"ABS Inflows to the U.S. and the Global Financial Crisis"

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It is widely accepted that international capital flows played an important role in the emergence of the U.S. housing bubble and the global financial crisis that followed the bursting of that bubble. In this view, an excess of saving over investment in many emerging market economies, popularly referred to as the "global saving glut" (Bernanke, 2005, 2007), led to a surge in capital inflows to the United States that increased available credit and lowered interest rates. In combination with a number of additional factors—the increase in securitization, excessive reliance on credit ratings, increases in leverage, failures to manage liquidity and risk, and inadequacies of supervision and regulation—the expansion of financing associated with the capital inflows contributed to the U.S. housing bubble and to the buildup in financial vulnerabilities more generally that led to the crisis.

However, the global saving glut story represents an incomplete description of the developments in international capital flows that contributed to the crisis. The emerging market economies at the center of the global saving glut—China, other Asian developing economies, and the oil exporters—for the most part restricted their U.S. purchases to Treasuries, agency debt, and other low-risk investments. Their provision of savings to what ultimately proved to be risky borrowers—such as those with subprime mortgages —

was indirect, as the massive capital inflows pushed down yields on safe assets, thus increasing the appetite for riskier assets on the part of other investors.

A second feature of international capital flows contributing to the global financial crisis—direct foreign purchases of asset-backed securities (ABS) and other structured products—has received less attention. By adding to the demand for these instruments, foreign acquisitions of risky securities likely contributed to the decline in their spreads over safe yields and to the increase in their supply, thus directly increasing the flow of resources to subprime and other risky borrowers. At the same time, foreign purchases of U.S. ABS ensured that when the bubble finally burst, the financial crisis would not be confined to the United States, but would spread throughout the world.

In our paper, we will analyze data on international capital flows and portfolio positions in order to describe the evolution, magnitude, and financing of foreign acquisitions of U.S. ABS and structured instruments. We will compare these acquisitions to those of U.S. Treasuries and Agencies by the "global saving glut" countries in order to examine the relative importance of these flows to the development of vulnerabilities leading to the crisis. We will then develop a portfolio balance model to calculate how changes in the foreign demand for U.S. ABS might have affected interest rates on risky U.S. assets, and compare that estimated effect to an estimate of the effect of purchases of U.S. Treasuries and Agencies by the global saving glut countries. This research will have ready implications for policy analysis: the better we can identify the underlying roots of the recent global financial crisis, the better we can identify trends that anticipate future crises and design measures to counteract them.

To analyze the pattern of international capital flows, we combine data from several sources. The Treasury International Capital (TIC) System provides detailed data on the composition of U.S. capital flows and the U.S. external position by country and instrument. To these data we add details from other countries' published external positions, the BIS data on international banking positions, and the IMF's Coordinated Portfolio Investment Survey (CPIS), which provides geographic breakdowns of many countries' external securities claims. Finally, the detail available in the TIC data allows us to estimate the composition of other countries' claims and liabilities that are not otherwise available. Such estimates help fill out the picture of international capital flows and positions, providing the basis for addressing the role of ABS and other structured products in global imbalances.

The remainder of this proposal describes some of our initial findings and outlines the future course of our work. One section of the paper will establish that foreign purchases of U.S. ABS were quantitatively important in the financing of U.S. investment, particularly in housing. Figure 1 summarizes the evolution of U.S. external liabilities, while Figure 2 compares the flow of foreign capital into U.S. Treasuries and Agencies with that into U.S. corporate bonds. The increase in liabilities required to finance the U.S. current account deficit in the years leading up to the crisis was very broad-based (Figure 1). While the stock of U.S. Treasuries and Agencies held by foreigners exceeded holdings of corporate bonds (including ABS), in the years leading up to the crisis, foreign *flows* into corporate debt were at least as large as those into Treasuries and Agencies (Figure 2). Nearly half of the inflows in corporate bonds come from ABS. In addition, much of the remaining, non-ABS, portion of foreign flows into

corporate debt securities was actually purchases of financial debt, floating rate notes, and various structured products, rather than relatively safe conventional nonfinancial corporate bonds. [1]

Furthermore, while foreign holdings of U.S. Treasuries and Agencies in mid-2007 were a large share of the amount outstanding—31 percent (see Table 1)—foreign holdings of ABS were not all that far behind. At 24 percent, they represented a substantial share of the market, certainly enough to have had a material impact on pricing. However, the geographic distribution of holdings is quite different for ABS as compared to Treasuries and Agencies. Figure 3 shows that just before the crisis ABS were held primarily by advanced economies, especially in Europe, whereas U.S. Treasuries and Agencies were held mainly by emerging market economies and Japan. This observation suggests a role for ABS in capital flows that is distinct from that implied by the standard saving glut story.

The second section of the paper will focus on the role of ABS in the increasing globalization of financial markets. Although all securities markets grew rapidly in the decade before the crisis, ABS and other structured products stand out as a significant component of the buildup in cross-border positions. Figures 4a and 4b show holdings of long-term debt securities by the euro area and the United Kingdom. Using TIC data, we can identify the portion of U.S. securities that is ABS, and some ABS issued in offshore centers. But some of the bar segments labeled "non-ABS", particularly the offshore and U.S. non-ABS segments, may also contain some ABS and certainly contain other structured products. Though it is difficult to distinguish with certainty among external

[1] Albertus, Bertaut, and Curcuru "Has the Crisis Changed Foreign Positions in U.S. Securities?" Federal Reserve staff working paper 2010.

holdings of ABS, other structured credit products, and conventional debt, it is nonetheless evident that ABS and other structured debt instruments played an important role in the expansion of external assets in the United Kingdom and the euro area, and thus contributed significantly to the increasing globalization of financial markets.

The role of ABS and other structured debt in financial globalization is illustrated more starkly in Figure 5. This figure identifies the part of the reduction in "home bias" for a number of advanced economies between 2003 and 2007 that is attributable to increased acquisitions of ABS and other structured products.[2] In the figure, reductions in home bias are expressed as positive values—the red portions of the bars represent the reduction in home bias associated with expanded holdings of ABS, while the blue portions represent reductions in home bias associated with acquisitions of other debt securities. For most of the economies examined, ABS accounted for a substantial part of the change in portfolios associated with a reduction in home bias during the period. Thus, while the process of financial globalization enhanced the breadth and depth of global financial markets, it also made it more likely that once the subprime housing bubble burst, its effects would be transmitted around the world.

A third section of the paper will look more closely at how economies financed their acquisitions of U.S. assets. Here, significant differences in the financing of purchases of Treasuries by the emerging market economies and ABS purchases by Europeans become apparent. Figure 6 focuses on the three groups of economies most associated with the global saving glut—China, other developing Asian economies, and the OPEC countries—and compares their current account surpluses over the period 2003

[2] Home bias refers to the extent to which a country's holdings of external assets as a share of its total portfolio fall short of the standard CAPM benchmark: the share of total external market capitalization in global market capitalization.

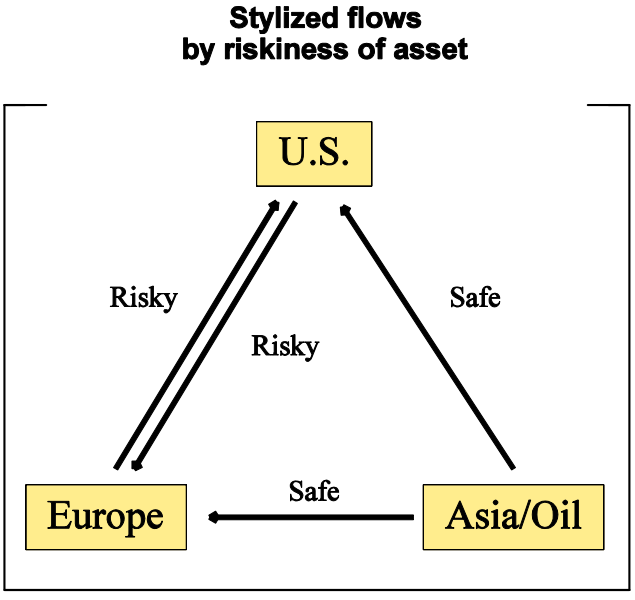
to 2007 with their acquisition of U.S. securities and their deposits into European banks.[3] Although the data are incomplete, especially for OPEC, it is apparent that these economies' acquisitions of foreign assets were financed primarily by their own current account surpluses. It is also apparent that these surpluses financed not only purchases of U.S. assets, but investments in other economies, such as in Europe, as well.

By comparison, Europe, which accounted for most of the foreign purchases of U.S. ABS during the period, was running a small current account deficit in aggregate. Accordingly, as shown in Figure 7, the expansion of its claims – primarily in the form of debt securities and banking flows – was financed by a comparable expansion in its liabilities. Figure 8 decomposes Europe's gross portfolio flows by our estimates of the relative riskiness of the instruments. The bottom segment shows ABS, which proved to be the most toxic securities during the crisis. On the liabilities side, this bottom segment represents our lower bound estimate of external acquisitions of European ABS, while the next segment represents our upper bound. By either measure, Europe bought much more ABS than they sold. The same is true for the next segment up, other financial debt securities. Europe's acquisitions of financial debt were mostly from the U.S. and from offshore centers, which also tended to issue exotic debt. Moving up the bar, Europe bought similar amounts of equity as they sold, but bought slightly less of the somewhat safer nonfinancial debt than they sold. Finally, we estimate that Europe bought essentially no sovereign debt, on net. However, a large part of their financing inflows were from foreign purchases of European sovereign debt, which was perceived at the time as quite safe. Figure 9 decomposes the debt securities flows from Figure 8 by the

[3] Data on the full range of external investments by these economies are not available. In particular, we have not yet identified their purchases of European securities.

destination of Europe's outward investment (on the claims side) and the source of the inflows (on the liabilities side). Outward investment was largely to the United States and on offshore centers, whereas most of the expansion in liabilities is accounted for by increased holdings of its currencies in the international reserves of other countries as well as a large residual category, comprising mainly EMEs and offshore centers. Most likely, both of these categories are largely accounted for by liabilities to the global saving glut economies.

Hence, the global saving glut countries not only provided financing to the United States directly through purchases of U.S. assets, but also indirectly through purchases of European assets that financed purchases of U.S. assets. Moreover, insofar as European liabilities to the saving glut countries were in the form of safe assets such as government bonds and bank deposits, whereas European claims on the United States were in the form of ABS and other risky structured credit instruments, Europeans had considerable exposure to the subsequent crisis (as illustrated by the diagram of the "triangular trade" in financial assets. Ironically, Europe was acting as an international hedge fund in this regard, a role that previously had been attributed to the United States.



A fourth section of the paper will develop a calibrated portfolio model of asset demands and supplies to compare how purchases of Treasuries and Agencies by the global saving glut countries and purchases of ABS by Europeans and others might have affected financial conditions in the United States. The model analyses the determination of interest rates on three assets: (1) bank deposits; (2) U.S. Treasuries; and (3) U.S. asset-backed securities (ABS). These assets are demanded by residents of three different economies: the United States, Europe, and the global saving glut countries (which, for convenience, we will refer to as "China"). An accumulation of external wealth by China which is channeled into U.S. Treasuries lowers the interest rate on those assets but also, depending on asset substitutabilities, on bank deposits and ABS as well. Europe did not run current account surpluses in aggregate to acquire U.S. ABS, but rather took in safe deposits from other countries to finance the ABS; this can be modeled as a reduction in European demand for deposits coupled with an increase in their demand for ABS, and will have the effect of raising rates on deposits and lowering them on ABS. The extent to which Chinese purchases of U.S. Treasuries lower interest rates on ABS more or less than European purchases of ABS depends on (1) the relative magnitudes of these purchases, and (2) the elasticities and cross-elasticies of demand for the different assets.

Finally, having made as assessment of the extent to which different types of capital inflows may have lowered interest rates on U.S. ABS, and by extension on the cost of residential mortgage borrowing by U.S. households, we plan to use the Federal Reserve staff's DSGE model, SIGMA, to translate that assessment into an estimate of the impact on the quantity of U.S. residential construction. This quantity, of course, was the ultimate outcome of the U.S. subprime housing bubble.

Our research builds on a number of papers linking the emergence of the global financial crisis to international imbalances. Previous research on the role of international capital flows in the global financial crisis has followed two distinct strands. The first of these is the story sketched out above, in which current account surpluses in the emerging market economies enhanced the global supply of capital, reduced interest rates in the United States and other advanced economies, and thus encouraged the emergence of the bubble in subprime housing. Caballero, Farhi, and Gourinchas (2009), Jagannathan, Kapoor, and Schaumburg (2009), and Obstfeld and Rogoff (2009), among others, all muster theoretical models and/or empirical evidence to discuss variants of this argument. Members of the official sector, such as Bernanke (2009) and Bini Smaghi (2008) have also referred to this line of causation.

The second strand of research into the international capital flows and the crisis has focused on the extent to which exposure to U.S. dollar assets and dollar liabilities—and particularly to U.S. ABS and other structured instruments—made foreign economies more vulnerable to financial disruptions, once the crisis began. Archaya and Schnabl (2009) assesses whether issuance of asset-banked commercial paper was associated with subsequent financial distress, while Kamin and Pounder (2010) examine whether holdings of U.S. ABS or financing in dollars led to greater declines in bank asset values in different economies. Rose and Spiegel (2009) and Ehrman, Fratzscher, and Mehle (2009) examine how exposure to U.S. assets and liabilities was related to broader economic movements during the crisis. Baba, McCauley, and Ramaswamy (2009) and McGuire and von Peter (2009) both analyze the funding patterns of non-U.S. banks that led to a severe shortage of dollar liquidity once the crisis began.

However, previous research has not considered whether the substantial acquisitions of U.S. ABS by foreigners, primarily in Europe, might not only have rendered foreigners more vulnerable to a bursting of the subprime housing bubble, but might also have contributed to the emergence of that bubble. Nor has previous research attempted a thorough-going comparison of the international capital flows associated with the "global saving glut" economies with those linked to the acquisition of U.S. ABS. Our research will thus fill gaps in the evolving literature on the global financial crisis in two respects, by exploiting the full range of available data to build a composite picture of the pattern of global capital flows in the lead-up to the crisis, and by assessing the extent to which foreign acquisitions of U.S. ABS and other structured investment products may have added to the factors propelling the emergence of the housing bubble.

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Table 1. Foreign Holdings of U.S. Securities as a Share of Outstandings

(as of June 2007, Billions of U.S. dollars)

		Total Outstanding [1]	Foreign Held[2]	Foreign Share of Total (Percent)
1	Treasury and agency securities[3]	11,688	3,607	31%
2	Corporate & municipal credit securities (non asset-backed)[4]	8,616	2,045	24%
3	Corporate ABS + ABCP[5]	4,185	990	24%
4	Corporate equities and fund shares	27,768	3,130	11%

Notes

1 Source: Flow of Funds March 6, 2008 Z.1 Statistical Release, tables L.200-L.228 (Federal Reserve Board, 2008). See note 5 for ABS and ABCP outstandings.

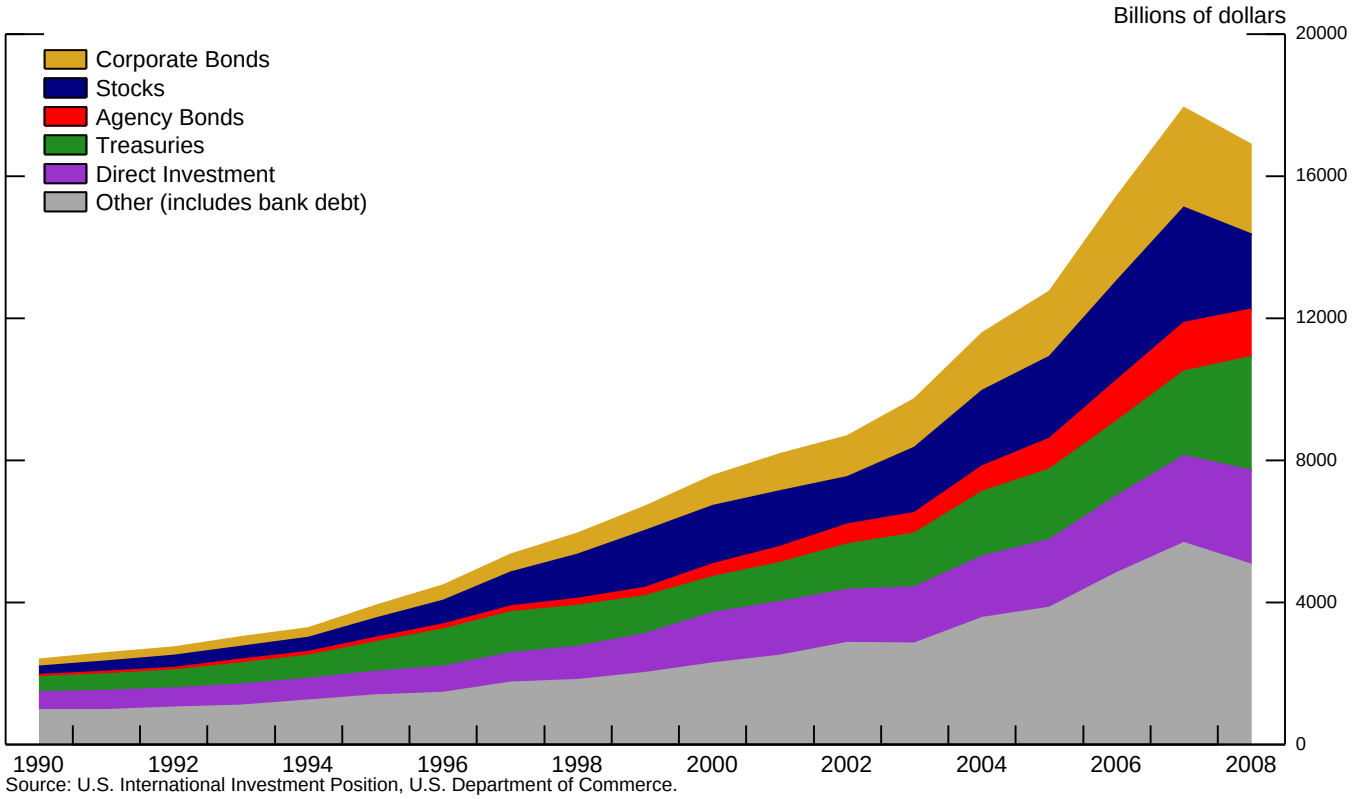
2 Foreign holdings were obtained from tables 1, 23 and 24 of the "Report on Foreign Portfolio Holdings of U.S. Securities," as of June 30, 2007 (Department of the Treasury, 2008) with slight modifications to foreign held corporate ABCP from Beltran, Pounder, Thomas (2008).

3 Total includes savings bonds and holdings of the Federal Reserve System.

4 Includes open market paper.

Figure 1

Composition of U.S. External Liabilities



Source: U.S. International Investment Position, U.S. Department of Commerce.

Figure 2

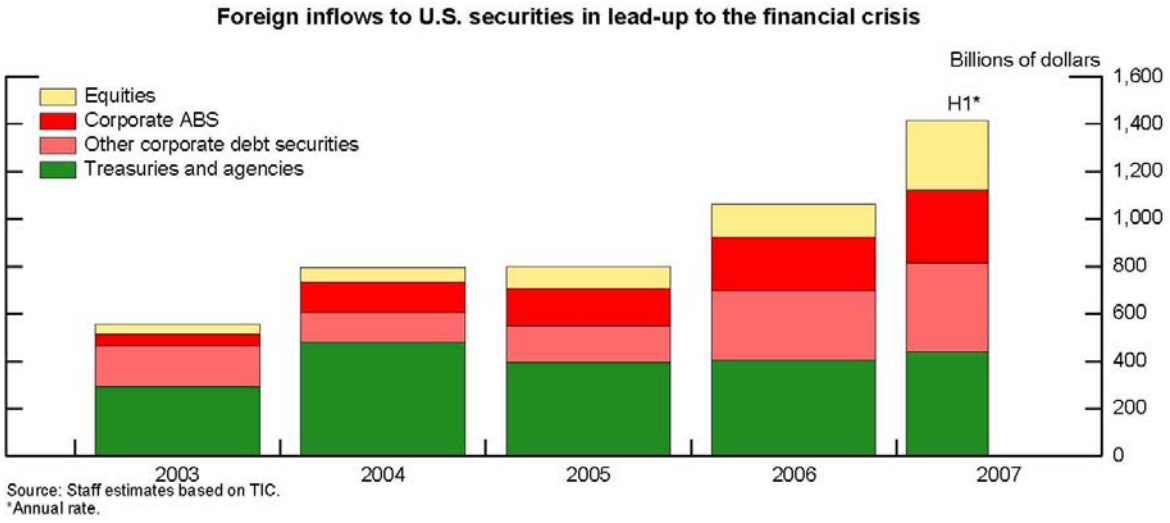
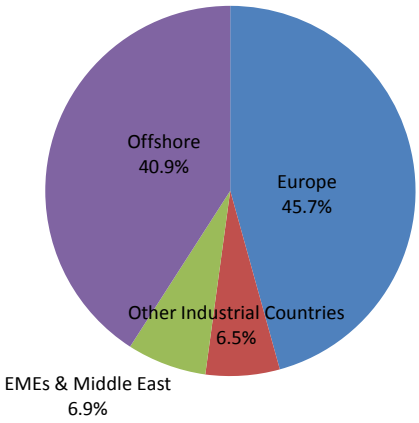
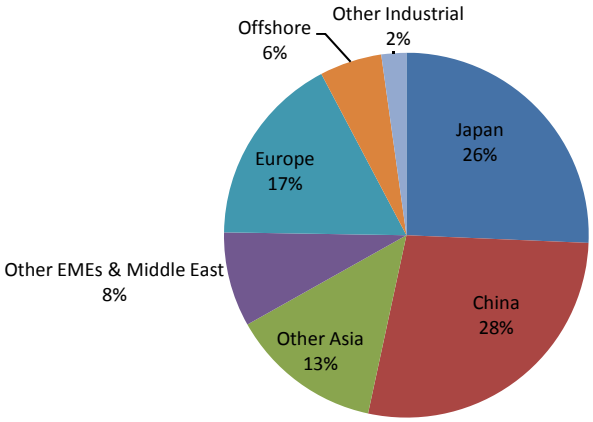

Foreign inflows to U.S. securities in lead-up to the financial crisis
Billions of dollars
Equities
Corporate ABS
Other corporate debt securities
Treasuries and agencies
H1*
1,600
1,400
1,200
1,000
800
600
400
200
0
2003
2004
2005
2006
2007
Source: Staff estimates based on TIC.
*Annual rate.

Figure 3

2007 Holdings of U.S. ABS



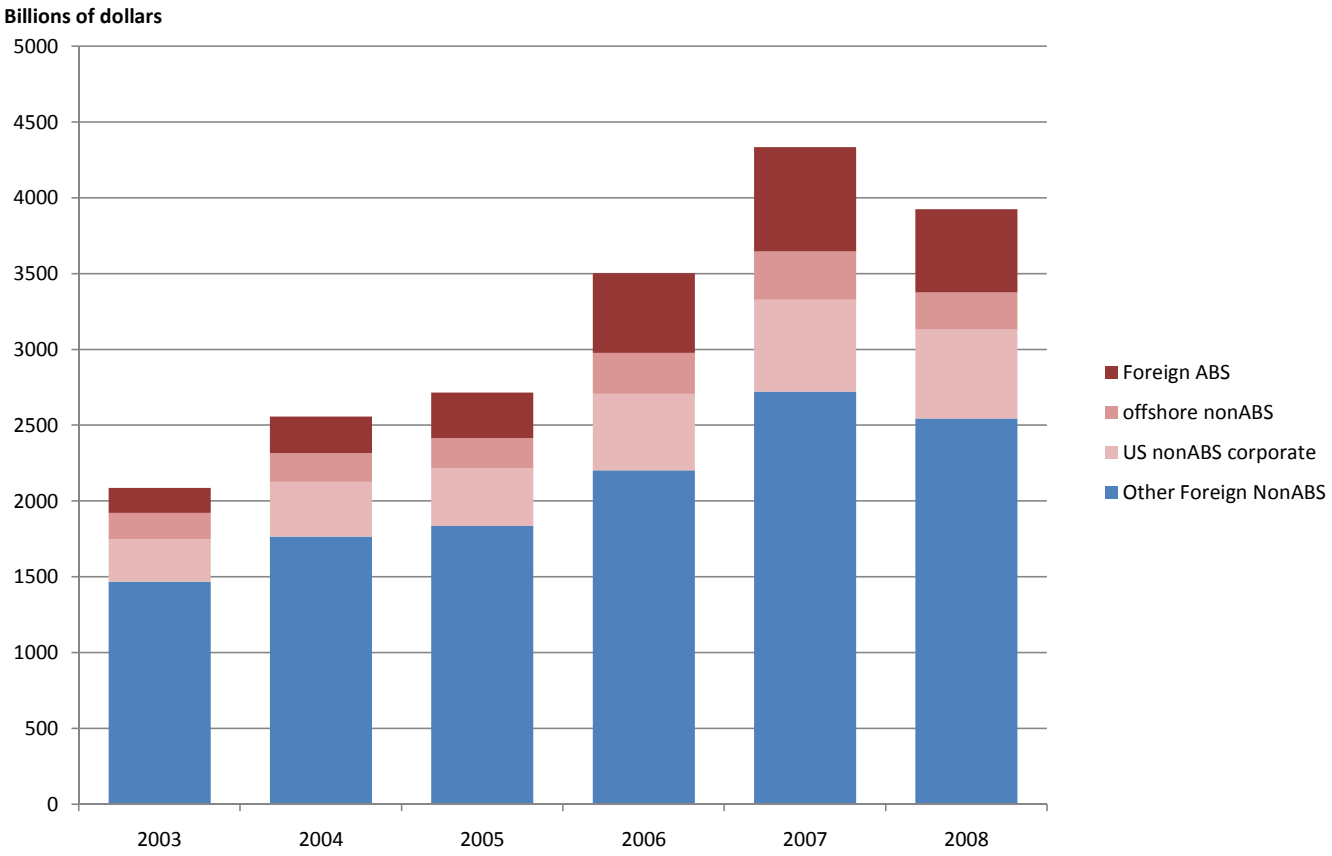
2007 Holdings of Treasuries and Agencies



Source: TIC data.

Figure 4a

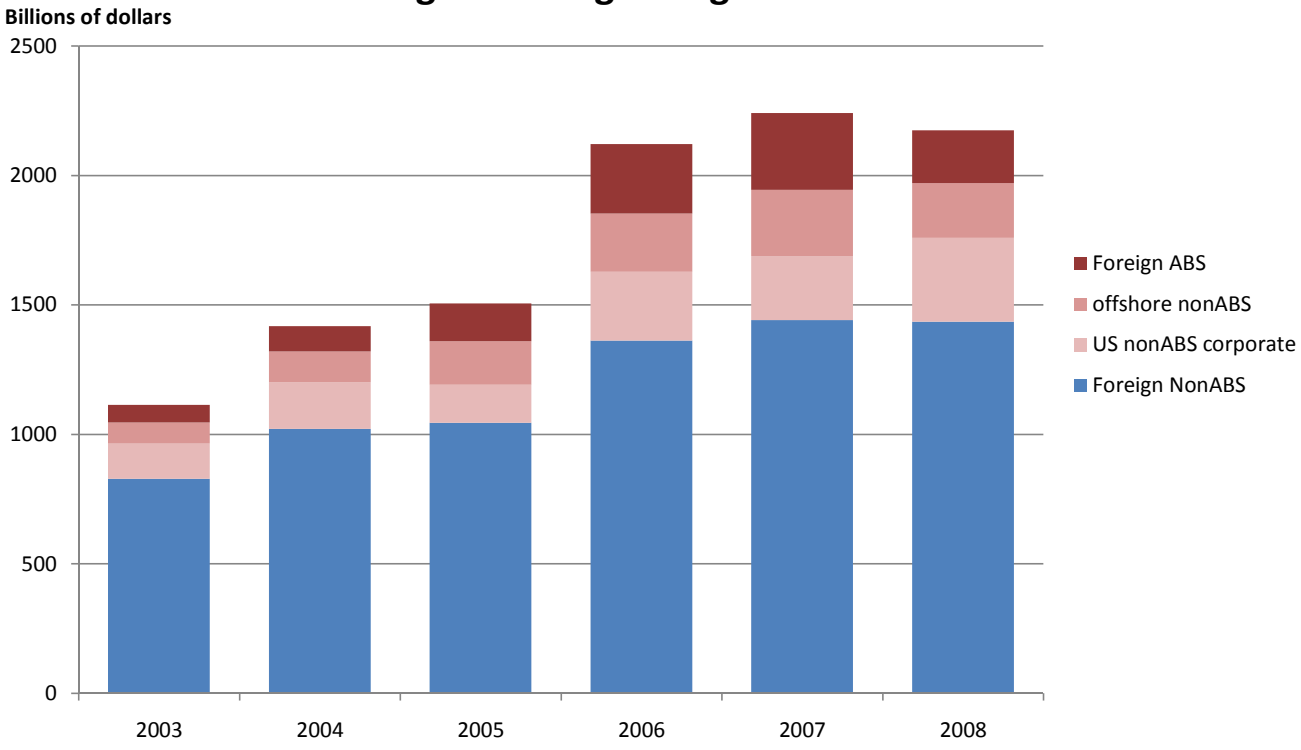
Euro area holdings of foreign long-term debt securities



Source: Staff estimates based on CPIS, euro area international investment position, and TIC.

Figure 4b

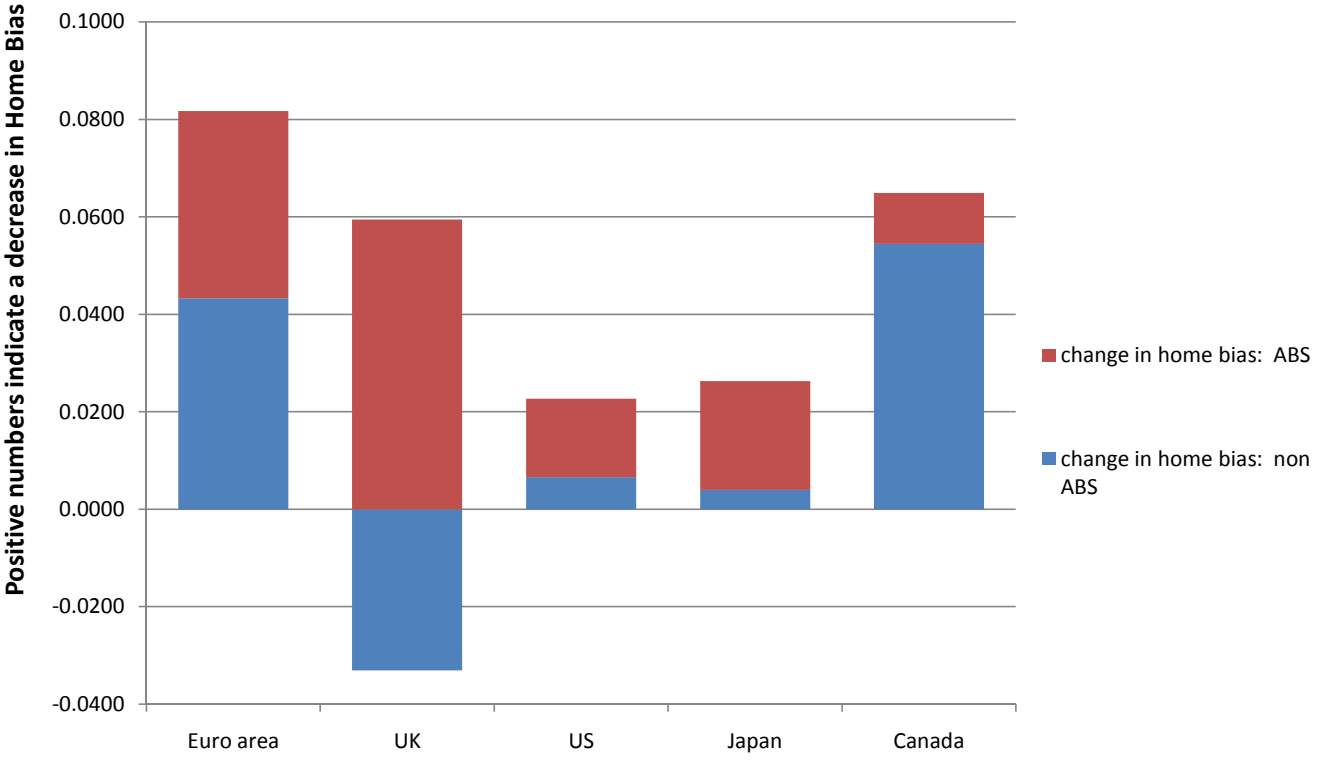
UK Holdings of Foreign Long-Term Debt Securities



Source: Staff estimates based on CPIS, UK international investment position, and TIC.

Figure 5

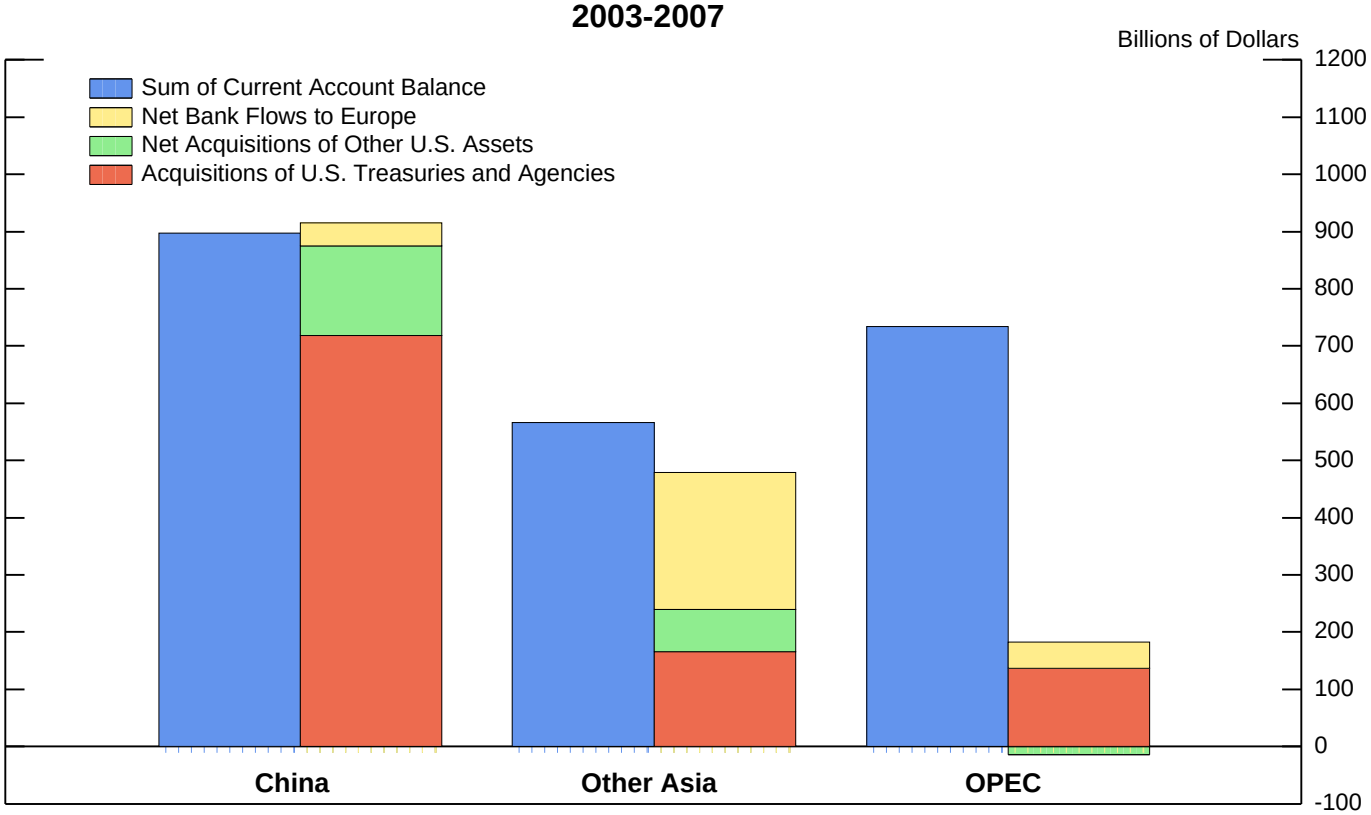
Decrease in "Home Bias" arising from ABS and nonABS cross-border investment: Dec. 2003 to Dec. 2007



Source: Staff estimates based on CPIS and TIC.

Figure 6

Current Account Surpluses and Financial Acquisitions of Certain Surplus Regions, 2003-2007



Source: For current account balance, Haver Analytics and BEA, for balance of payments accounts, staff estimates based on TIC and BIS banking data.

Figure 7

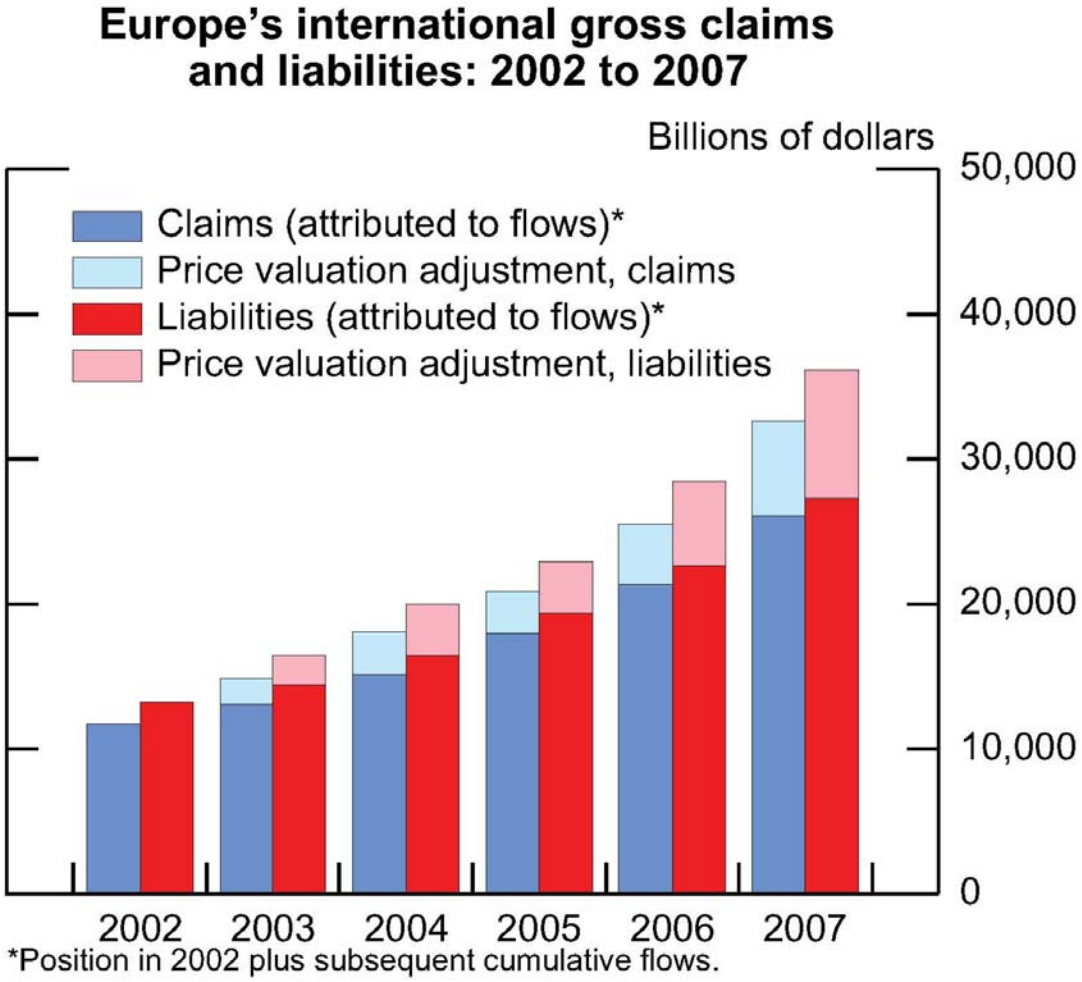

Europe's international gross claims and liabilities: 2002 to 2007
Billions of dollars
50,000
40,000
30,000
20,000
10,000
0
Claims (attributed to flows)*
Price valuation adjustment, claims
Liabilities (attributed to flows)*
Price valuation adjustment, liabilities
2002
2003
2004
2005
2006
2007
*Position in 2002 plus subsequent cumulative flows.

Figure 8

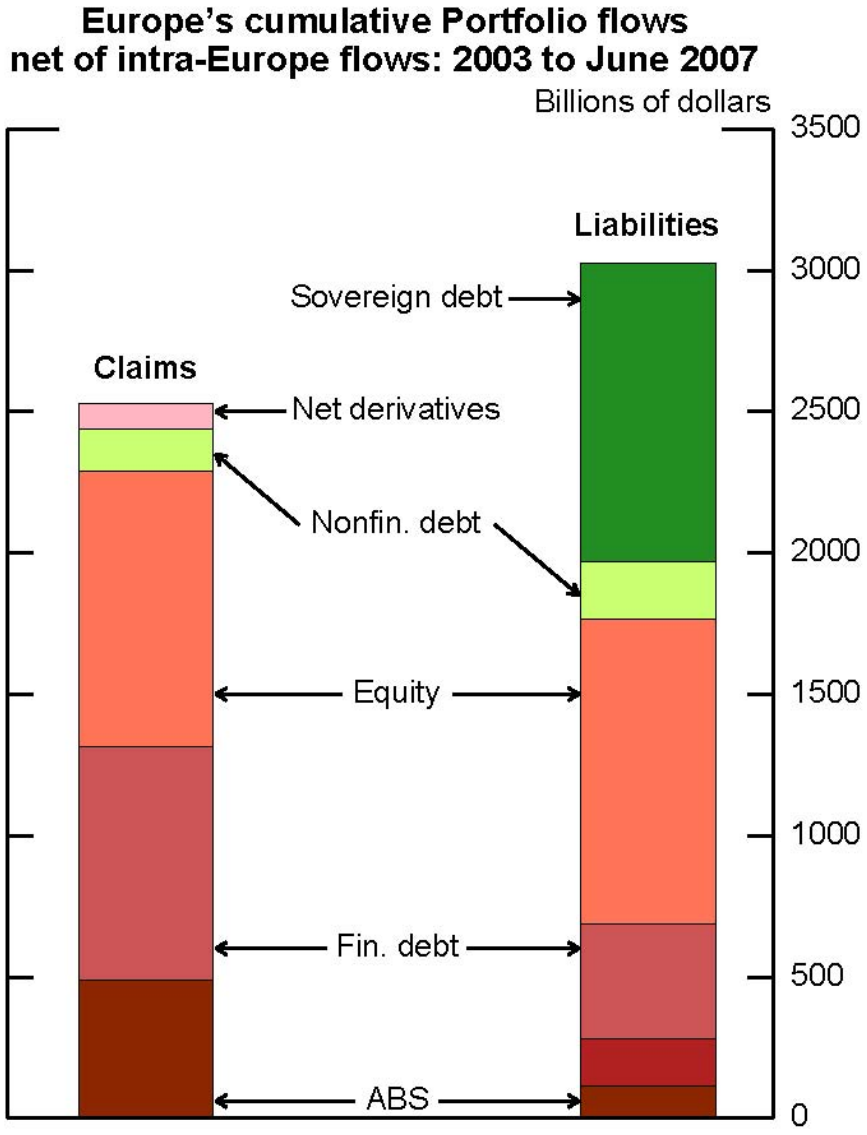
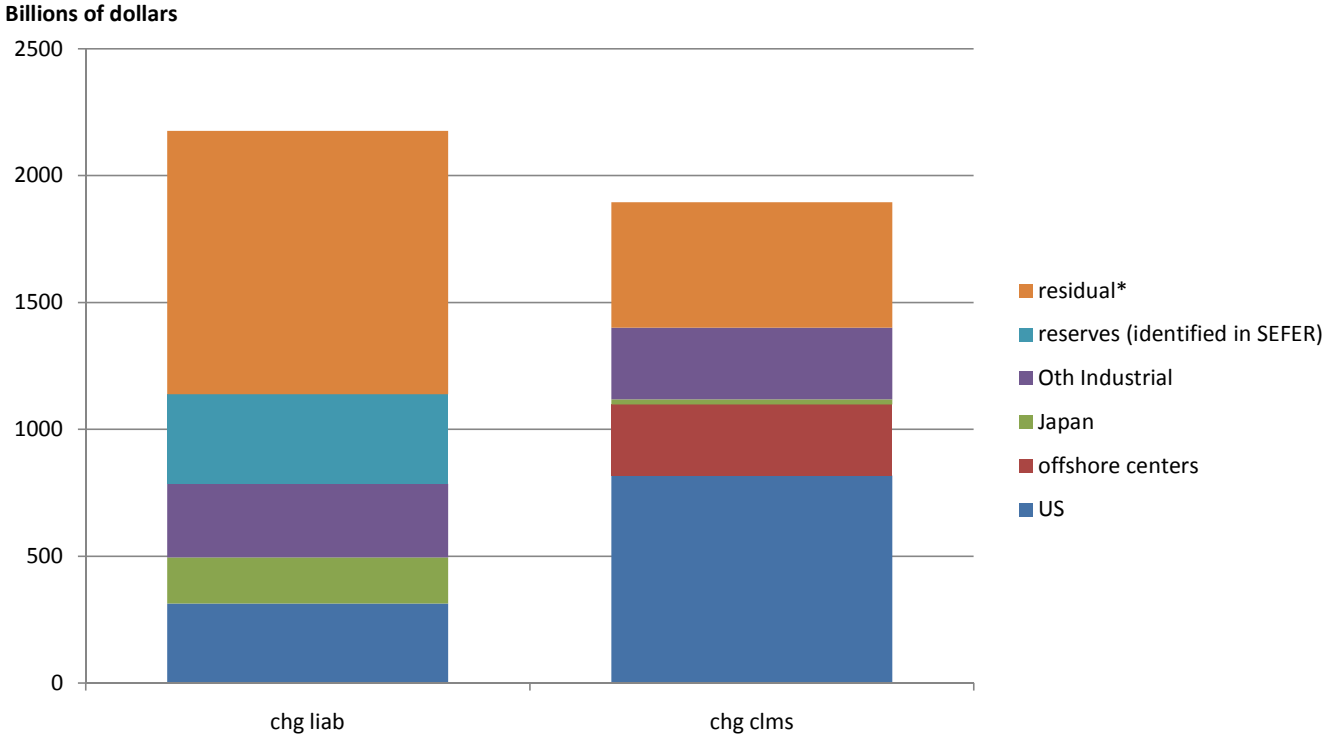

Europe's cumulative Portfolio flows
net of intra-Europe flows: 2003 to June 2007
Billions of dollars
3500
3000
2500
2000
1500
1000
500
0
Liabilities
Claims
Sovereign debt
Net derivatives
Nonfin. debt
Equity
Fin. debt
ABS

Figure ϕ

Change in cross border liabilities vs claims: euro area + UK; long-term debt securities; 2003 - 2007



Source: Staff estimates based on CPIS, euro area and UK international investment positions, and TIC.

***Residual liabilities are with EMEs and Offshore centers; residual claims are mainly with EMEs, including eastern Europe**