing boom. House prices appreciated rapidly earlier in this decade, and building increased to well-above historic levels. Eventually, house prices began to decline with this glut in housing supply.

In this interpretation, the trigger is excess savings associated with the inflows. What is missing from the story is the explanation for why the capital had to flow to the United States.<sup>24</sup> In contrast, [Obstfeld and Rogoff \(2009\)](#) argue

We too believe that the global imbalances and the financial crisis are intimately connected, but we take a more nuanced stance on the nature of the connections. In our view, both originated primarily in economic policies followed in a number of countries in the 2000s (including the United States) and in distortions that influenced the transmission of these policies through U.S. and ultimately through global financial markets.

Financial market distortions in the developing world led to the excess of saving; financial distortions in America pulled those flows to America. These financial distortions have been highlighted in a number of analyses of the financial crises. Irrationality, or waves of excess optimism and pessimism, is stressed by [Akerlof and Shiller \(2009\)](#). [Stiglitz \(2010\)](#) stresses the credit market imperfections associated with asymmetric information. Rent

<sup>23</sup> These alternative financial measures are based on updated versions of the [Beck et al. \(2001\)](#) data set.

<sup>24</sup> Caballero and coworkers view the link from inflows to crisis through the prism of the asset shortage interpretation ([Caballero et al., 2008a,b](#)).

seeking and regulatory capture dominate the discussion by [Johnson and Kwak \(2010\)](#). Interestingly, excess saving from East Asia does not appear as a causal factor in any of these accounts. [Roubini and Mihm \(2010, pp. 80–82\)](#) and [Chinn and Frieden \(2011\)](#) argue that excess saving combined with domestic financial distortions were central to the development and extent of the crisis.

## SEE ALSO

[Financial Globalization and Crises: Overview; Forces Behind Globalization: International Government Debt; Crises: A Perspective on Predicting Currency Crises.](#)

## Acknowledgments

This work draws upon the joint work conducted with Hiro Ito. The author thanks the editor, Stijn Claessens, and Joe Gagnon, Steve Kamin, and Hiro Ito for their helpful comments. The author acknowledges the financial support of faculty research funds of the University of Wisconsin.

## Glossary

**HP filter** The Hodrick–Prescott filter extracts the smooth component of a time series, with the objective of identifying cyclical and trend components.

**Integrated** A characteristic of a time series wherein the series must be differenced in order to induce stationarity. An integrated process of order one must be first differenced in order to achieve stationarity.

**Net foreign asset position** Value of holdings of foreign assets minus value of foreign holdings of domestic assets.

**Stationary** A characteristic of a time series wherein the joint distribution does not change over time, that is, the mean and variance exist, and do not vary.

**Sterilization** Open market operations undertaken by the central bank to offset the impact of foreign exchange reserve changes on the monetary base.

## References

- Aizenman, J., Lee, J., 2007. International reserves: precautionary versus mercantilist views, theory and evidence. *Open Economies Review* 18 (2), 191–214.
- Aizenman, J., Marion, N.P., 2003. The high demand for international reserves in the Far East: what's going on? *Journal of the Japanese and International Economies* 17 (3), 370–400.
- Akerlof, G.A., Shiller, R.J., 2009. *Animal Spirits: How Human Psychology Drives the Economy and Why It Matters for Global Capitalism*. Princeton University Press, Princeton.
- Alfaro, L., Kalemli-Ozcan, S., Volosovych, V., 2008. Why doesn't capital flow from rich to poor countries? An empirical investigation. *The Review of Economics and Statistics* 90 (2), 347–368, 01.
- Beck, T., Demirgüç-Kunt, A., Levine, R., 2001. A new database on financial development and structure. In: Demirgüç-Kunt, A., Levine, R. (Eds.), *Financial Structure and Economic Growth: A Cross-Country Comparison of Banks, Markets, and Development*. MIT Press, Cambridge, MA.
- Bernanke, B., 2005. The Global Saving Glut and the US Current Account. Remarks at the Sandridge Lecture (10 March). Virginia Association of Economics, Richmond, VA.
- Bussière, M., Fratzscher, M., Müller, G.J., 2005. Productivity Shocks, Budget Deficits and the Current Account. ECB, Frankfurt ECB Working Paper No. 509.
- Caballero, R., Farhi, E., Gourinchas, P.-O., 2008a. An equilibrium model of 'global imbalances' and low interest rates. *American Economic Review* 98 (1), 358–393.
- Caballero, R., Farhi, E., Gourinchas, P.-O., 2008b. Financial crash, commodity prices, and global imbalances. *Brookings Papers on Economic Activity* (2), 1–68.
- Chinn, M., 2005. Getting Serious About the Twin Deficits. Council on Foreign Relations, New York Council Special Report No. 10.
- Chinn, M., Eichengreen, B., Ito, H., 2010. Rebalancing Global Growth. Paper prepared for the World Bank's Re-Growing Growth Project.
- Chinn, M., Frieden, J., 2011. *Lost Decades: The Making of America's Debt Crisis and the Long Recovery*. W.W. Norton, New York.
- Chinn, M., Ito, H., 2006. What matters for financial development? Capital controls, institutions, and interactions. *Journal of Development Economics* 82, 163–192.
- Chinn, M., Ito, H., 2007. Current account balances, financial development and institutions: assaying the world 'savings glut'. *Journal of International Money and Finance* 26 (4), 546–569.
- Chinn, M., Ito, H., 2008. Global current account imbalances: American fiscal policy versus East Asian savings. *Review of International Economics* 16 (3), 479–498.
- Chinn, M., Lee, J., 2006. Current account and real exchange rate dynamics in the G-7 countries. *Journal of International Money and Finance* 25 (March), 257–274.
- Chinn, M., Lee, J., 2009. Three current account balances: a 'semi-structuralist' interpretation. *Japan and the World Economy* 21, 202–212.
- Chinn, M., Prasad, E., 2003. Medium-term determinants of current accounts in industrial and developing countries: an empirical exploration. *Journal of International Economics* 59 (1), 47–76.
- Chinn, M., Wei, S.-J., forthcoming. A faith-based Initiative meets the evidence: does a flexible exchange rate regime really facilitate current account adjustment? *Review of Economics and Statistics*.
- Choi, H., Mark, N.C., Sul, D., 2008. Endogenous discounting, the world saving glut and the U.S. current account. *Journal of International Economics* 75 (1), 30–53.
- Clarida, R., 2005a. Japan, China, and the U.S. current account deficit. *CATO Journal* 25 (1).
- Clarida, R., 2005b. Some thoughts on 'the sustainability and adjustment of global current account imbalances.' Speech given at the Council on Foreign Relations (28 March).
- Corsetti, G., Müller, G.J., 2006. Twin deficits: squaring theory, evidence and common sense. *Economic Policy* 21 (48), 597–638.
- Council of Economic Advisers, 2007. *Economic Report of the President, 2007*. U.S. GPO, Washington, DC.
- Council of Economic Advisers, 2009. *Economic Report of the President, 2009*. U.S. GPO, Washington, DC.
- Dooley, M., Folkerts-Landau, D., Garber, P., 2003. An Essay on the Revived Bretton Woods System. NBER Working Paper No. 9971.
- Dooley, M., Folkerts-Landau, D., Garber, P., 2008. Direct investment, rising real wages, and the absorption of excess labor in the periphery. In: Clarida, R. (Ed.), *G-7 Current Account Imbalances: Sustainability and Adjustment*. University of Chicago Press for NBER, Chicago.
- Dooley, M., Frankel, J., Mathieson, D., 1987. International capital mobility in developing countries vs. industrialized countries: what do saving–investment correlations tell us? *IMF Staff Papers* 34 (3), 503–530.

- Engel, C., Rogers, J.H., 2009. Expected consumption growth from cross-country surveys: implications for assessing international capital markets. *IMF Staff Papers* 56, 543–573.
- Erceg, C.J., Guerrieri, L., Gust, C., 2006. SIGMA: a new open economy model for policy analysis. *International Journal of Central Banking* 2 (1), 1–50.
- Faruqee, H., Lee, J., 2009. Global dispersion of current accounts: is the universe expanding? *IMF Staff Papers* 56 (3), 573–595.
- Feldstein, M., Horioka, C., 1980. Domestic saving and international capital flows. *The Economic Journal* 90, 314–329.
- Gagnon, J., 2010. Current Account Imbalances Coming Back. Peterson Institute for International Economics, Washington, DC. Working Paper No. 11-1.
- Greenspan, 2005. Current account. Presentation at Advancing Enterprise 2005 Conference, London, 4 February.
- Gruber, J., Kamin, S., 2007. Explaining the global pattern of current account imbalances. *Journal of International Money and Finance* 26, 500–522.
- Gruber, J., Kamin, S., 2009. Do differences in financial development explain the global pattern of current account imbalances? *Review of International Economics* 17, 667–688.
- Ito, H., Chinn, M., 2009. East Asia and global imbalances: saving, investment, and financial development. In: Ito, T., Rose, A. (Eds.), *Financial Sector Development in the Pacific Rim*. University of Chicago Press for NBER, Chicago, pp. 117–150.
- Jeanne, O., Ranciere, R., 2006. The Optimal Level of International Reserves for Emerging Market Economies: Formulas and Applications. IMF, Washington, DC IMF Working Paper WP/06/229.
- Johnson, S., Kwak, J., 2010. *13 Bankers: The Wall Street Takeover and the Next Financial Meltdown*. Pantheon, New York.
- Lane, P., Milesi-Ferretti, G.-M., 2006. The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970–2004. IMF, Washington, DC IMF Working Paper WP/06/69.
- Mendoza, E.G., Quadrini, V., Ríos-Rull, J.-V., 2009. Financial integration, financial deepness and global imbalances. *Journal of Political Economy* 117 (3), 317–416.
- Nason, J.M., Rogers, J.H., 2006. The present value model of the current account has been rejected: round up the usual suspects. *Journal of International Economics* 68, 159–187.
- Obstfeld, M., Rogoff, K., 1996. *Foundations of International Macroeconomics*. MIT Press, Cambridge.
- Obstfeld, M., Rogoff, K., 2009. Global imbalances and the financial crisis: products of common causes. Paper presented at Federal Reserve Bank of San Francisco Asia Economic Policy Conference, October 18–20, Santa Barbara, CA.
- Pakko, M.R., 1999. The U.S. trade deficit and the ‘new economy’. *Federal Reserve Bank of St. Louis Review* 81 (5), 11–20.
- Prasad, E., Wei, S.-J., 2005. The Chinese Approach to Capital Inflows: Patterns and Possible Explanations. IMF Working Paper No. 05/79.
- Roubini, N., Mihm, S., 2010. *Crisis Economics: A Crash Course in the Future of Finance*. The Penguin Press, New York.
- Sheffrin, S., Woo, W.T., 1990a. Present value tests of an intertemporal model of the current account. *Journal of International Economics* 29, 237–253.
- Sheffrin, S., Woo, W.T., 1990b. Testing an optimizing model of the current account via the consumption function. *Journal of International Money and Finance* 9, 220–233.
- Sinn, S., 1990. Net external asset positions of 145 countries. *Kieler Studien* 234. Kiel University, Kiel.
- Stiglitz, J.E., 2010. *Freefall: America, Free Markets, and the Sinking of the World Economy*. W.W. Norton, New York.
- Truman, E., 2005. Budget and external deficits: not twins but the same family. Paper presented at the Symposium on the ‘Revived Bretton Woods System: A New Paradigm for Asian Development?’ Federal Reserve Bank of San Francisco.