

Rhyme or Reason: What Explains the Easy Financing of the U.S. Current Account Deficit?

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This paper examines the roles of U.S. financial innovation, financial globalization, and the savings glut hypothesis in explaining the rise in U.S. external debt, first in a portfolio balance model, and then empirically. Perhaps surprisingly, financial deepening and falling home bias in industrialized countries explain a large share of external financing. The savings glut hypothesis (including difficult-to-track petrodollar recycling) and U.S. financial innovation also play a role, in part as a cause of declining home bias in industrialized countries. The latter underscores the importance of not looking at these factors in isolation, but rather as a constellation of forces that can be self-reinforcing. [JEL F32, F34, G11, G12, G15]

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Notwithstanding the shrinking of the U.S. current account deficit in 2007–08, global imbalances remain one of the most striking trends in the international economy. The substantial rise in the U.S. current account deficit as a ratio to GDP over the last decade, counterbalanced by surpluses in Asia and, more recently, oil exporters, has been the focus of significant concern and controversy. For example, global imbalances have been seen as a

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key risk in the International Monetary Fund's commentary on the global economy in its *World Economic Outlook* since at least the late 1990s.

On the one hand, many macroeconomic analysts have pointed out that an extremely large exchange rate adjustment would be needed to slow or stabilize U.S. international debt (Obstfeld and Rogoff, 2005; Krugman, 2006). Markets could also rapidly reassess the need for a "risk premium" to compensate for this depreciation, suggesting a risk of a rapid and disruptive correction in global financial markets and growth.

On the other hand, the seeming ease with which the current account deficit has been funded has led others to hypothesize that the deficit reflects the underlying strengths of the U.S. economy, in terms of productivity and financial market structure. In this view, financial instruments are correctly priced, and risks of a disorderly adjustment are limited. Indeed, rising U.S. net borrowing has occurred despite market forecasts of dollar depreciation that imply a negative risk premium on the dollar (Balakrishnan and Tulin, 2006). Supporting this, Kamin, Reeve, and Sheets (2007) find that the results of large trade balance adjustments in the United States and other industrialized countries have generally been benign.

Some have suggested that the strength of the U.S. economy is a key factor. For example, a higher level of productivity growth may have made U.S. assets more attractive (Caballero, Farhi, and Gourinchas, 2006).¹ However, the fact that the rise in U.S. indebtedness has been almost exclusively financed through fixed-income instruments as opposed to equity, and that equity valuations (as measured by price-earnings ratios) are modest, suggests that other explanations are needed (Figures 1 and 2). In particular, bonds usually have a fixed nominal interest rate, and so relative growth prospects should not affect their demand significantly.

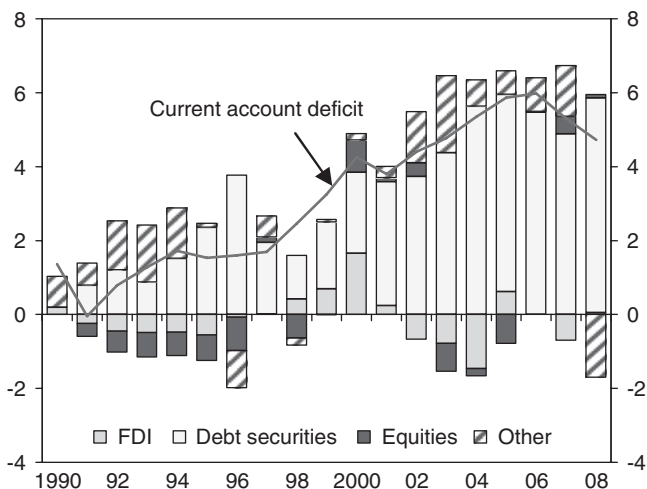
Indeed, the real question is why greater net U.S. borrowing has not put upward pressure on U.S. bond rates and spreads. Various explanations have been offered. The first is that demand and supply conditions in global bond markets have lowered borrowing costs. For example, increased saving from rapidly growing emerging markets that has not been matched by additional creation of liquid financial instruments has created a "global savings glut."²

This could be possibly allied with a preference for Asian countries to maintain competitiveness in goods markets. Indeed, Dooley, Folkerts-Landau, and Garber (2003) argue that the economic emergence of a fixed exchange rate periphery in Asia has reestablished the United States as the center country in a Bretton Woods style international monetary system. This periphery has a development strategy of export-led growth supported by

¹Some have also expressed these underlying strengths in terms of the existence of "dark matter" that supports the U.S. income position (Hausmann and Sturzenegger, 2006).

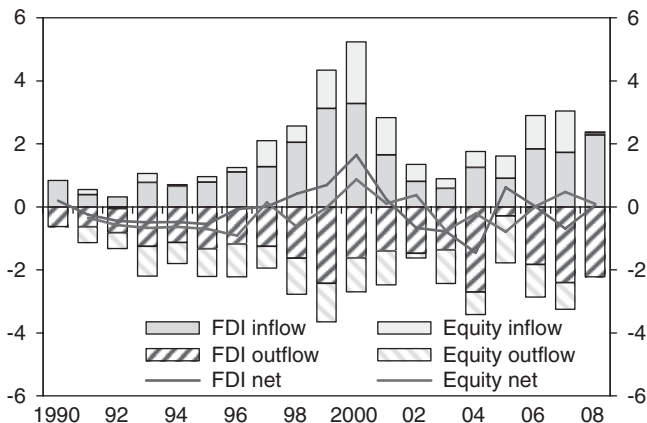
²Bernanke (2005) discusses the global saving glut.

Figure 1. Financing of the Current Account Deficit
(Percent of GDP)



Sources: Haver Analytics; Flow of Funds Accounts; and Treasury International Capital System.

Figure 2. Equity and Foreign Direct Investment Financing of the Current Account Deficit
(Percent of GDP)



Sources: Haver Analytics; Flow of Funds Accounts; and Treasury International Capital System.

undervalued exchange rates, capital controls, and official capital outflows in the form of accumulation of reserve asset claims on the United States.

Other potential factors include limited business investment and regulatory changes that have increased demand for fixed-income instruments (IMF, 2006a and 2006b). Alternatively, at a time of rapid financial globalization and declining home bias, the depth of U.S. financial

markets and reserve currency role of the dollar may have favored dollar instruments. Finally, the potential role of innovative U.S. financial markets can not be ignored, both its positive impacts until the financial crisis which started in 2007 and that led to U.S. securitized asset markets becoming frozen, and its likely negative effect subsequently.³

This paper provides a framework for evaluating these explanations. First, it sketches a simple international capital asset pricing model (ICAPM) of portfolio balance that illustrates the likely impact of these explanations on government bond yields/corporate spreads as well as the global allocation of U.S. and foreign bonds. Particular emphasis is put on the potential role of U.S. financial innovation—in the form of new instruments with different risk characteristics—in explaining the relative attractiveness of U.S. bonds for international investors. Second, the paper constructs a comprehensive global data set on bond yields, capital flows, overall foreign asset and liability positions, and size of bond markets from a variety of sources. Using this data set, the paper then studies a variety of bonds yields across industrialized countries to see if they are consistent with any of the channels traced out in the portfolio balance model. The paper also looks at asset allocation, using an extension of the ICAPM model to decompose the deterioration in the U.S. net foreign asset (NFA) position. Finally, using these results as background, the paper discusses the likely impact of the financial crisis of 2007–08 on the outlook for U.S. current account financing.

I. Portfolio Balance

This section sketches a highly stylized ICAPM model of portfolio balance which allows us to examine the impact of the global savings glut, declining home bias, and financial innovation. As shall be seen in Section III, it is very difficult to take such a model to the data. Indeed, we will have to extend the model to construct a decomposition that specifically allows us to quantify the impact of the aforementioned factors on the U.S. NFA position. That said, the purpose of the model is to illustrate the likely impact of the different explanations on government bond yields/corporate spreads and the allocation of U.S. and foreign bonds *in all regions*.⁴

The Basic Model

Consider a model in which bond yields are characterized by a market-determined promised return (r) and risks factors (ε) which (for simplicity) are assumed to be normally distributed and uncorrelated. More concretely, let us assume there are two types of bonds—a government security that has a “country-specific” risk factor and a corporate bond that also includes a

³Evidence that U.S. markets are innovating faster than competitors is provided in IMF (2006c).

⁴Further details of the model are provided in Appendix I of the differently titled working paper version of this paper (Balakrishnan, Bayoumi, and Tulin, 2007).

“corporate” risk factor—and two countries—labeled the U.S. and EA (for the euro area). Hence, there are four bonds: U.S. government, euro area government, U.S. corporate, and euro area corporate. In addition to “country-specific” U.S. and euro area shocks, we assume a single corporate shock common to both areas. Although this is clearly a simplification, and adding factors that represent U.S.- and euro area-specific corporate shocks might be more realistic, this adds complications without changing the underlying conclusions from the model.

The yields on the four instruments are thus:

$$\begin{aligned} r_G^{US} &= f(r, \varepsilon_{US}), \\ r_C^{US} &= f(r, \varepsilon_{US}, \varepsilon_C), \\ r_G^{EA} &= f(r, \varepsilon_{EA}), \\ r_C^{EA} &= f(r, \varepsilon_{EA}, \varepsilon_C), \end{aligned} \tag{1}$$

where r is the risk-free real rate, r with superscripts/subscripts G , C , US , and EA refer to yields on government, corporate, United States, and euro area bonds, and ε_{US} , ε_{EA} , and ε_C refer to the risk factors associated with U.S., euro area, and corporate assets, respectively.

There are two identical investors—in the United States and the euro area—with unlimited access to capital at the risk-free real rate (assumed to be zero) and identical mean-variance preferences:

$$U = \mu - \sigma^2/2. \tag{2}$$

Assuming outstanding balances for each instrument (using obvious notation) of $2\alpha_G^{US}$, $2\alpha_G^{EA}$, $2\alpha_C^{EA}$, and $2\alpha_C^{US}$, and observing that because investors are identical they each hold half of the market, the investor’s problem is to maximize utility by selecting optimal amounts of each instrument:

$$\begin{aligned} &Max \alpha_G^{US} r_G^{US} + \alpha_G^{EA} r_G^{EA} + \alpha_C^{US} r_C^{US} + \alpha_C^{EA} r_C^{EA} \\ &- ((\alpha_G^{US} + \alpha_C^{US})^2 \sigma_{US}^2 - (\alpha_G^{EA} + \alpha_C^{EA})^2 \sigma_{EA}^2 \\ &- (\alpha_C^{US} + \alpha_C^{EA})^2 \sigma_C^2)/2. \end{aligned} \tag{3}$$

The resulting yields on government bonds and the spread on corporate loans from this maximization problem are:

$$\begin{aligned} r_G^{US} &= (\alpha_G^{US} + \alpha_C^{US}) \sigma_{US}^2, \\ r_G^{EA} &= (\alpha_G^{EA} + \alpha_C^{EA}) \sigma_{EA}^2, \\ r_C^{US} - r_G^{US} &= r_C^{EA} - r_G^{EA} = (\alpha_C^{US} + \alpha_C^{EA}) \sigma_C^2. \end{aligned} \tag{4}$$

Yields on government bonds depend on borrowing by that country in the market and the underlying uncertainty associated with that country, but the spread on corporate bonds depends on the size of overall corporate borrowing and associated risks.

As investors hold identical portfolios, U.S. net international debt is:

$$Net\ Debt = 2((\alpha_G^{US} + \alpha_C^{US}) - (\alpha_G^{EA} + \alpha_C^{EA})). \quad (5)$$

Additional international borrowing involves either more borrowing by the U.S. government or corporates. Such an increase in U.S. borrowing raises interest costs for U.S. and (possibly) foreign corporate borrowers. For example, if the U.S. government borrows an additional δ_G^{US} , this will raise the required yield on U.S. government/corporate bonds by $\delta_G^{US} \sigma_{US}^2$. If the additional borrowing comes from the U.S. private sector, there is also a rise in spreads on both U.S. and euro area corporate spreads of $\delta_C^{US} \sigma_C^2$. Hence, higher U.S. international debt comes at the price of higher borrowing costs.

To summarize, we have the following relationships for U.S. borrowing on spreads and net debt:

$$\begin{aligned} \Delta r_G^{US} &= (\delta_G^{US} + \delta_C^{US}) \sigma_{US}^2, \\ \Delta(r_C^{US} - r_G^{US}) &= \delta_C^{US} \sigma_C^2, \\ \Delta US\ net\ debt &= 2(\delta_G^{US} + \delta_C^{US}). \end{aligned} \quad (6)$$

Rising Financial Globalization and Declining Home Bias

One type of explanation for why higher U.S. international debt has not led to higher borrowing costs is that it has been accompanied by a generalized erosion in home bias, which has naturally increased the indebtedness of countries that were initial debtors. In our framework, this can be modeled as a reduction in the disutility of foreign borrowing. This reduction in disutility lowers costs to borrowers while expanding the proportion of assets held by foreigners, thereby increasing net borrowing and net lending (see Balakrishnan, Bayoumi, and Tulin, 2007, Appendix I).

Global Savings Glut

A global savings glut can be modeled in this framework by assuming that a new investor is added to the model but the supply of securities remains the same. Reverting to the baseline model, if the new “emerging Asia” investor is identical to the other two, then the portfolios of the other two investors each shrink by one-third to accommodate the new region. As a result, all interest rates and spreads are also lowered by one-third. Furthermore, net foreign borrowing by the United States rises by one-half as the emerging Asia investor now holds one-third of the global portfolio of securities.

The analysis can be made more interesting and realistic by assuming that the emerging Asia investor is more concerned about corporate risks (that is, is more risk averse) and about euro area risks than its U.S. and euro area counterparts—implying a preference for U.S. government instruments, possibly reflecting intervention to stabilize the dollar exchange rate. In this

case, it is easy to show that—compared with the case of adding an identical investor—the addition of this emerging Asia investor reduces U.S. government bond yields by the same amount, but puts less downward pressure on yields on the other three bonds. Reflecting these investor preferences, there is a larger rise in U.S. net international debt than in euro area net debt (see Balakrishnan, Bayoumi, and Tulin, 2007, Appendix I).

Some analysts have also posited that the downward pressure on yields has come less from a global saving glut than from a dearth of global investment opportunities. In this model, such a situation can be modeled as a reduction in issuance of debt by the United States and the euro area. For this to raise U.S. net international borrowing, the fall must be larger in the euro area than in the United States, implying greater downward pressure on euro area than U.S. borrowing costs.

Financial Innovation

Innovation Through New Products

Now consider a situation in which the U.S. private sector starts issuing a new bond which is linked to household risk (H) rather than its corporate counterpart (C), and these risks (ε_C and ε_H) are assumed uncorrelated. The new bond has the following yield:

$$r_H^{US} = f(r, \varepsilon_{US}, \varepsilon_H).$$

The equations for the rates of return are now:

$$r_G^{US} = (\alpha_G^{US} + \alpha_C^{US} + \alpha_H^{US})\sigma_{US}^2$$

$$r_G^{EA} = (\alpha_G^{EA} + \alpha_C^{EA})\sigma_{EA}^2$$

$$r_C^{US} - r_G^{US} = r_C^{EA} - r_G^{EA} = (\alpha_C^{US} + \alpha_C^{EA})\sigma_C^2$$

$$r_H^{US} - r_G^{US} = \alpha_H^{US}\sigma_H^2. \tag{7}$$

As investors continue to hold identical portfolios, higher U.S. borrowing will raise U.S. net debt. The difference in this case is that while this additional borrowing raises the return on government bonds as in the base case, diversification into new products unambiguously reduces upward pressures on private spreads, and can even lower the cost of private sector borrowing, particularly for the United States.

To see this, compare the impact of issuing an additional δ_C^{US} of “traditional” corporate bonds discussed above with the impact of borrowing the same amount of “new” household bonds on spreads. If the money is borrowed using the “new” instruments, there is now no upward pressure on global corporate bond spreads. Indeed, as the household bond is scarce and hence in high demand its spread remains lower than that for corporates under the not very stringent condition that α_H^{US} is less than $(\alpha_C^{US} + \alpha_C^{EA})\sigma_C^2/\sigma_H^2$. Hence, the average spread on U.S. private sector borrowing falls as

long as the additional borrowing in household bonds is lower than the risk-adjusted aggregate size of the corporate bond market. Moreover, to the extent that additional issuance in the new H market partly substitutes for borrowing in the C market—and hence the aggregate amount of U.S. corporate borrowing (α_C^{US}) is reduced—these “new” instruments will lead to a fall in global corporate spreads.

In addition to the reduction in the level of spreads as a result of introducing the new bond, it can also be easily shown that additional borrowing now puts less upward pressure on spreads than in the case when there are only corporate bonds (this assumes that the additional borrowing comes in part from both types of bonds). Although the formulas get increasingly cumbersome, it is clear that under some conditions this model of financial innovation implies a fall in the cost of borrowing in the United States and elsewhere even if the United States increases its overall issuance of bonds and hence incurs higher net debt. Many argue, however, that financial innovation, rather than leading to a new product that creates new risks, leads to a new product that splits existing risks. It can be easily shown that this does not matter, as increased lending with limited impact on borrowing costs generalizes to the case of financial innovation splitting risk.

Autonomous Rise in Demand for U.S. Assets

Financial innovation could also cause an autonomous rise in demand for U.S. assets. In our two country model, this shows up as a decline in home bias (see Balakrishnan, Bayoumi, and Tulin, 2007, Appendix I). In a multicountry model, however, it could also show up as an autonomous rise in portfolio demand. In particular, foreign investors could divert more of the capital they allocate to investments abroad to the United States, without a decline in home bias.

In sum, even in the face of an increase in U.S. borrowing and some increase in rates on government bonds, U.S. financial innovation can lead to lower overall borrowing costs through lower spreads on private borrowing, particularly in the United States.

Table 1 summarizes the impact of different factors, using the portfolio balance model, on borrowing costs and the allocation of bonds.

II. Impact on Borrowing Costs

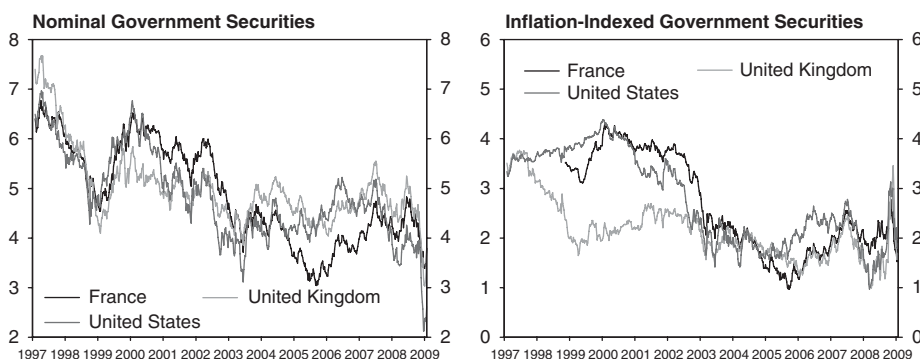
Analyzing yields across assets and countries to discriminate between the different explanations documented in Table 1 is a formidable task given the many factors that affect interest rates, and the difficulty of getting comparable yield data across countries—particularly with respect to corporate bonds. Nonetheless, Figures 3 and 4 make such an attempt, plotting yields/spreads for a variety of industrialized country government bonds, as well as investment grade and speculative grade corporate bonds for the United States and euro area.

Table 1. Impact of Different Explanations of Current Account Financing on Yields and Asset Allocation

Change in Financial Structure	Impact on Borrowing Costs	Impact on Asset Allocation
None		
U.S. issues more traditional government and private sector bonds.	Upward pressure on U.S. government bond yields and on private sector spreads.	Rise in U.S. debt being held by other industrialized countries.
Rising globalization		
Financial innovation lowers home bias across industrialized countries.	Some downward pressure on all borrowing costs and spreads, and less upward pressure from additional private sector borrowing.	Rise in proportion of industrialized country assets held by other industrialized countries.
Autonomous rise in demand for U.S. assets		
The rest of the world increases its demand for U.S. securities (could be caused by financial innovation).	U.S. yields fall while those on foreign securities do not, and less upward pressure on U.S. government yields from additional U.S. borrowing.	U.S. bonds become a larger part of foreign portfolios with no equivalent change in U.S. portfolios. Could result in a fall in home bias of foreign investors or simply a reallocation of their existing foreign asset portfolios.
Savings glut		
Financial innovation, rapid economic growth, and reserve build-ups widen the amount of industrialized country assets held by emerging markets.	Downward pressure on all borrowing yields and spreads, particularly U.S. government bonds, and less upward pressure from additional borrowing.	Expansion in proportion of U.S. and other industrialized country assets held by emerging markets.
Financial innovation		
United States issues a large amount of financial instruments that split/reconfigure risk.	Some upward pressure on U.S. government bond yields. A possible fall in private sector spreads, and less upward pressure from additional private sector borrowing.	Rise in U.S. bonds held by other industrialized countries, with much of the increase in new instruments, and potentially, a fall in industrialized country home bias.

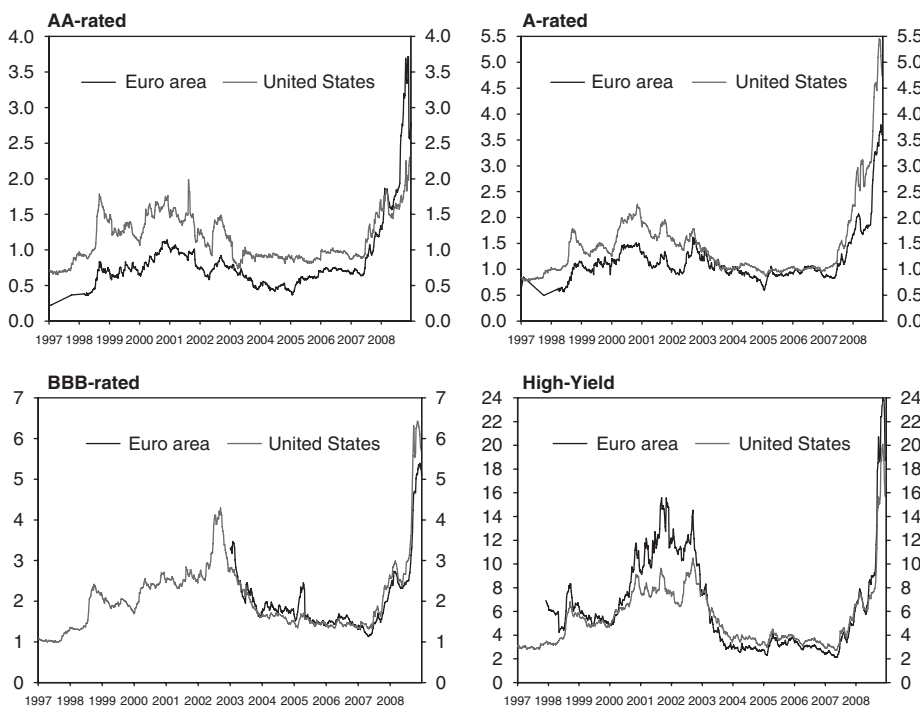
In general, low long-term government bond yields have been common to many industrialized countries. On the corporate side, spreads fell in both the United States and euro area until mid-2007, since when they have widened considerably. Until mid-2007, investment grade corporate spreads tightened a little more in the United States than in the euro area, with the reverse true

Figure 3. Selected Yields on Long-Term Government Securities (*In percent*)



Source: Bloomberg L.P.

Figure 4. Selected Nonfinancial Long-Term Corporate Credit Spreads (*In percent*)



Source: Bloomberg L.P.

for speculative grade corporate spreads. Overall, although such trends give a mixed picture—and could reflect other factors such as declining macroeconomic and financial volatility—the general pre-crisis decline in yields appears to be consistent with the savings glut and financial globalization hypotheses.

III. Impact on Asset Allocation: Considerations in Decomposing the Rise in U.S. External Debt

In this section, we set out a framework to analyze asset allocation and determine which explanations in Table 1 are consistent with recent trends. There are, of course, limits to what analysis can be done on asset allocation. As alluded to earlier, it is very difficult to take the ICAPM portfolio balance model sketched in Section I to the data. That model suggests different global asset allocations for the savings glut, declining home bias in industrialized countries, and financial innovation. But existing data sets do not allow one to track the proportion of industrialized country assets held by other industrialized countries or emerging markets for a reasonable time span.⁵

Detailed data on country-level U.S. assets and liabilities flows, however, are available from the Treasury international capital (TIC) system, which records monthly transactions involving U.S. residents and foreigners, mainly reported by brokers and dealers. We use such data to decompose the deterioration of the U.S. NFA position by extending the ICAPM model sketched in Section I. Given that most of the external financing has been through the bond market, as noted at the beginning of this paper, we concentrate on the NFA position of the United States with respect to bonds. We make one important correction to the gross bond flows into the United States for principal repayments on asset-backed securities (ABS). The monthly TIC system does not track such payments. Since 2002, however, the TIC website has started publishing data on repayment flows associated with foreign holdings of ABSs, which have grown substantially in recent years.⁶

We focus on flows between the United States and four major zones, industrialized countries, emerging market countries (including some large oil exporters), Middle Eastern oil-exporting nations, and Caribbean offshore centers.⁷ We group the countries as such because we want to discriminate between industrialized country financial globalization and the savings glut hypothesis—the latter which we view as manifested in flows of the “new players” or emerging market countries.⁸ We consider Middle Eastern

⁵Coordinated Portfolio Investment Surveys conducted annually under the auspices of the IMF do have some bilateral data of industrialized country holdings in other industrialized countries. For many countries, however, the surveys are not particularly comprehensive, and generally only start in 2001.

⁶Principal repayments on asset-backed corporate and agency bonds are taken out in proportion to their regional holdings, with the latter taken from estimates published in the annual TIC surveys of U.S. liabilities.

⁷See Appendix I for the countries that make up the emerging market countries, Caribbean offshore centers, Middle Eastern oil-exporting nations, and industrialized countries.

⁸As Bernanke (2005) notes, while population aging in other industrialized countries could also lead to a savings glut, the fact that their aggregate current account surplus has improved only marginally over the last decade suggests that other developments have been more important.

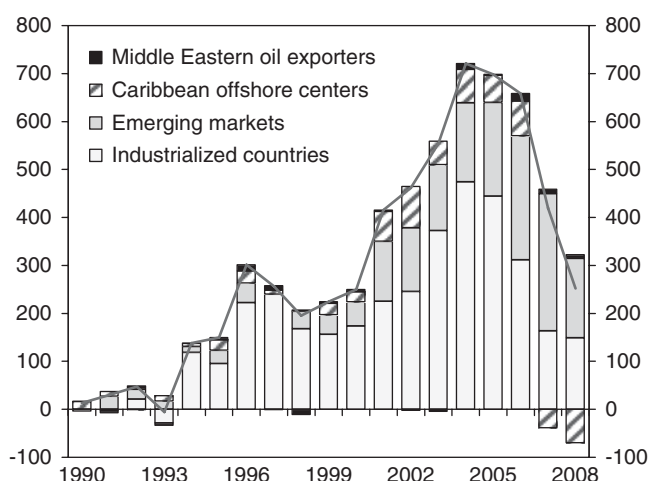
oil-exporting nations separately as many analysts have argued that their capital flows are substantial but particularly difficult to track given the lack of information of some of the large sovereign wealth funds in this zone. Caribbean offshore centers are also considered separately, as it has been argued that they act as an important conduit for financing flows to and from the United States.

The sample includes 2007–08, allowing us to see the initial impact of the financial crisis that started in mid-2007. The crisis initially only encompassed the subprime segment of the mortgage market, but soon spread, causing many U.S. securitized markets to freeze up and interbank markets to become impaired. In many ways, this episode provides a great natural experiment into how a loss of confidence in sophisticated financial assets impacts U.S. current account financing, something we will discuss in more detail in Section V.

Regional Picture

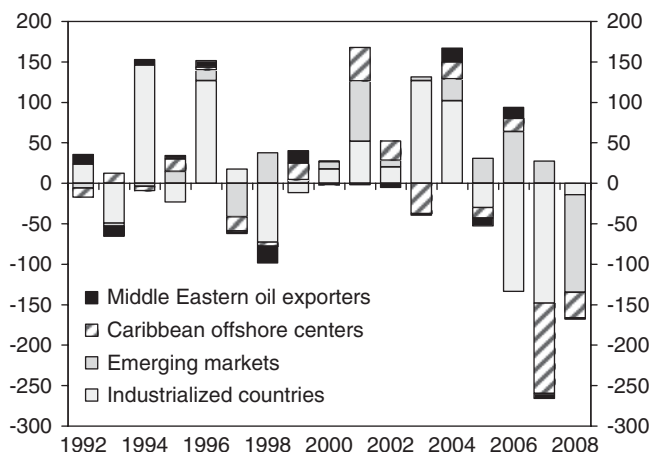
Figure 5 shows that while net flows from emerging markets to the United States have increased in recent years (constituting around 40 percent of total net flows in the last five years), the bulk of the financing has come from the industrialized countries during the last decade (about 55 percent). Middle Eastern oil exporter flows are surprisingly low and Caribbean offshore centers do not appear to be a major source of financing. Looking at which regions have contributed to bond financing at the margin paints a more nuanced picture (Figure 6). In particular, during 2005–07, increased financing from emerging markets partially offset reduced funding from industrialized

Figure 5. Regional Composition of Net Bond Flows into the United States
(In billions of U.S. dollars)



Source: Treasury International Capital System.

Figure 6. Regional Composition of Marginal Bond Financing of U.S. Current Account Deficit (In billions of U.S. dollars)



Source: Treasury International Capital System.

Table 2. Global Current Account Balances (In billions of U.S. dollars)

	1995	2000	2002	2006	2007	2008
United States	-114	-417	-461	-788	-731	-673
Euro area	42	-34	50	38	29	-81
Japan	111	120	113	170	211	156
Other industrialized countries	-1	34	34	51	21	92
Emerging Asia excluding China	-34	58	83	125	152	84
China	2	21	35	253	372	440
Middle Eastern oil exporters	0	62	29	238	246	332
Other major emerging markets	-36	-22	5	69	0	-25

Note: See Table A1 for the list of countries included in the aggregated categories.
Source: IMF, *World Economic Outlook*.

countries, although in 2008 financing from emerging markets also fell. The impact of the financial crisis appears significant—net bond flows fell by nearly 60 percent from 2006 to 2008.

At first glance, the relative importance of industrialized country flows compared with those of emerging market and Middle Eastern oil exporter flows sits oddly with the fact that most of the deterioration in the U.S. current account position is mirrored by an improvement in the current account position of emerging market countries and Middle Eastern oil exporters (Table 2). Explaining this apparent dichotomy is key to the whole analysis of current account financing, and we will analyze it in detail in

Section IV. Likely explanations include financial center biases in the TIC data and the importance of indirect financing of the U.S. current account deficit.

Portfolio Balance between U.S. and Foreign Investors

Given the evidence in Figures 5 and 6 that industrialized country and emerging market flows are the biggest source of financing, we focus on decomposing these flows further. We build on the approach outlined in Section I, emphasizing the ICAPM aspect (see also Bertaut and Grier, 2004). This implies that in equilibrium, each investor will hold exactly the same portfolio, which resembles the structure of the world market. Consequently, the allocation of the foreign assets should mirror the market structure of the rest of the world. In this subsection, we sketch a decomposition to demonstrate the main effects for industrialized countries. The same decomposition holds for emerging market countries, but, of course, most of the superscripts and subscripts change. For a full derivation for industrialized countries, see Appendix III of Balakrishnan, Bayoumi, and Tulin (2007).

Defining a as the size of U.S. bond markets, a^{ic} as the size of other industrialized country bond markets, a^{em} as the size of emerging market country bond markets, fa^{ic} as total foreign bond assets of other industrialized countries, fli as total foreign bond liabilities of other industrialized countries, and fli as industrialized country assets in the United States, if industrialized country investors place assets in the United States in accordance with the U.S. share in a “borderless” global bond portfolio:

$$fli = \frac{a}{a + a^{ic} + a^{em}} fa^{ic}. \quad (8)$$

Totally differentiating equation (8):

$$\begin{aligned} \Delta fli = & \frac{a}{a + a^{ic} + a^{em}} fa^{ic} \left(\frac{\Delta a}{a} - \frac{\Delta(a + a^{ic} + a^{em})}{a + a^{ic} + a^{em}} \right) \\ & + \frac{a}{a + a^{ic} + a^{em}} fa^{ic} \frac{\Delta fa^{ic}}{fa^{ic}}. \end{aligned} \quad (9)$$

We call the first term in equation (9) *the U.S. market effect*, as it shows that even with industrialized country foreign assets staying constant, if U.S. financial markets are growing quicker than global markets, there should be a rebalancing within a representative industrialized country investor’s international portfolio, causing a flow into U.S. bonds.⁹ The second term shows that if industrialized country foreign assets expand, then there should

⁹This can be further decomposed into a larger market effect for U.S. private and government bonds, and a compositional effect allowing for a switch between government and private bonds (see Balakrishnan, Bayoumi, and Tulin, 2007, Appendix III).

be a flow into U.S. bonds which is equal to the product of the share of U.S. bond markets in global markets and the increase in industrialized country foreign assets.

To get further insights, we decompose the second term of equation (9) using the concept of home bias. It is well documented that investors strongly favor their domestic markets, or, display home bias. To consider the impact of this, we follow Swiston (2005) and use a measure of home bias that accounts for the size of the domestic financial market relative to the rest of the world:¹⁰

$$\text{Home Bias} = \frac{A^*}{A} \bigg/ \frac{W - D}{W}, \quad (10)$$

where A^* represents domestic holdings of foreign assets, A is domestic holdings of all assets, D is the size of the domestic market, and W is the size of the world financial market. The numerator measures the actual share of foreign assets in the portfolio, but the denominator measures what this ratio would be in a fully diversified world according to an ICAPM. A value of zero indicates no holdings of foreign assets, but a value of one indicates that the country's portfolio is perfectly diversified from a geographic perspective. This implies that U.S. investors would be expected to hold a lower share of foreign assets and a higher share of domestic assets, reflecting the country's greater weight in the global financial universe.

We can rewrite equation (10) to give:

$$A^* = \left(A \frac{W - D}{W} \right) HB, \quad (11)$$

where HB is home bias.

Totally differentiating equation (11):

$$\Delta A^* = A^* \left(\frac{\Delta HB}{HB} + \frac{\Delta A}{A} + \frac{\Delta(W - D)}{W - D} - \frac{\Delta W}{W} \right). \quad (12)$$

The first term of equation (12) represents the increase in foreign assets because of a decline in home bias ($\Delta HB > 0$). The next three terms show notwithstanding constant home bias, because of increasing total assets—which we call *financial deepening*—or a decrease in the size of the domestic markets relative to world financial markets, a rebalancing of portfolios leads to higher demand for foreign assets.

¹⁰This is sometimes referred to as the foreign asset acceptance ratio (FAAR).

If we insert equation (12) into equation (9), we have a predicted value for industrialized country gross flows, which is a function of three effects:

$$\begin{aligned} \Delta f\hat{li} = & (\text{U.S. large market effect}) \\ & + (\text{declining home bias effect}) \\ & + (\text{financial deepening effect}). \end{aligned} \tag{13}$$

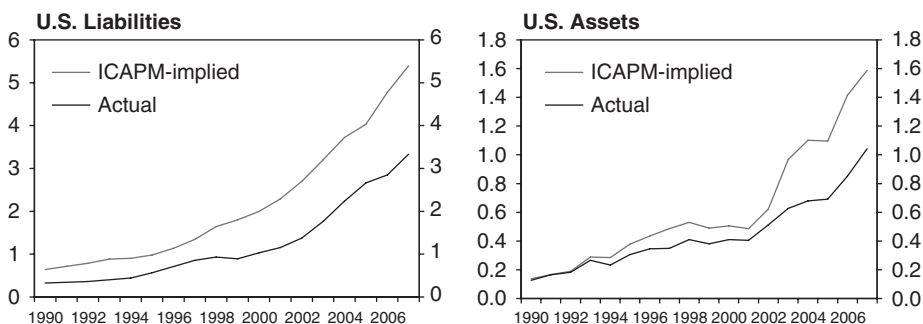
As noted earlier, Appendix II of Balakrishnan, Bayoumi, and Tulin (2007) has the full derivation of this decomposition and we will discuss in more detail each effect in Section IV. In this framework, interest rates will be endogenously determined given the shifts in bond market size, home bias, and financial deepening.

We make one final adjustment to equation (13) to take into account that actual stocks differ from the ICAPM benchmarks. In equation (13), the predicted value for inflows is essentially a function of changes in market size, home bias, and total assets; and a weighting factor—the ICAPM benchmarks. As Figure 7 shows, however, according to this criteria, foreign investors have been persistently underweight in U.S. assets (and U.S. investors have been persistently underweight in industrialized country assets). This suggests that we may be overestimating the impact of changes in market size, home bias, and total assets on financing. To adjust for this, we add a term called the stock adjustment effect, which is:

$$stock_{adj} = \left(fli - \frac{a}{a + a^{ic} + a^{em}} f a^{ic} \right) \frac{\Delta f a^{ic}}{f a^{ic}}. \tag{14}$$

Thus, as industrialized country investors have been persistently underweight in U.S. assets, the sign of this adjustment is generally

Figure 7. ICAPM-Implied and Actual Bond Holdings of United States vis-à-vis Industrialized Countries (In trillions of U.S. dollars)



Source: IMF staff estimates.

Note: ICAPM = international capital asset pricing model.

negative, reducing the magnitude of the flows predicted by the model:

$$\begin{aligned} \Delta f\hat{l}i_{adj} = & (\text{U.S. market effect}) \\ & + (\text{declining home bias effect}) \\ & + (\text{financial deepening effect}) + stock_{adj} \end{aligned} \tag{15}$$

and

$$\Delta fli = \Delta f\hat{l}i_{adj} + residual_{us}. \tag{16}$$

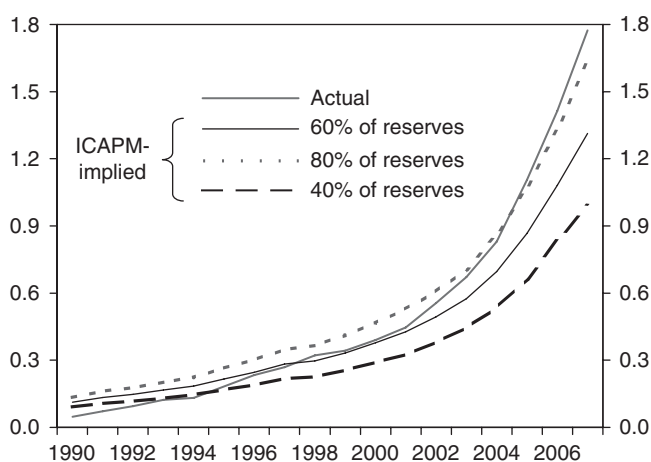
We derive a similar expression to equation (16) for U.S. gross capital flows to industrialized countries (see Balakrishnan, Bayoumi, and Tulin, 2007, Appendix III):

$$\Delta fai = \Delta f\hat{a}i_{adj} + residual_{ic}, \tag{17}$$

where *fai* are U.S. assets in industrialized countries. Equations (16) and (17) are the decompositions we take to the data.

For emerging market countries, as Figure 8 shows, the degree to which they are underweight or overweight in U.S. assets depends on the amount of official reserves which are in long-term foreign bonds. This is because, unsurprisingly, emerging market countries—such as China—have large official reserves relative to private foreign asset holdings. Thus the amount of official reserves in long-term foreign bonds has a large impact on their overall NFA position with respect to bonds, which is not the case for industrialized countries. Annual benchmark surveys of foreign holdings of U.S. assets suggest that around 85 percent of U.S. portfolio debt securities

Figure 8. ICAPM-Implied and Actual Emerging Markets' Holdings of U.S. Bonds
(In trillions of U.S. dollars)



Source: IMF staff estimates.

Note: ICAPM = international capital asset pricing model.

held by foreigners are in long-term bonds and IMF Coordinated Portfolio Investment Surveys suggest that, globally, around 75 percent of foreign portfolio debt holdings are in long-term bonds.

Given this, and assuming a significant share of official reserves will also be in bank deposits, our baseline assumption is that 60 percent of official reserves are in long-term bonds. This assumption suggests that emerging markets have oscillated around being appropriately weighted in U.S. assets according to an ICAPM model. Currently, they are overweight in U.S. assets, something which actually increased in the run-up to the crisis. Thus, as opposed to the case with industrialized countries, the stock adjustment should not be as a significant factor.¹¹

IV. Empirical Decomposition of The Rise in U.S. External Debt

Overview of the Main Factors in the Decomposition

To summarize what we have learnt so far, Section III shows that looking at raw TIC flows suggests that industrial country inflows have been the largest source of financing of the U.S. current account deficit over the last decade, although emerging market flows have gained prominence in the last few years. Given this, we also derive a decomposition of the U.S. NFA position with respect to bonds against industrialized countries and emerging market countries. This decomposition allows us to trace the impact of four key components on both inflows to and outflows from the United States:

- *Bond market size*: This effect captures a desired rebalancing within a representative foreign country investor's international portfolio as the relative share of regional bond markets change. As equation (9) shows, for flows into the United States, this is made up of two components: (1) the growth rate of U.S. bond markets relative to that of the global bond markets; and (2) a weighting factor, which is the share of the United States in the global bond market (also the expected level of bond holdings in the United States according to ICAPM). We have a similar equation for flows out of the United States to foreign countries.
- *Declining home bias*: This leads to more capital being invested abroad. For foreign countries, given the share of the United States in the global market, such a decline leads to significant outflows to the United States. A similar effect applies for U.S. bond outflows to foreign countries.
- *Financial deepening*: As equation (12) illustrates, if the total assets a country holds expands, this can lead to a further demand for foreign assets even if home bias has not changed. There are two components to

¹¹For industrialized countries, we make the same assumption that 60 percent of official reserves are invested in long-term bonds. Of course, given the dominance of private capital flows, the results for industrialized countries are not sensitive to this assumption.

increasing total assets or financial deepening: growing domestic bond markets and an improving NFA position.

- *Residual*: If the residual is positive, this would reflect a “pure” preference for U.S. assets. In the case of industrialized countries, part of it could be linked to “catching-up” to ICAPM predicted holdings given that we make an adjustment to the flows predicted by expanding bond markets, declining home bias, and financial deepening for the fact that industrialized country investors have been persistently underweight in U.S. assets (the stock effect). We will discuss further what else could explain a pure preference later in Section IV.

Of course, apart from declining home bias, these four key components do not map one-to-one into the explanations highlighted in Table 1. Given this, we will discuss the mapping between the two of them in detail once we report the results. Indeed, we will show that financial innovation can be linked to more than just bond market size, and that the global savings glut could be a factor behind a decline in home bias of industrialized countries. Before getting to the results, however, we briefly discuss the data set put together to estimate the decomposition.

Further Data Considerations

Apart from the TIC data discussed at the beginning of Section III, we also need annual data on the size of bond markets for the United States, industrialized countries, and emerging markets, as well as gross foreign asset positions of emerging market countries, industrialized countries, and the United States. For bond market size, we use Bank for International Settlements (BIS) data, with changes in market size adjusted for valuation effects caused by exchange rate movements. For asset positions, we update the data set used in Swiston (2005)—which uses a combination of IIP data, estimates based on balance of payments, and various official sources—and add to it long-term bond assets which are part of official reserves (see Balakrishnan, Bayoumi, and Tulin, 2007, for more details). Although our decomposition is at an annual frequency, bond market size data are only available up to the third quarter of 2008. However, especially in light of the financial crisis, it would be illuminating to have some analysis for 2008. To this end, we report the results of the decomposition for the first three quarters of 2008, with the added caveat that such results are not directly comparable to the rest of the sample as they do not capture a full year. Overall net flows from the various regions are available for all of 2008.

Results of the Decomposition

Figures 9–12 plot the results from estimating equations (16) and (17) for industrialized countries. Figure 9 shows that the trend of deterioration is dominated by liability flows, which for the period 1994–2008 have been around eight times the size of asset flows. Decomposing overall net flows

Figure 9. Breakdown of the Net Increase in U.S. Bond Liabilities Against Industrialized Countries (In billions of U.S. dollars)

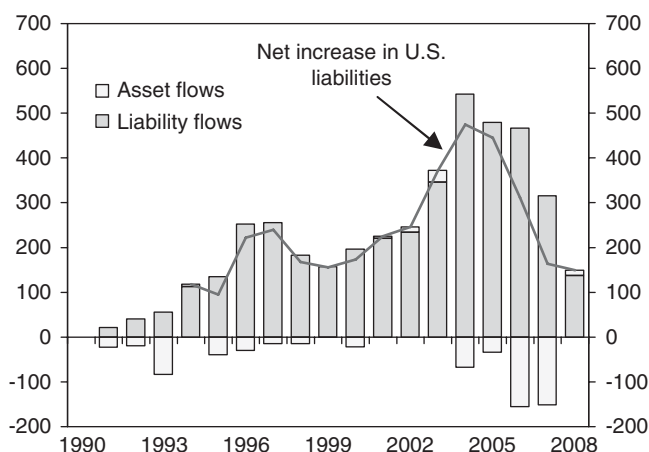
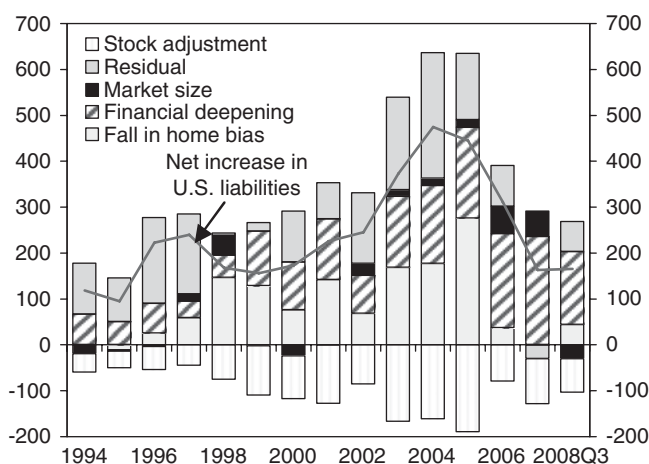


Figure 10. Decomposition of the Net Increase in U.S. Bond Liabilities Against Industrialized Countries (In billions of U.S. dollars)



suggests that financial deepening and declines in home bias have been key drivers over the last decade (Figure 10). There is also, as expected, a negative effect from the stock adjustment; and, in general, a positive residual. As noted in Section III, these two effects are related. Indeed, in some years (for example, 2005–06), the stock adjustment more than offsets the residual. This illustrates that if industrial country investors were using ICAPM to determine their purchases of U.S. assets at the margin, in some years we could more than fully account for net industrial country flows to the United States.

Interestingly, net flows from industrialized countries fell by nearly 40 percent in 2007 and the residual turned negative. The latter was largely

Figure 11. Breakdown of Industrialized Countries' (IC) Net Purchases of U.S. Bonds
(In billions of U.S. dollars)

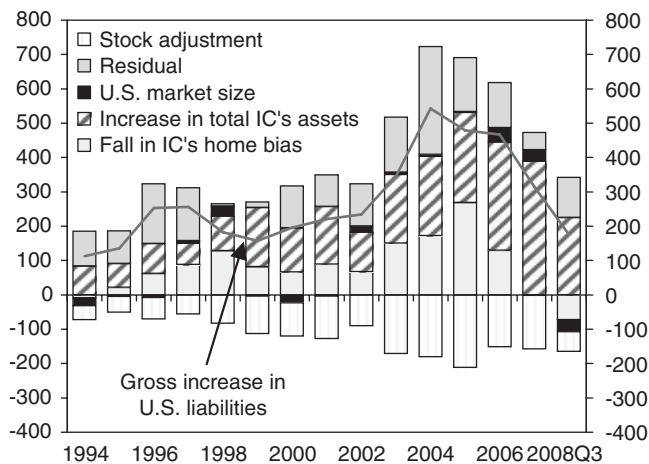
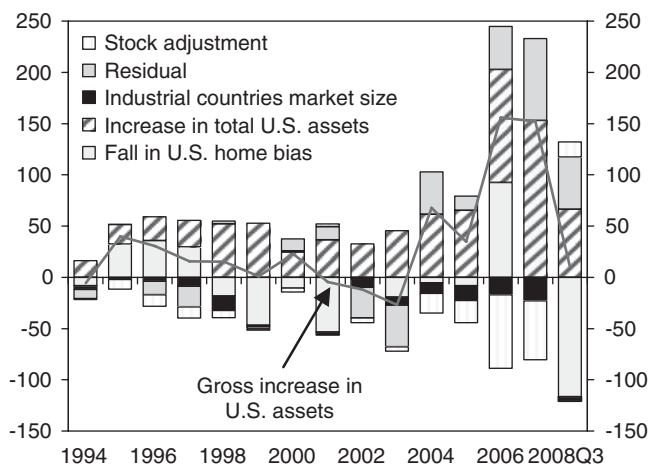


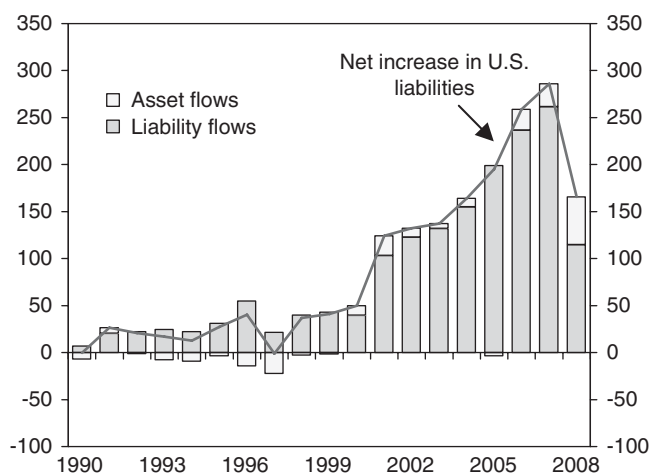
Figure 12. Breakdown of U.S. Net Purchases of Industrialized Countries' Bonds
(In billions of U.S. dollars)



driven by both a substantial positive residual for U.S. flows to industrialized countries, and a falling negative residual for industrialized country purchases of U.S. bonds (Figures 11 and 12). These trends probably illustrate a couple of key developments: (i) a flow out of risky U.S. assets; (ii) safe haven flows into U.S. treasuries; and (iii) a massive increase of U.S. home bias (see section V for details).

Drilling down further on the gross flows between regions, on the liability side (Figure 11), the effect from the expansion of foreign assets of

Figure 13. Breakdown of the Net Increase in U.S. Bond Liabilities Against Emerging Markets (In billions of U.S. dollars)



industrialized countries (fa^{ic}) dominates (financial deepening), with a negligible U.S. market effect. Figure 12 decomposes the increase in gross U.S. assets in industrialized countries, illustrating that U.S. home bias, if anything, has been increasing in recent years. Indeed, in 2008, an unprecedented increase in U.S. home bias led to an actual repatriation from industrialized countries after a significant build up of U.S. assets in previous years (Figures 9 and 12). Financial deepening in the United States, in contrast, is the main contributor to outflows over the whole period.

Figures 13–16 plot the results of the decomposition for emerging market countries. As is the case for industrialized countries, Figure 13 shows that the trend of deterioration is dominated by liability flows. Interestingly, asset flows have been negative since the late 1990s, with the repatriation again being especially strong in 2008. Figure 16 suggests that this is because of a sizable negative residual, which could be related to U.S. investors having less appetite for emerging market debt after the Asian crisis. Figures 14 and 15 show that the key driver of liability flows has been financial deepening in emerging market countries, although there is an important positive residual. The stock adjustment, as expected is smaller than for industrial countries. Perhaps surprisingly, declining home bias is only a positive contributor to flows in 2006 and 2007.

Despite the financial turmoil, net flows from emerging markets to the United States increased in 2007, although they declined significantly in 2008 (Figure 13). Moreover, since 2006, the residual associated with emerging market purchases of U.S. bonds has turned negative. This may support the view that while less developed emerging markets previously invested in the United States partly because their own financial markets are underdeveloped (Forbes, 2008), concerns about the quality of U.S. assets and the dollar are

Figure 14. Decomposition of the Net Increase in U.S. Bond Liabilities Against Emerging Markets (In billions of U.S. dollars)

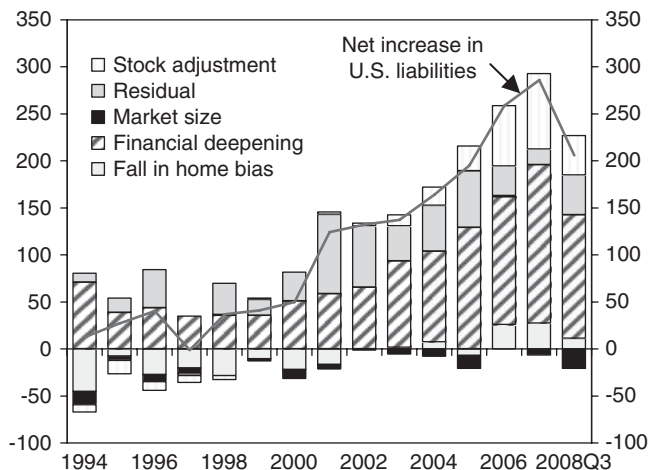
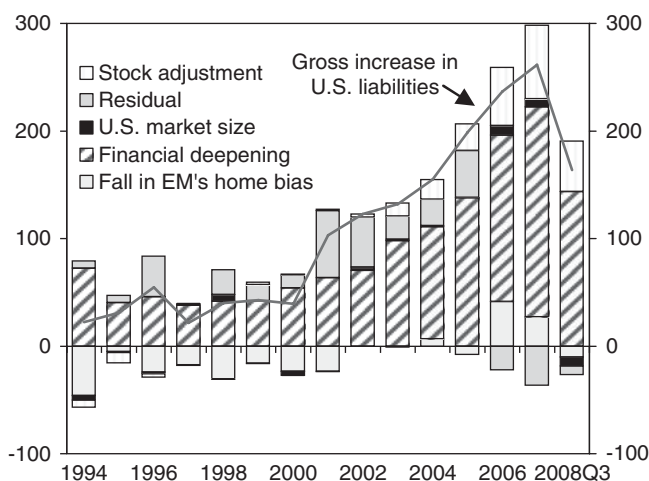


Figure 15. Breakdown of Emerging Markets' (EM) — Net Purchases of U.S. Bonds (In billions of U.S. dollars)



Sources: Treasury International Capital System; and IMF staff estimates.

starting to offset this. Next, we map these results into the explanations outlined in Table 1.

Home Bias and Financial Deepening in Industrialized Countries

As shown in Figure 17, according to our definition (with an inverted scale), home bias has been falling in industrialized countries in recent years. The level of gross foreign assets and liabilities at the country level has also

Figure 16. Breakdown of U.S. Net Purchases of Emerging Markets' Bonds (In billions of U.S. dollars)

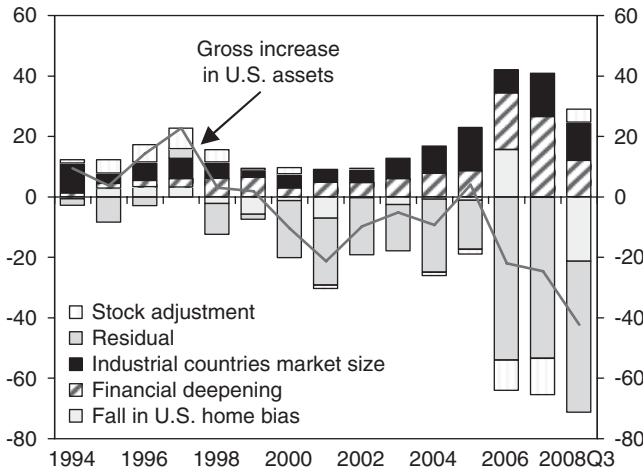
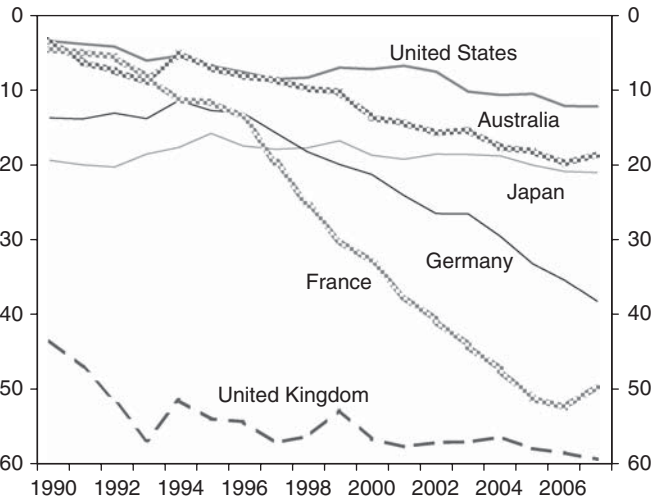


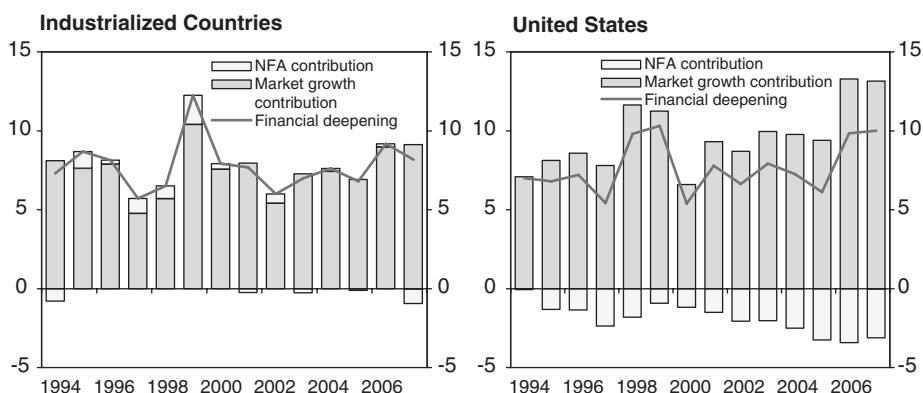
Figure 17. Home Bias Trends in Industrialized Countries (In percent)



Source: IMF staff estimates.

Note: Calculated according to equation 10, but shown on an inverted scale.

expanded significantly, often referred to as financial globalization. Factors driving financial globalization and declining home bias include reductions in the costs of cross-border financial transactions, increasing investor sophistication, and financial deregulation (IMF, 2005a and 2005b). For the euro area, the impact of the introduction of the euro cannot be ignored. In particular, it has allowed member countries to take on foreign assets without currency risk, and consequently led to a major reduction in home bias.

Figure 18. Financial Deepening (*In percent*)

Source: IMF staff calculations.

Note: NFA = net foreign asset.

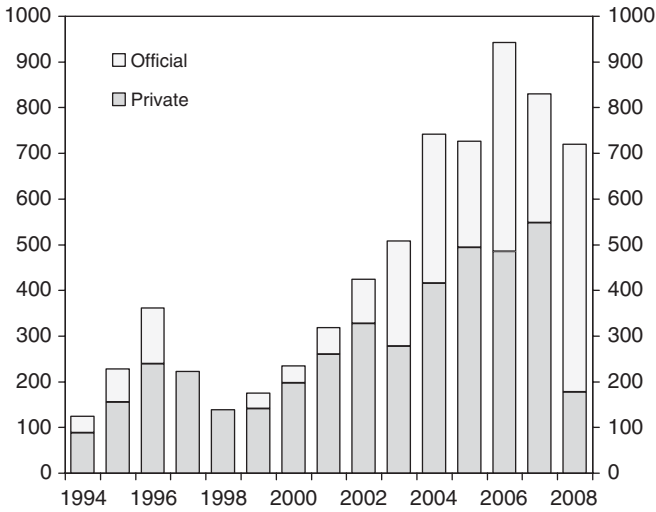
In light of such trends, it is perhaps not surprising that declining home bias can explain a significant portion of expansion of industrialized country assets in the United States. Indeed, it is consistent with the views of former Federal Reserve Chairman Alan Greenspan (2005), who believes that such trends have allowed individual countries to run large deficits for sustained periods. On the U.S. asset side, home bias has remained high. Indeed, it has even increased in some years (especially in 2008), and consequently made a negative contribution to U.S. outflows (as seen in Figure 10). This may be consistent with U.S. bond markets already being highly liquid, deep, and innovative, allowing U.S. investors to structure highly diversified portfolios with ease and likely reducing their interest in foreign fixed-income securities. It is also consistent with the view that in troubled times—no matter whether the troubles originate in the United States or abroad—U.S. investors repatriate their funds.

Financial deepening has been the other key factor. For the other industrialized countries, this has mainly come about by a rapid increase in the size of domestic bond markets, rather than an increase in NFA, as their current account surpluses have not changed much over the last decade (Figure 18). As noted earlier, on the U.S. asset side, the biggest contribution to purchases of industrialized country assets comes from financial deepening. Again, this is fully explained by rapid growth of U.S. fixed-income markets, as the U.S. NFA position has deteriorated.

Global Savings Glut: Emerging Market Country and Petrodollar Financing

We noted in this section that while net flows from emerging markets increased significantly in recent years, the bulk of the financing had come

Figure 19. Comparison of Official and Private Bond Purchases in the Balance of Payments (In billions of U.S. dollars)



Sources: Haver Analytics; and IMF staff calculations.

from the industrialized countries. We also suggested that this sits oddly with the pattern of recent current account imbalances as shown in Table 2. This puzzle is confirmed when we look at the pattern of official and private inflows, with official flows largely thought to come from nonindustrialized countries. As Figure 19 shows, the share of official inflows has increased since the late 1990s: it reached around 40 percent during 2005–07, and an incredible 75 percent in 2008. Explaining this puzzle is what we turn to next.

As is well known, monthly TIC transactions have significant financial center bias.¹² Indeed, it could be that significant emerging market and petrodollar flows are showing up as industrialized country flows and, thus, explaining part of the residual. To test for the importance of such a bias, we performed some robustness checks using TIC flow data corrected using custodial data—which are considered more accurate and comprehensive—as reported in infrequent benchmark surveys of U.S. assets and liabilities for the industrialized countries, emerging markets, and offshore centers.¹³

¹²For example, if the Bank of China instructed a private bank in London to buy U.S. treasury bonds from a U.S. resident, this would show up in the TIC system as a treasury bond flow from the United States to the United Kingdom. For further details see Warnock and Cleaver (2002).

¹³The authors thank Frank Warnock for providing the benchmark consistent TIC data, and readers interested in further details are referred to Thomas, Warnock, and Wongswan (2006) and Chinn, Rogers, and Warnock (2006).

Although liability data from the benchmark surveys in theory still suffer from custodial bias, it does not appear to be strong for the big emerging market countries.¹⁴ For example, the latest annual benchmark liability survey suggested that of the estimated \$1 trillion of reserves that China held at end-June 2006, around 70 percent were in U.S. dollars (assuming that virtually all holdings are official). Various commentators have suggested that this demonstrates that the annual surveys do not significantly undercount Chinese holdings of U.S. assets (Setser, 2007), with an ICAPM suggesting that China should be holding around 40 percent of its foreign assets in U.S. securities. Overall, emerging market country flows do not change materially when using the corrected TIC data. Indeed, it appears that financial center bias largely affects country assignment *within* the industrialized countries; in particular, euro area flows are underestimated and U.K. flows are overestimated.

For the Middle Eastern oil exporters, financial center and custodial center biases could be more of a problem, likely explaining why their measured flows are so low. Indeed, as Setser (2007) argues, U.S. asset holdings of the Middle Eastern oil exporters recorded in the annual surveys are low relative to most estimates of total portfolios of the respective central banks and investment authorities. This may reflect the difficulty of tracking purchases of some of the major investment authorities in the Middle East, who rarely report their activities, in sharp contrast to the Norwegian Government Pension Fund. An example of a potentially significant channel for undercounting would be if large purchases are made through private fund managers in London. This would show up as a flow from the industrialized countries to the United States and, thus, explain part of the residual.

However, the trends in Table 2 could also be consistent with another theory—even if the emerging markets countries and Middle Eastern oil exporters have not been providing direct financing of the U.S. current account deficit, they have been providing *indirect financing* (Higgins, Klitgaard, and Lerman, 2006). As a recent McKinsey Global Institute (2007a) report notes, it does not matter whether such funds are invested in Europe or Asia rather than being invested directly in the United States; by increasing the capital available in the global financial system, they still contribute to the funding of the U.S. current account deficit.

For example, petrodollars may have been used to purchase assets in Japan. Since Japan is running a balance of payments surplus, this would lead to overfinancing, which, in turn, would lead to Japanese investments elsewhere. In other words, both the gross foreign assets and liabilities of the industrialized countries would expand equally. According to equation (16),

¹⁴Warnock and Cleaver (2002) argue that while benchmark surveys of U.S. assets should not suffer from custodial bias, surveys of U.S. liabilities probably do. This is because the identifier on a U.S. security only provides information on the custodian, which is not necessarily in the country of the actual owner of the security. Nonetheless, the bias is significantly less than in the raw monthly TIC data.

this would show up as a decline in home bias of the industrialized countries as their total assets would remain unchanged. Under our decomposition, this would be part of the “declining home bias” component of the financing, but not financial deepening.

In sum, the global savings glut has likely played a bigger role in providing external financing than a first glance at Figures 5 and 6 would suggest. This is partly through misclassified emerging market/petrodollar purchases and its contribution to declining home bias of the industrialized countries, which our results suggest has been a key factor explaining current account financing.

Financial Innovation

Financial innovation can show up in various forms. It can be consistent with the U.S. market effect if innovation has led to the rapid expansion of U.S. private bond markets relative to other countries. Indeed, it can be shown that the U.S. market effect splits into a market effect for U.S. private and government bonds, and a compositional effect allowing for a switch between government and private bonds (see Balakrishnan, Bayoumi, and Tulin, 2007, Appendix IV).

As Figure 12 shows, however, the U.S. market effect has not contributed much to inflows from industrialized countries to the United States. This may seem surprising given the global preeminence of U.S. private fixed-income markets. But it reflects the fact that while U.S. fixed-income markets have grown rapidly, so have such markets in the rest of the world. Thus, the dominance in terms of size of U.S. fixed-income markets has not really changed in the last decade, and the U.S. market effect—which depends on changes—is small. It is worth underscoring, however, that although rapid expansion of bond markets both in the United States and abroad tend to offset each other in terms of the bond market size effect, they still lead to a substantial financial deepening effect on both flows into and out of the United States. Financial innovation can also show up as a decline in home bias or as a portfolio rebalancing—with foreign investors diverting more of the capital they allocate to investments abroad to the United States—if it leads to an autonomous rise in demand for U.S. assets. While declining home bias caused by financial innovation will be picked up by our decomposition, any resulting portfolio rebalancing would not be tracked and would show up in the residual.

Until the onset of the financial crisis in mid-2007, it is quite plausible that investors may have autonomously raised their demand for U.S. fixed-income instruments. Simply put, they may have perceived U.S. financial markets to be producing assets to help create diversified portfolios. For example, U.S. corporates certainly issue more speculative grade bonds than European corporates. Furthermore, at least until 2007, U.S. financial markets securitized vastly more assets than markets in other regions. Investors may have viewed such assets as allowing them to expose themselves to a wide variety of risks and embedded leverage. Moreover, regarding securitized

assets, the majority of subprime ABSs were rated AAA, which allowed many investors to hold them in their portfolios. However, as investors lost faith in the quality of securitized assets in late 2007, this effect may have reversed, something which would be consistent with the precipitous drop off in gross industrialized country flows in 2007 and 2008, and gross emerging market country flows in 2008 and which we will return to in Section V.

Other Factors Explaining the Residuals

The fact that the industrialized country residual fell despite oil prices continuing to increase during 2005–07 suggests that difficult-to-track petrodollar recycling is only part of the explanation. As noted earlier in this section, inflows associated with financial innovation could also be showing up in the residual. Other explanations for the positive, and often sizable, residual include the reserve currency role of the dollar and the level of investor protection that U.S. financial markets offer.

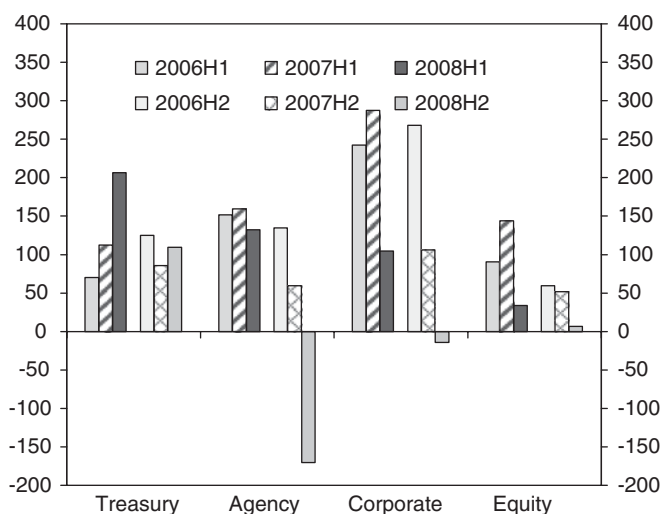
Does the stock adjustment also help explain the residual? As discussed earlier in this section, for industrialized countries, the stock adjustment effect is negative over the horizon considered, consistent with industrialized country investors being persistently underweight in U.S. assets. Clearly, an ICAPM is a simplification as it implies that investors' relative holdings in equilibrium should depend only on the relative size of bond markets. The world economy, however, has faced many structural changes in recent years—including persistently elevated commodity prices, rapid financial development, and a secular decline in macroeconomic volatility. Given that the impact of such developments on desired portfolios may take time to process, investors may still be in a state of *transition* toward a new equilibrium, and different equilibriums given that they are unlikely to have identical preferences.

Mechanically, a negative stock adjustment reduces the size of the predicted flows from increasing bond market size, declining home bias, and financing deepening. This, in turn, increases the size of the residual. Does this imply that part of the industrialized country residual could be “catch-up” associated with the stock adjustment effect? Possibly. Certainly, the decomposition does not capture flows associated with industrialized country investors attempting to “catch-up,” because they were initially underweight in U.S. assets, as defined using an ICAPM approach. Although how large this affect could be is debatable as, if anything, the degree to which industrial country investors are underweight in U.S. assets has increased (Figure 6). The later, however, could reflect valuation effects.

V. The Impact of the Financial Crisis

As noted in previous sections, overall net portfolio flows were significantly lower in 2007–08, even being negative from Caribbean offshore centers (Figures 5 and 6). Industrialized country flows fell considerably in 2007, while those from emerging market countries dropped off in 2008. The pattern of

Figure 20. Net Foreign Purchases of U.S. Securities (In billions of U.S. dollars)



Source: Haver Analytics.

the flows over the 2007–08 makes the link with the financial crisis clear. Foreign net purchases of U.S. assets were about \$150 billion higher during the first half of 2007 than during the same period in 2006. However, during the second half of 2007, net flows were close to \$200 billion lower than in the second half of 2006. And late July 2007 was when financial strains started to escalate, with the subprime crisis blowing up, interbank markets becoming impaired, and the asset-backed commercial paper market freezing shortly afterwards in August 2007. During 2008, net inflows continued to fall precipitously, and in the second half of the year were even negative.

The composition of the flows also tells an interesting story. Perhaps unsurprisingly given their riskier nature, as Figure 20 shows, there has been a big switch out of corporate bonds and equities. Such purchases were higher in the first half of 2007 when compared with 2006, but lower in the second half. The drop off in the second half of 2007 is particularly severe for corporate bonds. The drop off in corporate bonds and equity purchases continued in 2008, with flows into the former even turning negative in the second half of 2008. Moreover, even agency bond purchases started dropping off in the second half of 2007. Likely reflecting the troubles at the housing GSEs, which eventually ended up with them being bailed out by the U.S. government in October 2008, agency bond purchases actually turned negative in the second half of 2008.

In contrast, and not surprisingly given their status as a flight to quality assets, treasury purchases remained robust in the second half of 2007 when compared with 2006, and they also increased significantly in 2008.

In sum, the evidence so far suggests that financial turmoil has impacted U.S. current account financing. Not only was the level of portfolio inflows

substantially lower in the second half of 2007 and all of 2008, but the composition dramatically changed. In particular, corporate bond purchases declined substantially. As subprime ABS and collateralized debt obligations are classified as corporate bonds, this trend is consistent with foreign investors fleeing from U.S. securitized assets as they lost faith in their quality and how to value them. This could represent the financial innovation channel reversing somewhat. More recently, even agency bonds, which were previously considered relatively safe, have seemingly lost their luster. The ramifications of this for the future are discussed in the next section.

VI. Conclusions and Policy Implications

This paper develops a portfolio balance model to help evaluate to what extent the global savings glut hypothesis, financial globalization and declining home bias, and financial innovation can explain the easy financing of the U.S. current account deficit. One important explanation that we reject is that it reflects high expected U.S. productivity growth. This appears inconsistent with the fact that funding has occurred almost exclusively through fixed-income markets and U.S. equity prices are moderate. Rather, globally low long-term interest rates on government debt and tightening spreads on a variety of corporate bonds suggest that the global savings glut and declining home bias in industrialized countries have been important drivers.

This is largely confirmed when looking at a detailed decomposition of the deterioration in the U.S. NFA position with respect to bonds. At a first pass, the decomposition suggests that the *majority* of financing over the last decade can be explained by declining home bias and financial deepening in industrialized countries, although financial deepening in emerging countries has become increasingly important in recent years. Interestingly, U.S. flows to emerging markets have largely been negative since late 1990s, perhaps consistent with U.S. investors reevaluating the attractiveness of emerging market assets in the aftermath of the Asian crisis.

The decomposition also throws up a not insubstantial positive residual in the financing that foreign investors have provided to the United States for much of the last decade. For industrialized countries, this could be consistent with foreign investors having been persistently underweight in U.S. bonds according to an ICAPM model or having a preference for the wide array of bonds that deep and innovative U.S. financial markets issue, as well as difficult-to-track petrodollar recycling. For emerging market countries, the depth of U.S. financial markets and the level of investor protection they provide, as well as the reserve currency role of the dollar, have probably been the key factors.

At a second pass, there are some important nuances to the decomposition. In particular, in many ways, the different factors are

intertwined. For example, apart from showing up in the residual, the global savings glut and financial innovation could also be factors behind the decline in home bias in other industrialized countries. This underscores the importance of not looking at these factors in isolation, but rather as a constellation of forces that can be self-reinforcing.

With most analysts forecasting continued large U.S. current account deficits over the medium term, what are the implications from the conclusions above for the financing of such deficits? To the extent that financial deepening and declining home bias continue in industrialized countries, it would appear that substantial financing will likely continue, consistent with the views expressed in McKinsey Global Institute (2007a).

Regarding financial deepening, while the current financial crisis has clearly been a major negative shock, we continue to see a long-run upward trend for structural reasons. Similarly, regarding home bias, while we have argued that the global savings glut may have supported the trend fall in industrialized country home bias so far, there are other reasons why we may expect such a trend to continue in the long-run after the financial crisis abates. In particular, IMF (2005a) suggests that out of the G-3, Japan still has much to gain from further international diversification. Cooper (2005) also argues that large current account surpluses are likely to persist in industrialized countries, such as Japan and Germany, that have aging populations. Moreover, industrialized country investors are still underweight in U.S. assets using an ICAPM model.

Some would argue that the subprime-related financial crisis will leave a permanent scar on the attractiveness of U.S. assets. Certainly, the evidence presented earlier suggests that the financial turmoil did have a major impact on portfolio flows to the United States from industrialized countries and Caribbean offshore centers (which are seen as a conduit for sophisticated investor flows to and from the United States). Looking ahead, it is probably likely that some sophisticated investors who previously bought corporate ABS will be wary of buying such assets (including nonagency subprime mortgage-backed securities) in the short term. However, like the junk bond market of the late 1980s, securitized asset markets will likely survive, but in a simpler form. Moreover, demand for treasuries and non-ABS should remain strong given the depth and liquidity for such markets in the United States, and the robust investor protection offered. Overall, while the innovativeness of U.S. financial markets may be less attractive to investors, at least for the immediate future, the likely trends in industrialized country home bias and financial deepening suggest that significant funds will continue to be directed toward the United States.

Some have also argued that easy financing will no longer come from the big emerging market countries and oil exporters, despite their increasingly important role in providing capital. In particular, as emerging market countries have accumulated significant reserve assets in recent years, it is argued that their sovereign wealth funds (often recently created) will start

diversifying away from U.S. treasuries driving dollar depreciation as well as increases in relative interest rates in the United States. Moreover, as fixed-income markets in emerging market countries continue the process of “catch up,” this will reduce the share of the United States in the global bond market, causing investors to rebalance their portfolios away from U.S. assets.

Certainly, emerging market portfolio flows dropped off dramatically in 2008, which may be the first sign of this. However, looking beyond the near-term impact of the financial crisis, financial deregulation and increasing investor sophistication in emerging markets are likely to continue to reduce home bias. Combined with financial deepening, this will provide a large pool of funds to be invested globally. For the same reasons as outlined for industrialized countries, and given the reserve currency role of the dollar, a substantial portion of such funds, while maybe not directed to U.S. treasuries, will likely be invested in U.S. assets. Indeed, as shown by the TIC benchmark surveys, the share of treasury bonds in emerging markets’ U.S. bond portfolios has already been falling for a number of years. More fundamentally perhaps, significant diversification away from dollar assets will only come about if dollar pegs become less prevalent among emerging market countries.

Regarding sovereign wealth funds, as McKinsey (2007b) notes, many act like private investors and often have a stronger preference for equity and alternative investments than traditional investors. As an example, many sovereign wealth funds injected capital into U.S. banks in late 2007 and early 2008. Moreover, 40 percent of total petrodollar assets are owned by wealthy private individuals rather than large funds. This suggests, given the size and depth of U.S. equity and debt markets, sovereign wealth funds will continue to direct a sizable share of their portfolio to U.S. assets.

To be sure, risks to continued easy financing of large U.S. current account deficits remain. Already, U.S. home bias regarding equities has fallen considerably in recent years (IMF, 2005b). It still remains high though and home bias with respect to bonds is even higher. Undoubtedly the depth, liquidity, and perceived innovativeness of U.S. fixed-income markets is one of the reasons why U.S. home bias with respect to bonds has remained so high. If the edge that the United States has had regarding financial markets is being lost—through innovation elsewhere and/or the loss of attractiveness of securitized assets—it could lead not just to reduced inflows, but *rising outflows* as U.S. investors increasingly look abroad to structure their portfolios. Although this has not happened during the current crisis, which has so far seen a major repatriation of funds back to the United States, it remains a risk over the medium term.

In sum, one of the great unknowns facing U.S. current account financing is the future behavior of U.S. investors and their degree of home bias. In particular, to what extent the financial crisis of 2007–08 will lead them to diversify out of U.S. bonds, resulting in a sharp rise in U.S. interest rates and a potential dollar collapse.

Table A1. List of Countries

Industrial Countries	Emerging Markets	Offshore Centers	Middle Eastern Oil Exporters
Austria	Argentina	Bahamas	Bahrain
Australia	Brazil	Bermuda	Iran
Belgium	China, P.R.: Hong Kong	Cayman Islands	Iraq
Canada	China, P.R.: Mainland	Netherlands Antilles	Kuwait
Denmark	Chile		Oman
Finland	Colombia		Qatar
France	Czech Republic		Saudi Arabia
Germany	Hungary		United Arab Emirates
Greece	India		
Ireland	Indonesia		
Italy	Korea		
Japan	Malaysia		
Luxembourg	Mexico		
Norway	Peru		
Netherlands	Philippines		
Portugal	Poland		
Spain	Russia		
Sweden	Singapore		
Switzerland	Slovakia		
United Kingdom	South Africa		
	Taiwan Province of China		
	Thailand		
	Turkey		
	Venezuela		

APPENDIX I. DATA

Table A1 provides the list of countries included in industrialized countries, emerging markets, and Caribbean offshore centers.

Debt securities outstanding: From the *Quarterly Review* of the Bank for International Settlements, Tables 12A, 12B, 12C, 12D, 16A, and 16B. Bond market size corresponds to the stock of outstanding domestic and international debt securities, but market size change is the sum of net issues of international debt securities and changes in stocks of domestic debt securities adjusted for exchange rate valuations as calculated by BIS.

Foreign assets position: Data on international bond holdings and liabilities were kindly provided by Lane and Milesi-Ferretti (2006), which we update for 2005, 2006 and 2007. These combine official data on international investment position with estimates based on balance of payments and various official sources. International bond flows data are from IMF, *Balance of Payments Statistical Yearbook*, and other official sources. Stocks of foreign exchange international reserves are from the IMF, *International Financial Statistics*, but flows are from the IMF, *Balance of Payments Statistical Yearbook*. We add 60 percent of foreign exchange reserves to foreign portfolio debt holdings and 60 percent of the change in international reserves to bond purchases. While for the industrial countries, inclusion of reserve assets leads to a 2 to 4 percent increase in foreign bond holdings for 2000–05, for emerging markets 60 percent of international reserves are about 2 to 2.5 times larger than foreign portfolio bond holdings.

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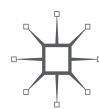
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