

Preliminary and incomplete, comments welcome

# Bilateral Cross-Border Holdings and Global Imbalances: A View on the Eve of the Global Financial Crisis<sup>1</sup>

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## **Abstract**

We present a novel and comprehensive dataset of bilateral gross and net external positions in various financial instruments for the main advanced and emerging economies and regions, designed to improve our understanding of cross-border financial linkages. The data show no strong correspondence between country or region pairs with the largest gross and net external positions, and the importance of international financial centers, including offshore centers, in intermediating financial flows. We also highlight some important data gaps in completing a network of cross-border holdings, related to the limited available information on the size and geographical pattern of external claims and liabilities of offshore centers, oil exporters, and other emerging markets.

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## I. INTRODUCTION

During the last 15 years international financial integration has increased dramatically. This process was characterized in particular by two related trends: an explosion in the size of cross-border capital inflows and outflows, reflected in rapidly expanding stocks of external assets and liabilities; and the emergence of global imbalances, reflected in an increased dispersion in world current account positions and a sharp widening of global net debtor and creditor positions. With cross-border financial linkages becoming much stronger, measuring them accurately is essential to understand the impact and international transmission of shocks, as the global financial crisis has clearly shown. However, while research on causes and consequences of global imbalances and international financial integration has been extensive, and recent pioneering work by Kubelec and Sa (2010) has documented the increase in bilateral financial linkages among 18 advanced economies and emerging markets, we still lack a comprehensive global picture of bilateral net and gross positions across countries. This paper takes a first step towards filling that gap.

Specifically, we construct a dataset of bilateral holdings of assets and liabilities, broken down by type of financial instrument, as of end-2007, for all the main “actors” in financial globalization: large countries or regions, such as the United States, the euro area, and Japan; important financial centers, such as the United Kingdom and Switzerland; rapidly growing emerging markets, such as Brazil, China, India, and Russia; other emerging market country groups that play an important role in international trade and global imbalances, such as oil exporters and emerging Asia; and offshore centers, that play an important role in the intermediation of international capital flows. Overall, our sample covers some 70 countries and a global set of partner countries.

Our data provide a snapshot of cross-border gross and net holdings after over a decade of expansion in cross-border financial activity, just before the inception of the most virulent phase of the global financial crisis. It brings together the analysis of gross positions, associated with increased cross-border portfolio diversification, with the analysis of net positions, which reflect the period of widening global imbalances. For example, it allows establishing whether the most important financial trading partners of the United States are also the countries holding the largest net claims on the United States. And importantly, it also provides a measure of what we don’t know: for each asset class, we compare total external holdings (or liabilities) by a country with those that we can actually “attribute” to specific financial trading partners to assess gaps in our information by type of financial instrument, and make inferences about their possible sources.

A simple example can illustrate the usefulness of these data. The trigger of the financial crisis originated in a segment of the U.S. bond market—namely, U.S. mortgage-backed securities. An analysis based on aggregate data could have suggested that countries with large net creditor positions—the counterpart to the large U.S. current account deficits—would have been affected more severely, and all the more so since these countries had large holdings of U.S. debt

securities. Instead, overseas holdings of U.S. “toxic” assets were concentrated in highly leveraged financial institutions in offshore centers and advanced economies such as Germany, France, Switzerland, and the United Kingdom rather than emerging economies (Figure 1), while emerging market investors held primarily Treasury securities and agency bonds. As a result, the initial shock affected financial institutions in advanced European countries, leaving emerging markets unaffected. This example illustrates several key points: the importance of looking at gross exposures, and not just net exposures; the importance of the composition of cross-border holdings, and not just their level; and the importance of sectoral exposures.

In order to gain a better understanding of the transmission of shocks across borders, it is important to complement data based on the concept of residence (the guiding principle of our data, and of balance of payments statistics more generally) with data on ultimate exposures and currency of denomination. For example, residence-based data will overstate exposures to and of small financial centers that play an important role as international financial intermediaries. Also, currency mismatches can arise even without net creditor or debtor positions vis-à-vis specific geographical areas. Unfortunately, data on ultimate exposures are so far only available for bank assets (“consolidated foreign claims”) of a group of mostly advanced economies (reported by the Bank of International Settlements) and information on the currency of denomination of cross-border holdings is still incomplete (see Lane and Shambaugh, 2010 for progress on this front). We discuss the links between these types of data later in the paper (see also McGuire and von Peter, 2009 and Kubelec and Sa, 2010 for related discussions).

Our data analysis is somewhat hampered by our limited knowledge of the size and geographical composition of external balance sheets in certain countries—particularly Middle-Eastern oil exporters and offshore centers. In this respect, the strength of our work in that respect consists in clearly documenting where the major data shortfalls are, including by type of financial instrument. In turn, this provides useful information as to the likely ultimate holders of claims and liabilities that are not properly identified. In addition, our data can also highlight cases where reported total positions appear at odds with partner-country information.

Our work is related to a number of existing papers in the literature. The closest ones are Kubelec and Sa (2009, 2010). These authors construct data on bilateral external positions for 18 countries for the period 1980–2005 to describe the evolution of the “global financial network” and estimate the degree of international trade and financial spillovers in a vector autoregression model. The time-series coverage of this pioneering work is impressive, but the cross-sectional coverage (18 countries, 5 of which belong to the euro area) is considerably more limited than ours. The data work is also different. Kubelec and Sa assume that claims and liabilities between these 18 countries “span” the entirety of their cross-border external claims and liabilities, and rely on data estimation to fill in missing data. We instead construct bilateral positions vis-à-vis all financial trading partners, and we instead rely almost entirely on “measured” data, thereby helping establish and characterize the extent of data shortfalls. In related work, Kubelec, Orskaug, and Tanaka (2007) construct bilateral external positions of 3 countries (the United

States, the United Kingdom, and Canada) and describe the degree of financial integration among them and exposures to financial shocks. Daude and Fratzscher (2008) use an extensive data set of bilateral external positions to examine the role of information frictions and institutional factors in determining the composition of capital flows. Our work is also related to McGuire and von Peter (2009), who focus on the structure of global banking operations, and in particular the funding needs of the ultimate holders of bank claims, to understand the factors which led to global dollar shortages during the crisis.

Our data analysis identifies a number of important stylized facts:

- As the data on countries' aggregate external balance sheets suggests, we find that countries' main financial partners are not necessarily their main net creditors (or debtors).
- The degree of financial integration and the magnitude of global imbalances vary considerably across regions, level of income, and types of financial instruments. In general, advanced economies have large cross-border claims and liabilities vis-à-vis other advanced economies, particularly within Europe and between Europe and the United States. In contrast, some emerging markets as well as Japan have sizable net bilateral positions vis-à-vis major advanced economies.
- As documented by Lane and Milesi-Ferretti (2010) and Kubelec and Sa (2009, 2010), financial and offshore centers are major players in the global financial system. We show that linkages between offshore centers and the United States and the United Kingdom are particularly strong.
- Countries' exposures to foreign financial shocks vary considerably, reflecting the degree of their financial integration with foreign countries and the nature of financial instruments they trade with them.

The rest of the paper is organized as follows. Section II describes the data. Section III presents the key stylized facts related to aggregate data and data coverage, while Section IV describes the structure of the bilateral external portfolio for the main countries and regions. Section V discusses exposures to external financial shocks, and Section VI concludes.

## **II. BILATERAL DATA ON EXTERNAL ASSETS AND LIABILITIES**

We construct bilateral international investment positions for those countries and regions playing a more prominent role in the global financial system for end-2007.<sup>2</sup> Such positions

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<sup>2</sup> Comprehensive statistics on bilateral cross-border holdings typically become available with a significant lag with respect to data on aggregate cross-border holdings, the exception being banking data.

describe the financial relationship between domestic residents and residents of other countries. The data cover about 70 countries, including 14 source countries or regions (the United States, Japan, the United Kingdom, Switzerland, Canada, China, Hong Kong S.A.R, Singapore, the euro area, other advanced countries, oil exporters, offshore centers, the rest of emerging Asia, Brazil, Russia, and India) and 19 partner countries or regions (14 source countries or regions, 4 residual groups, including other Europe, other Latin America and Caribbean, other Asia and Pacific, and other Africa; and international organizations). Appendix 1 provides more details on the composition of regional groups.

The choice of the countries and regions for which we collected data was driven by three primary considerations: i) their economic size; ii) the size of their overall external portfolios (for example, financial and offshore centers); and their importance in global net creditor and debtor positions (for example, oil exporters). We use statistics for the aggregate euro area—rather than individual euro area countries—in light of the extensive data availability on bilateral external positions and the role of the euro as a global currency. We discuss the implications of this choice in the following sections.

### **A. Instrument breakdown**

The instrument breakdown of our external assets and liabilities data follow the conventions of balance of payments reporting. Specifically, we report data for foreign direct investment (FDI), portfolio equity, portfolio debt, and other investment, plus holdings of official reserves. For the remaining balance of payments category—financial derivatives—information is much more limited: bilateral data are only available for the United States, and several countries do not yet report even the aggregate value of their holdings of financial derivatives. Data for portfolio equity assets and liabilities are at market prices, while the reporting convention for FDI data varies between book and market value across countries. Our bilateral data identifies total claims of residents of country Y on residents of country X in the form of financial instrument Z, but not the currency of denomination of the financial instrument.<sup>3</sup> Still, in several cases we can make inferences about currency composition: for example, virtually the entire stock of cross-border portfolio equity and FDI holdings are denominated in the currency in use in the residence of the issuer.

The dataset is assembled using a variety of sources, summarized below. Appendix II provides more details on data sources and assumptions made in constructing the data set.

### **Foreign direct investment**

Statistics on bilateral FDI claims and liabilities come from Eurostat, OECD, UNCTAD, as well as national sources. As we discuss later, these statistics are less than ideal: they are not uniformly available for our sample, they use a variety of valuation methods (historical cost; book value; market value), and show at times significant differences between the claims reported by country X in country Y and country Y's reported liabilities vis-à-vis country X.

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<sup>3</sup> See Lane and Shambaugh (2010) for an attempt to estimate cross-border currency exposures.

### **Portfolio investment: equity securities**

The main source of data is the IMF's Coordinated Portfolio Investment Survey (CPIS), which reports bilateral portfolio assets for about 70 reporting countries, broken down into portfolio equity and portfolio debt securities. For those countries, the breakdown of total reported portfolio assets into bilateral claims is virtually complete. These data also allow us to derive portfolio equity liabilities vis-à-vis CPIS-reporting countries. We integrate these data with national-source data on reported bilateral portfolio liabilities (available for the United States and a few other countries).

### **Portfolio investment: debt securities**

For portfolio debt assets, we also make use of the IMF's CPIS, which also allows us to derive portfolio debt liabilities vis-à-vis CPIS-reporting countries. As for portfolio equity, we integrate these data with national-source data on bilateral portfolio liabilities (available for the United States and a few other countries). In addition, we use estimates of portfolio debt liabilities that partner countries hold as foreign exchange reserves, using information on a survey of reserves in the form of securities conducted in parallel to the CPIS.

### **Other investment**

Our primary source of data is bilateral locational banking statistics reported by individual countries to the Bank for International Settlements. These statistics capture banks' external assets and liabilities on a bilateral basis, broken down along two dimensions: total assets and loans and deposits, and claims and liabilities vis-à-vis banks and nonbanks. For countries whose banks report data to the BIS, these statistics provide a complete picture of domestic banks' external claims and liabilities vis-à-vis foreign banks and foreign nonbanks. These data can be complemented with the claims and liabilities of other BIS-reporting countries' banks vis-à-vis domestic nonbanks (since only domestic banks report their external claims and liabilities). This implies that the only missing data are claims and liabilities of domestic nonbanks vis-à-vis foreign nonbanks, as well as claims and liabilities of domestic nonbanks vis-à-vis non-BIS-reporting banks. For countries whose banks do not report data to the BIS, we use instead total claims and liabilities of BIS-reporting countries' banks vis-à-vis home country's residents, implying a more partial coverage (since we only cover domestic residents' positions vis-à-vis foreign banks from BIS-reporting countries). In a few cases national sources provide a direct geographical breakdown for other investment assets and liabilities—this is the case, for example, for the euro area and the United Kingdom.

### **Foreign exchange reserves**

Data on the composition of foreign exchange reserves is only available for a relatively limited set of countries (for details, see, for example, Truman and Wong, 2006). The data generally refers to the composition of reserves by currency, rather than by residence of the counterpart. There are two exceptions. The first is provided by data on the issuers of securities held as reserves published by the IMF in its Coordinated Portfolio Investment

Survey, which report the destination country of reserves held in the form of securities for the aggregate of some 70 countries participating in the CPIS. The second is the U.S. Treasury survey of U.S. portfolio liabilities, which provides information on foreign holdings of U.S. securities by country and type of security. While the report does not provide a breakdown between private and official holdings, the data can be used in conjunction with country-reported data on holdings of portfolio assets in the United States (which do not include reserves) to infer the amount of securities held as reserves in the United States. We combine these data with information on the currency allocation of reserves, based on national sources, BIS multilateral surveillance statistics, and data on the currency composition of reserves published by the IMF (“COFER data”) to infer their geographical allocation. This is the only instance in which we partially depart from the exclusive use of reported or derived bilateral positions. For example, for those CPIS-reporting countries for which we have no other information on the composition of reserves we assume that reserves held as securities for each country are held in different countries in the same proportion as the aggregate.<sup>4</sup>

### **B. Other data issues**

The construction of data involves addressing several thorny issues. The first concerns differences between reported claims and reported liabilities. Specifically, there can be differences between what country X reports to be holding in country Y in terms of financial claims Z and the liabilities reported by country Y vis-à-vis country X. In these cases, our general approach is to rely primarily on what is reported by the “creditor country”, particularly for traded financial instruments. For example, it is much easier for asset surveys to ascertain the residence of the issuer of a bond owned by a country resident than for borrowers’ surveys to ascertain the ultimate ownership of their bonds.<sup>5</sup> In our dataset, large differences can also arise for estimates of foreign direct investment between the two “FDI partners” (as also discussed in Kubelec and Sa, 2010). These differences can relate to different methods of estimation (book value versus market value) but also different principles in establishing the partner country.<sup>6</sup> In a number of cases, we use for each country its own reported data, thus facilitating comparisons with total external assets and liabilities reported by the country. However, this also implies that in those few instances our dataset is not perfectly symmetric.<sup>7</sup>

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<sup>4</sup> While it is reasonable to assume that, say, most dollar-denominated securities are issued by the United States, BIS data on bank liabilities vis-à-vis central banks show that as of end-2007 over 2/3 of dollar deposits by central banks were held in banks outside the United States.

<sup>5</sup> See, for example, Bertaut and Grier (2003).

<sup>6</sup> For example, a U.S. firm can have a direct investment position in, say, Poland through an affiliate domiciled in Ireland. U.S. reported data will show a claim of the United States on Ireland, but Polish data may show a FDI liability vis-à-vis the United States.

<sup>7</sup> There are some large differences in reported FDI positions between the United Kingdom and the euro area. Also, creditor and debtor positions vis-à-vis Switzerland tend to exceed Swiss reported positions in a number of cases.

A second problem relates to the use of banking data. In line with our use of balance of payments statistics conventions, the bilateral data on external assets and liabilities of banks needs to be split among different asset categories: “other investment” for loans and deposits, and portfolio investment for holdings of securities. Unfortunately, a proper split between these two categories is not always available on a bilateral basis. In addition, some countries (such as Switzerland) have significant differences in their total reported bank holdings through BIS and those inferred from the IIP. For countries for which we only have data on total bilateral bank positions we either use data on the composition of their portfolio assets, if available, to infer the portion of bank claims that reflect portfolio assets, and amend bank holdings accordingly to avoid double-counting. For cases in which data on the level or sectoral composition of portfolio assets are not available (for example, for some offshore centers) we classify all bank claims and liabilities as “other investment”, which may imply some overestimate of other investment claims and liabilities and a corresponding underestimate of portfolio claims or liabilities.

The data on bilateral asset and liability positions is complemented by data on total external assets and liabilities of countries (the so-called “International Investment Position”). The source of data for aggregate external positions are the updated EWN II database (described in Lane and Milesi-Ferretti, 2007b and updated to 2008 for some 180 countries) and a new database on external assets and liabilities of small offshore centers (Lane and Milesi-Ferretti, 2010). Several countries in our sample report official estimates of their external assets and liabilities, and those are used by the EWN II database. However, for a number of countries and territories (ranging from several major oil exporters to small offshore centers) no data on the International Investment Position are available. In those cases, the EWN II database and the offshore center database construct estimates on the basis of a variety of methods and sources, detailed in the papers cited above. In the context of this paper, the data on total external assets and liabilities provides the starting point for establishing “global stylized facts” that the bilateral data will help us understand, and also allows us to measure the extent to which our bilateral data “spans” total external holdings.

### **III. STYLIZED FACTS: AGGREGATE POSITIONS AND DATA COVERAGE**

Before turning to bilateral data, it is useful to highlight some key stylized facts concerning gross and net external positions of the countries and regions in our sample.

#### **A. Aggregate positions**

The trend towards increased international financial integration accelerated rapidly in the 1990s, especially in advanced economies, where the ratio of external assets and liabilities to GDP more than tripled between 1990 and 2007 (Figure 2, top panel). The increase in external positions in emerging markets was more gradual, and the overall size of their external portfolio is much lower in relation to the countries’ GDP than it is for advanced economies (Figure 2, bottom panel). Figure 3 summarizes the geographical distribution of world external assets and liabilities as of end-2007. The figure, which specifically highlights the countries and regions of our sample, shows that claims and liabilities of advanced economies and offshore centers were well over 80 percent of the world total, a much higher share if compared to their share of world GDP or world trade.



On the other hand, the evolution of net creditor and debtor positions underscores a much more important role played by emerging markets (Figure 4). Emerging Asian countries and oil exporters were among the main counterparts to the increased external liabilities accumulated by the United States, and 7 of the 10 largest net creditors at the end of 2007 were emerging markets.

What lies behind these trends? Are global net creditors' claims primarily vis-à-vis net debtors? What is the pattern of international financial integration across countries and regions? Is there a correlation between gross and net positions? Which countries hold larger claims on emerging markets, and where do emerging markets invest? These are some of the questions our data can help address. But of course the first question is how well our bilateral data can track the aggregate external positions described in Figures 2-4.

### **B. Bilateral data coverage**

As noted earlier, the main obstacle in comparing bilateral data on cross-border assets and liabilities with totals at the country level is the fact that a number of countries in our sample—primarily oil exporters and offshore centers—do not report total external assets and liabilities, and available estimates are subject to very significant uncertainty.

With that caveat in mind, Figure 5 shows what fraction of a country or region's external assets and liabilities our bilateral dataset is able to explain.<sup>8</sup> Overall, the bilateral data coverage for advanced economies is very satisfactory. This reflects the more extensive reporting of bilateral data by individual advanced economies, as well as the availability of partner-country data (given the extensive financial linkages among advanced economies that we will document shortly).

At the other extreme, data coverage is particularly poor for Middle-Eastern oil exporters. These countries generally do not report any geographical breakdown of their external assets and liabilities—indeed, in most cases they do not report their total external assets and liabilities either. Hence for the vast majority of countries in this group we rely on trading partners' data to identify bilateral holdings. Still, since advanced economies are likely to be the destination of most of the financial claims of these countries, why is the data coverage so scant? One reason are the (likely very extensive) securities holdings by these countries (foreign exchange reserves, sovereign wealth funds, and other holdings). However, the availability of bilateral portfolio liabilities data is limited to a few advanced economies (the most prominent being the United States). In addition, these data are likely to underestimate holdings by oil exporters because of a “custodial bias”—the destination country's survey only identifies the first holder in the chain.

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<sup>8</sup> In order to maintain consistency with aggregate country data, bilateral assets and liabilities include those within the same region (for example, emerging Asian countries' claims on other emerging Asian countries) with the exception of the euro area, for which we have aggregate data on external assets and liabilities that exclude intra-euro area holdings.

Coverage for other emerging markets is less complete than for advanced economies, but better than for oil exporters. In general, obstacles to coverage reflect a variety of factors: lack of information on the geographical allocation of foreign exchange reserves, incomplete coverage of other investment claims and liabilities (hampered by the fact that several emerging markets do not report locational bilateral banking statistics to the BIS) as well as incomplete statistics on bilateral FDI claims and liabilities. Also, no bilateral data are available for some large holders of external portfolio assets (for example, Taiwan province of China, in addition to oil exporters such as the United Arab Emirates). Still, existing data combined with partner-country data ensure that our data covers between 2/3 and 3/4 of the external portfolio of Brazil, Russia, and India as well as of emerging Asia, and a larger share of the external portfolio of China.<sup>9</sup>

While Figure 5 suggests full coverage for offshore centers' external positions, true coverage is likely to be incomplete, because total external assets and liabilities of these centers are likely to be significantly underestimated (see Lane and Milesi-Ferretti, 2010, for a more extensive discussion). For example, total external assets and liabilities for offshore centers in Lane and Milesi-Ferretti, 2010 (which are used in the denominator of the top panel) reflect only those claims and liabilities that can be attributed to individual offshore centers, while in some cases our bilateral partner data provides exposures to groups of offshore centers, without identifying them separately (for example, in the case of the euro area). In addition, incomplete partner-country reporting likely implies a significant under-estimate of portfolio assets and liabilities in some large offshore centers with significant mutual fund activity.<sup>10</sup>

The bottom panel of Figure 5 summarizes the absolute size of our “gaps” in terms of bilateral data coverage. The largest absolute value—some \$3.5 trillion, is for the euro area's external liabilities, and its lion share is accounted for by portfolio liabilities, particularly in the form of equity (Table 1). Portfolio liabilities is the only category in the euro area's external position for which the European Central Bank does not provide a geographical breakdown, in light of the difficulty in ascertaining holders of tradable financial instruments. Since the counterpart of euro area portfolio liabilities is identified on the basis of partner-country data, primarily coming from the Coordinated Portfolio Investment Survey, a significant part of the missing data is likely to be accounted for by the main holders of portfolio assets that do not participate or participate only partially to the CPIS. In particular, these include oil-exporting countries with large sovereign wealth funds, such as Kuwait and the United Arab Emirates; offshore centers with a large presence of investment funds, such as the Cayman Islands; and

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<sup>9</sup> The bilateral data coverage for China is somewhat inflated by the fact that partner-country data on Chinese FDI and portfolio equity holdings overseas exceeds by a significant margin total reported Chinese external assets in those categories. The same phenomenon occurs, albeit to a less significant extent, for FDI in China.

<sup>10</sup> For example, the portfolio equity liabilities of the Cayman Islands derived from the CPIS portfolio survey were around \$770 billion at end-2007, but a Cayman Islands Monetary Authority's survey of investment fund activity in the Cayman Islands found net asset values totaling over \$2.2 trillion. Only the banking sector of the Cayman Islands has so far participated in the CPIS, and therefore the information on the geographical distribution of portfolio claims by the Cayman Islands is severely incomplete.

economies in emerging Asia that are holders of large reserves and/or large portfolio assets, such as China and Taiwan province of China. For example, the sum of China's foreign exchange reserves and portfolio debt assets at the end of 2007 was close to \$1.8 trillion. The United States reported around \$1 trillion in portfolio debt liabilities to China, and portfolio debt claims on the euro area are likely to account for part of the balance.

The "portfolio equity gap" may also be partly due to some under-reporting by other European countries of their claims on financial centers in the euro area. This explanation is supported by the fact that, as shown in Table 1, most of the "equity gap" is explained by unidentified claims on Ireland and Luxembourg, the major centers for the European mutual fund industry.

#### IV. NET AND GROSS EXTERNAL POSITIONS

We turn now to a characterization of bilateral net and gross external positions for the countries and regions in our sample.

##### A. Net and Gross External Positions: the United States

U.S. data is of particular interest for several reasons: the United States is the largest net debtor, reflecting its large current account deficits during the past decade; the role played by financial linkages with the United States in the transmission of the global financial crisis; and the fact that our bilateral data spans almost the full range of U.S. external assets and liabilities.

The upper panel of Figure 6 shows bilateral net external positions vis-à-vis the United States. The countries and regions with the largest net claims on the United States—China, Japan, oil exporters—are also among the largest "net creditors" in an absolute sense, as shown in Figure 3 on global imbalances. Another noteworthy feature is the net liability position of the United States vis-à-vis offshore centers, which likely captures indirectly additional claims on the United States by other country groups. The U.S. is instead a net creditor vis-à-vis a number of other advanced economies, as well as Brazil, India, and Russia taken together.

The lower panel, which depicts bilateral external assets and liabilities, clearly illustrates how the dominant share of the U.S. external portfolio is accounted for by the euro area, the United Kingdom, and offshore centers—each having external claims and liabilities vis-à-vis the U.S. exceeding 20 percent of U.S. GDP. In contrast, the size of direct U.S. claims on China or oil exporters is quite modest. A particularly noteworthy feature is the importance of international financial centers as "financial trading partners" for the United States. Collectively, the United Kingdom, Hong Kong S.A.R., Singapore, Switzerland, and offshore centers had external claims and liabilities vis-à-vis the U.S. exceeding 50 percent of U.S. GDP in 2007. This makes it more difficult to infer the transmission of U.S. financial shocks to the rest of the world and viceversa.

Figure 7 depicts the composition the bilateral external position of the United States by financial instrument. The upper panel of the figure shows that the United States has a positive net portfolio equity position vis-à-vis virtually all country groups, with the exception of oil exporters (where foreign access to domestic equities is limited) and Singapore (a financial

center with very large net foreign assets). The U.S. also tends to have a positive net FDI position vis-à-vis its financial trading partners. Conversely, the United States has a negative portfolio debt position vis-à-vis all countries and regions, with the exception of Canada, with net debt positions being particularly large vis-à-vis the euro area, China, and Japan. In many cases, this reflects large holdings of U.S. debt securities in the form of foreign exchange reserves, while for the euro area holdings of U.S. debt securities were primarily in the form of corporate bonds. Overall, the bilateral U.S. positions exhibit the “long equity, short debt” pattern of the overall U.S. external portfolio.

The bottom panel of Figure 7 depicts the composition of the entire external portfolio (the sum of external assets and liabilities). The figure clearly shows the large role played by banking flows (primarily reflected in the category “other investment”) in cross-border financial holdings vis-à-vis the United Kingdom and offshore centers. For the euro area instead FDI and portfolio positions play a more important role, and portfolio holdings also account for the lion share of claims and liabilities vis-à-vis Japan.

### **B. Net and gross external positions: the euro area**

The euro area is the largest holder of external assets and liabilities in our sample—a remarkable stylized fact since these data net out all cross-border holdings within the region.<sup>11</sup> The bilateral net and gross external positions of the euro area are summarized in Figure 8. In interpreting these data, it is useful to keep in mind that for the euro area bilateral data coverage is virtually complete on the asset side but has a significant gap on the liability side, reflecting incomplete information on the residence of holders of euro area securities (as discussed earlier). As a result, the sum of the net bilateral positions in our dataset is close to balance, while the euro area’s overall net external position was around – 15 percent of GDP. As discussed at the end of the previous section, it is likely that some countries in emerging Asia, oil exporters, and offshore centers account for a significant portion of the unidentified claims on the euro area.

With this caveat in mind, the top panel of the Figure shows that the largest identified net creditor position of the euro area, and by a significant extent, is vis-à-vis Central and Eastern Europe. The euro area has also smaller net creditor positions vis-à-vis the United Kingdom and the United States, while the net creditor position vis-à-vis offshore centers is likely to reflect in part incomplete information on bilateral portfolio liabilities of the euro area.<sup>12</sup>

The bottom panel of Figure 8 highlights the striking size of cross-border claims and liabilities of the euro area vis-à-vis the United Kingdom, which exceed considerably even those vis-à-vis the United States. The euro area also has large external positions vis-à-vis offshore centers, Switzerland, and other advanced economies (the latter reflecting primarily positions

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<sup>11</sup> Total external assets of the 13 countries that were euro area members at end-2007 were over US\$37 trillion, of which some \$17 trillion consisted of holdings in other euro area countries.

<sup>12</sup> The United Kingdom and United States report their bilateral portfolio holdings vis-à-vis the euro area, and are hence not likely to account for the missing euro area liability data.

vis-à-vis Denmark, Norway, and Sweden). In contrast, bilateral positions vis-à-vis emerging countries outside Europe are considerably smaller in size.

Figure 9 provides a characterization of the euro area net and gross positions in terms of the underlying financial instruments. Its top panel shows that FDI accounts for a significant portion of net claims on “other Europe”—a group of emerging European economies. For other countries, the euro area has generally a positive net FDI positions vis-à-vis emerging markets and a negative position vis-à-vis advanced economies. Also noteworthy are the large net creditor position in portfolio debt instruments vis-à-vis the United States, and the large negative portfolio debt position vis-à-vis Japan and Switzerland. Its bottom panel shows the importance of “other investment” positions in explaining the size of the external portfolio vis-à-vis the United Kingdom, as well as vis-à-vis offshore centers and Switzerland. These positions reflect to a significant extent the cross-border activity of euro area banks, which is conducted to a significant extent through their London subsidiaries (McGuire and von Peter, 2009).

### **C. Net and gross positions: Japan**

Figure 10 summarizes the bilateral net and gross positions of Japan. As shown by the top panel, the country is a large net creditor, with particularly large net claims on the United States (close to 30 percent of Japan’s GDP), as well as the euro area and offshore centers. The pattern of gross positions (depicted in the bottom panel) shows a comparatively smaller external portfolio relative to the euro area or the United States, with fewer instances of very large asset and liability positions vis-à-vis the same partner.

The composition by instrument of Japan’s external portfolio (Figure 11) shows that net portfolio debt holdings account for the lion share of Japan’s net claims, while foreign holdings of Japanese equities tend to exceed Japan’s holdings of foreign equities. As was the case with the euro area, Japan’s gross positions vis-à-vis the United Kingdom (bottom panel of Figure 11) are dominated by “other investment”, primarily reflecting cross-border banks’ claims and liabilities. In relative terms, other investment claims and liabilities are also an important component of the external portfolio vis-à-vis Hong Kong S.A.R., Singapore, and Switzerland, but in general play a smaller role for Japan than they do for the United States and the euro area, reflecting more modest cross-border activity by banks.

### **D. The external portfolios of emerging markets**

As documented earlier (Figure 5) our bilateral data coverage for emerging markets, while high, is less complete than for advanced economies. Among other things, this reflects on the asset side the difficulty in establishing the geographical allocation of reserve claims (and, for some oil exporters, of claims held by sovereign wealth funds). With this caveat in mind, the two panels of Figure 12 provide a snapshot of the bilateral allocation of emerging market portfolios (including in this group the financial centers of Hong Kong S.A.R. and Singapore). One first striking stylized fact is the overall size of the external portfolio of Hong Kong S.A.R., the largest of the entire group. Also, the figures highlight significant heterogeneity among these countries and regions. For example, the identified bilateral claims and liabilities of oil exporters and especially of Brazil, Russia, and India are to a very large extent vis-à-vis

advanced economies (with oil exporters having significant claims and liabilities vis-à-vis the United Kingdom, considered in the figure together with other advanced economies). In contrast, emerging markets in Asia have much larger bilateral positions vis-à-vis other emerging markets, as well as offshore centers (particularly from Hong Kong S.A.R.). With regard to China, bilateral claims vis-à-vis the United States account for over half of external claims, with Hong Kong S.A.R. accounting for a significant portion of the remainder. Hong Kong S.A.R. is by a significant extent the largest holder of claims on China, where FDI plays a particularly important role.

### **E. The role of offshore and financial centers**

The previous sub-sections have already documented the important role of offshore centers as financial trading partners of the main world economies. Figure 13 summarizes the estimated net and gross bilateral positions of these centers. Unlike for other countries, these positions are reported in billions of U.S. dollars, given that they represent very high multiples of the GDP of these economies.

It is interesting to note that while other investment positions, relating to a significant extent to banking activity, constitute a significant share of the external portfolio of offshore centers, other asset and liability types—including FDI, portfolio equity, and portfolio debt—are also of significant size. For example, portfolio equity positions are related to the presence of a significance mutual and hedge fund industry in some offshore centers, as well as to the fact that some major firms are incorporated in offshore centers. FDI positions are related both to the activities of large firms incorporated in offshore centers, as well as to the use of offshore centers to route FDI.<sup>13</sup> Finally, portfolio debt positions are also related to the large presence of structured finance vehicles, particularly in the Cayman Islands—for example, as discussed in the introduction, the Cayman Islands are the largest nonresident holders of U.S.-issued asset-backed securities.

### **V. IMPACT OF ASSET PRICE SHOCKS IN PARTNER COUNTRIES**

Our bilateral dataset allows us to examine what would be the impact of asset price declines in partner countries on the value of a country's external claims. Specifically, we conduct two simple exercises. The first consists in examining the impact of a 20 percent decline in the value of portfolio claims (equity and debt) as well as other investment claims on the countries with the largest external balance sheets (the euro area, the United Kingdom, and the United States). The second exercise examines the impact on the value of external assets in partner countries and regions of a generalized 20 percent decline in asset values in emerging markets (including FDI, portfolio claims, and other investment claims).<sup>14</sup>

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<sup>13</sup> For example, in 2007 the British Virgin Islands were the largest recipient of Hong Kong's FDI (ahead of China) and the second largest source of FDI in Hong Kong (after China).

<sup>14</sup> Our exercise is similar in spirit to the one conducted by Warnock (2006), who examines the potential financial spillovers of a decline in the value of claims on the United States. In related work, Lane and Milesi-

(continued...)

Before turning to the results, it is important to point out that the results of this exercise significantly overstate the impact of partner-country shocks on financial centers. For example, in economies with a large investment fund industry a decline in the value of portfolio assets due to asset price declines in trading partners will be symmetrically reflected in a decline in the value of external portfolio liabilities in the form of investment fund shares. This notwithstanding, the exercise provides a useful sense of the sensitivity of countries' external asset values to specific countries and regions.

The results are presented in Figure 14. The top left panel shows the effect of a 20 percent decline in the value of portfolio equity holdings in the euro area, United Kingdom, and United States. The effects are strongest for financial centers such as Switzerland (particularly exposed to the euro area) and Hong Kong S.A.R. More generally, the effects are largest for smaller advanced economies, while emerging markets have relatively modest portfolio equity assets overseas. The top right panel shows instead the effect of a decline in the value of bonds issued in the euro area, United Kingdom, and United States. Once again the impact on external holdings of financial center is the largest, but in this case there is also a significant impact on countries that are large holders of reserves or portfolio debt claims, such as Japan and China (particularly exposed to the United States) and the United Kingdom and other advanced economies (exposed primarily to the euro area).

The bottom left panel shows the impact of a 20 percent decline in the value of other investment claims in the euro area, United Kingdom, and the United States. This exercise has a less clear-cut interpretation than the one on portfolio holdings, in light of the importance of cross-border banking positions between parents and affiliates, and the use of financial centers as pure intermediaries in banking activity. The effects are larger in absolute terms, reflecting the size of cross-border banking positions among the main advanced economies. Here the most affected countries are financial centers and advanced economies, particularly in Europe (where the external portfolios of banks are much larger than in the United States, Japan, and Canada) while the impact on emerging markets' holdings is smaller.

Finally, the bottom right panel shows the impact on external assets of a decline in the value of all claims on emerging markets (including FDI positions, portfolio claims, and other investment claims). Claims on emerging markets are divided into claims on Hong Kong S.A.R. and Singapore, claims on emerging Asia (including China and other emerging and developing Asian economies), and claims on other emerging markets. The chart excludes Hong Kong S.A.R. and Singapore, for which the effects are an order of magnitude larger than for other countries (some 90 percent of GDP for Hong Kong, and over 50 percent of GDP for Singapore), reflecting in particular very large exposures to China and the remainder of emerging Asia. Among the other countries, the effects are generally smaller than those arising from asset price declines in advanced economies. They are largest for financial centers, and European advanced economies more generally, and they reflect primarily exposures to European emerging markets as well as to Brazil, India, and Russia. Among

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Ferretti (2007a) examine the impact of large currency adjustments associated with a resolution of global imbalances on the value of external assets and liabilities for the world's major economies.

emerging markets, the effects are largest for China (reflecting almost entirely the effect through Hong Kong S.A.R.) and the rest of emerging Asia (reflecting in particular exposures to China).

In sum, asset price declines in partner countries—particularly if these are advanced economies—can have significant effects on the value of countries’ external portfolios. Of course, a detailed vulnerability analysis would also need to assess the domestic incidence of the external asset price shock: as we learned from the financial crisis, the transmission of shocks depends on the extent of leverage of the holders of external claims. The effects on emerging market countries and regions are generally weaker, given the smaller size of their external claims in relation to GDP. Among asset categories, emerging markets are generally more vulnerable to declines in the value of bonds in advanced economies—particularly the United States and the euro area—in light of their large holdings of foreign exchange reserves in the form of U.S. and euro area debt securities.

TO BE COMPLETED: discussion of relation of the paper’s bilateral data with data on “ultimate exposures” compiled for consolidated bank claims by the BIS.

## VI. CONCLUDING REMARKS

This paper presents a new comprehensive dataset on bilateral gross and net external positions, which covers all those countries and regions with large external claims and liabilities vis-à-vis the rest of the world for the year 2007. The data document the very large size of financial linkages among the main advanced economies, and in particular the very important role played by financial centers in intermediating international capital flows. For example, the euro area’s external claims and liabilities vis-à-vis the United Kingdom are of the order of 50 percent of euro area GDP, and claims and liabilities of the United States vis-à-vis small offshore centers are close to  $\frac{1}{4}$  of U.S. GDP. The importance of international financial intermediaries complicates the task of assessing the extent of a country’s balance sheet vulnerability to shocks affecting different geographical areas.

With the exception of oil exporters, our data coverage for emerging markets is good, even though not as comprehensive as for the main advanced economies. This evidence suggests that a dominant share of cross-border assets and liabilities for Brazil, India, and Russia are vis-à-vis the main advanced economies, while for emerging Asian economies as well as Asian financial centers such as Hong Kong S.A.R. and Singapore regional financial linkages and linkages to other emerging markets play a comparatively more important role. In absolute terms, the largest ‘data gap’ is for holders of euro area portfolio liabilities, which may reflect a combination of holdings by sovereign wealth funds and reserves holders in the Middle East and emerging Asia, claims held through offshore centers, as well as some under-reporting of holdings by other euro area countries and advanced economies.

Given the large size of external portfolios in advanced economies, particularly those in Europe, asset price declines in individual partner countries can have a significant effect on the value of a country’s external claims.



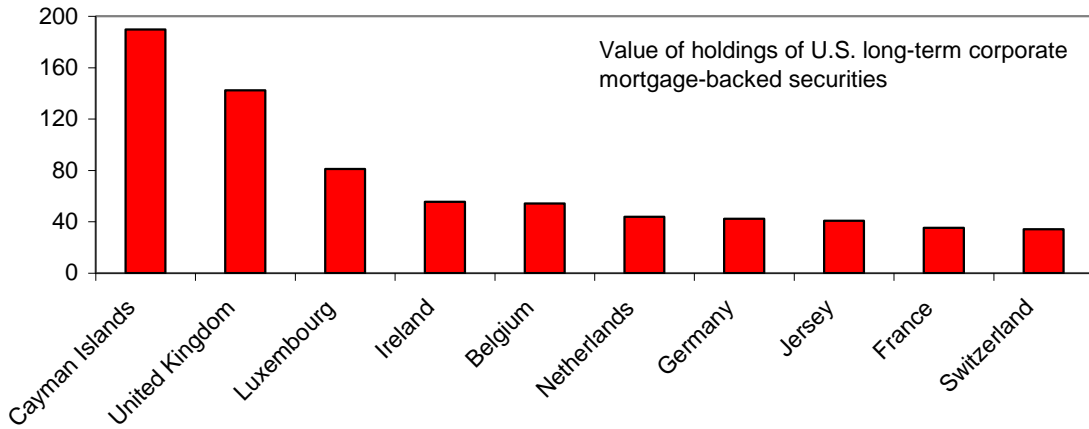
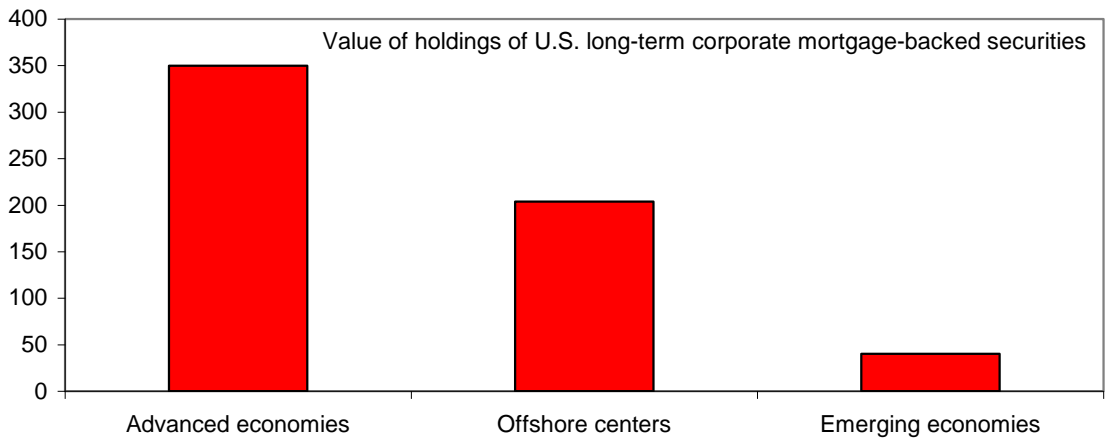
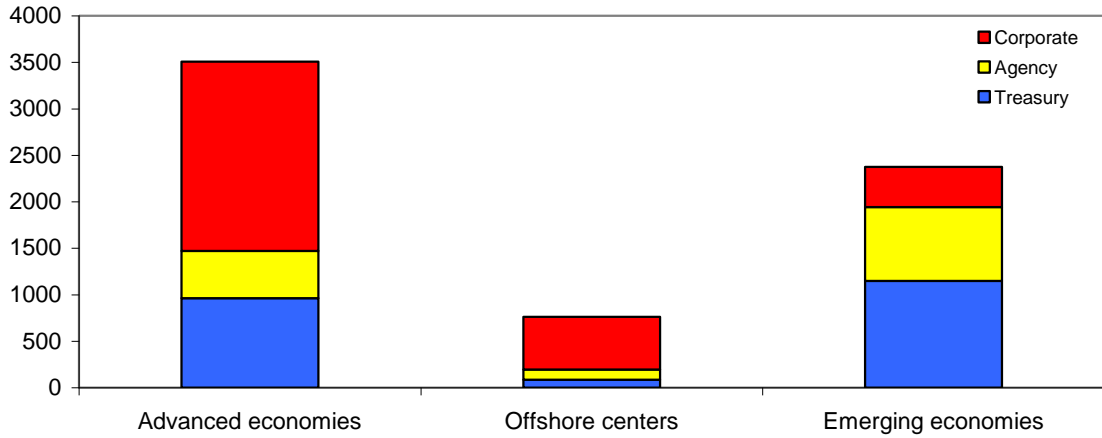
Looking forward, as more recent bilateral data becomes available it will be interesting to assess how bilateral financial linkages have changed since the onset of the global financial crisis, particularly in light of the retrenchment in cross-border banking positions among advanced economies that has characterized the last two years (Milesi-Ferretti and Tille, 2010). The bilateral FDI data that is being collected by the ongoing Coordinated Direct Investment Survey, which will start to become available in late 2010 will be particularly valuable. A finer breakdown of bilateral positions for individual euro area countries can help shed light on the cross-country implications of the recent disruptions in some euro area bond markets. Increased availability of data on bilateral external positions—particularly for emerging Asian economies, offshore centers, and oil exporters—would help provide a more complete picture of cross-border financial linkages, thus improving our understanding of the international transmission of financial shocks. In that respect, further progress in establishing ultimate exposures, including on a currency and sectoral basis, would also be very important.

Table 1. Euro Area Portfolio Liabilities:  
coverage gap by country (2007)

Portfolio equity		Portfolio debt	
Total euro area	2,271	Total euro area	1,357
Luxembourg	1,100	France	415
Ireland	733	Netherlands	260
Netherlands	271	Italy	248
Spain	106	Germany	167

Note: the table reports the difference between countries' total portfolio equity and debt liabilities and the total equity and debt claims on these countries reported by participants to the CPIS.

Figure 1. Foreign Holdings of U.S. Securities, 2007



Source: US Treasury.

Figure 2. Financial integration: sum of external assets and liabilities, ratio of group GDP

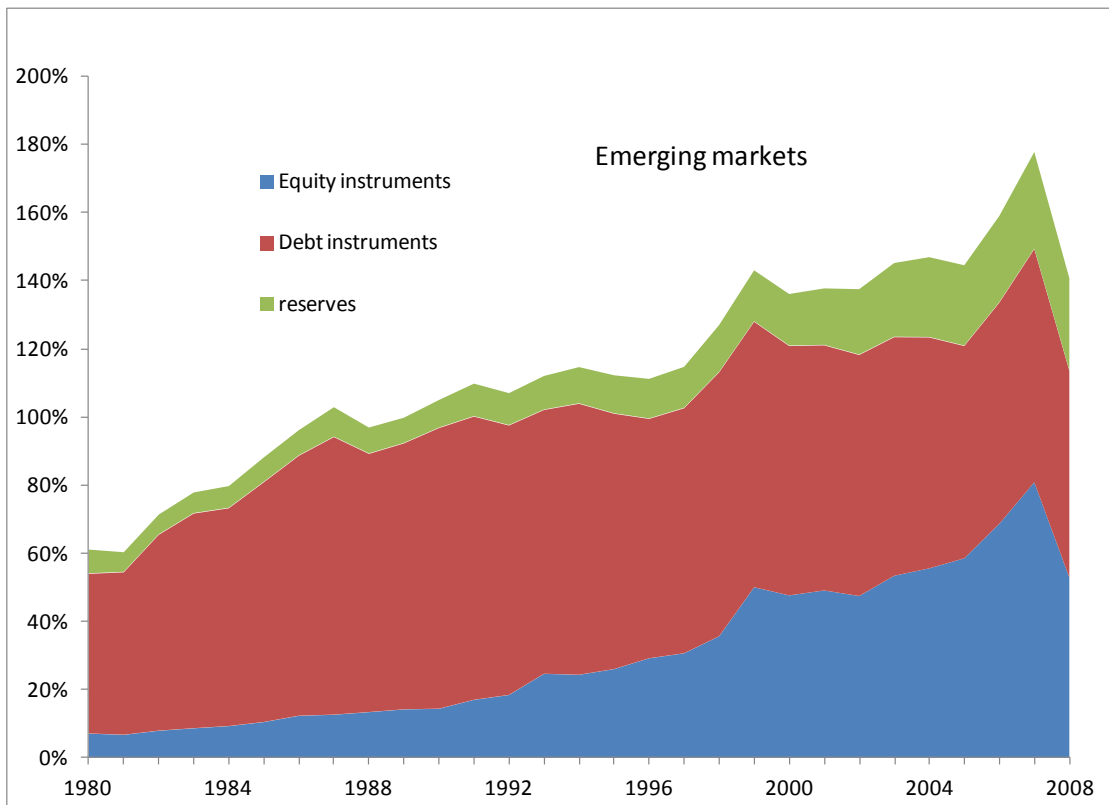
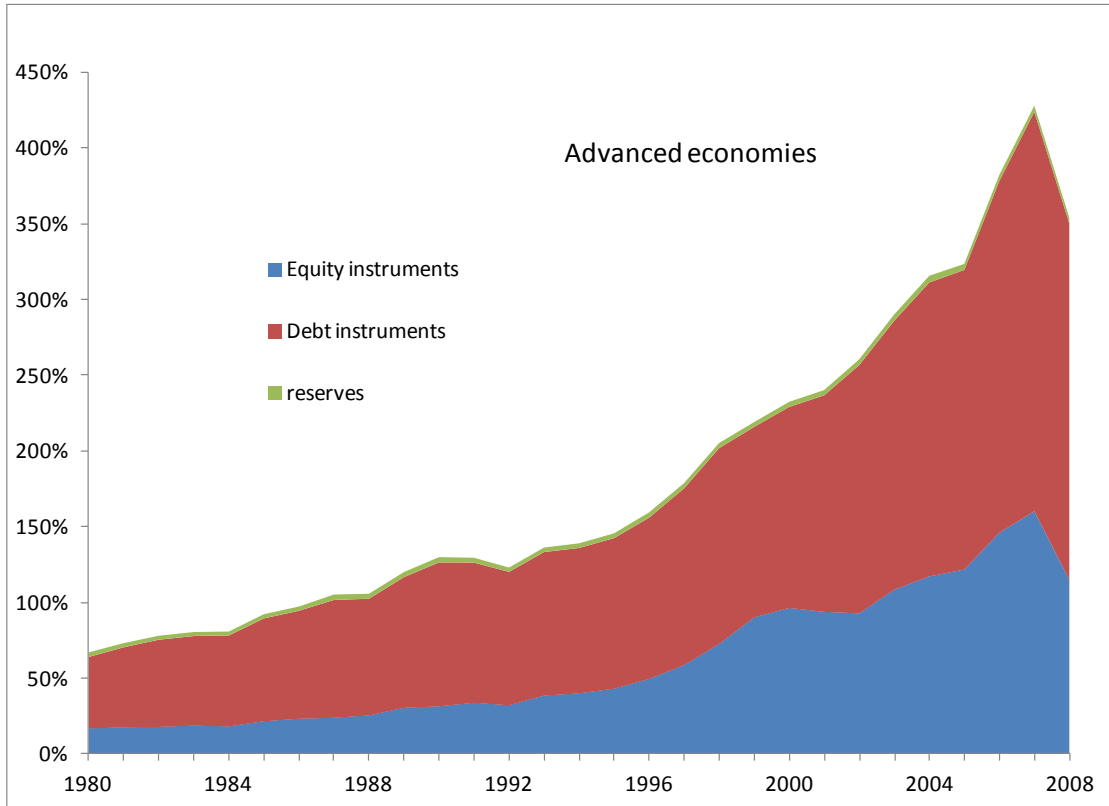
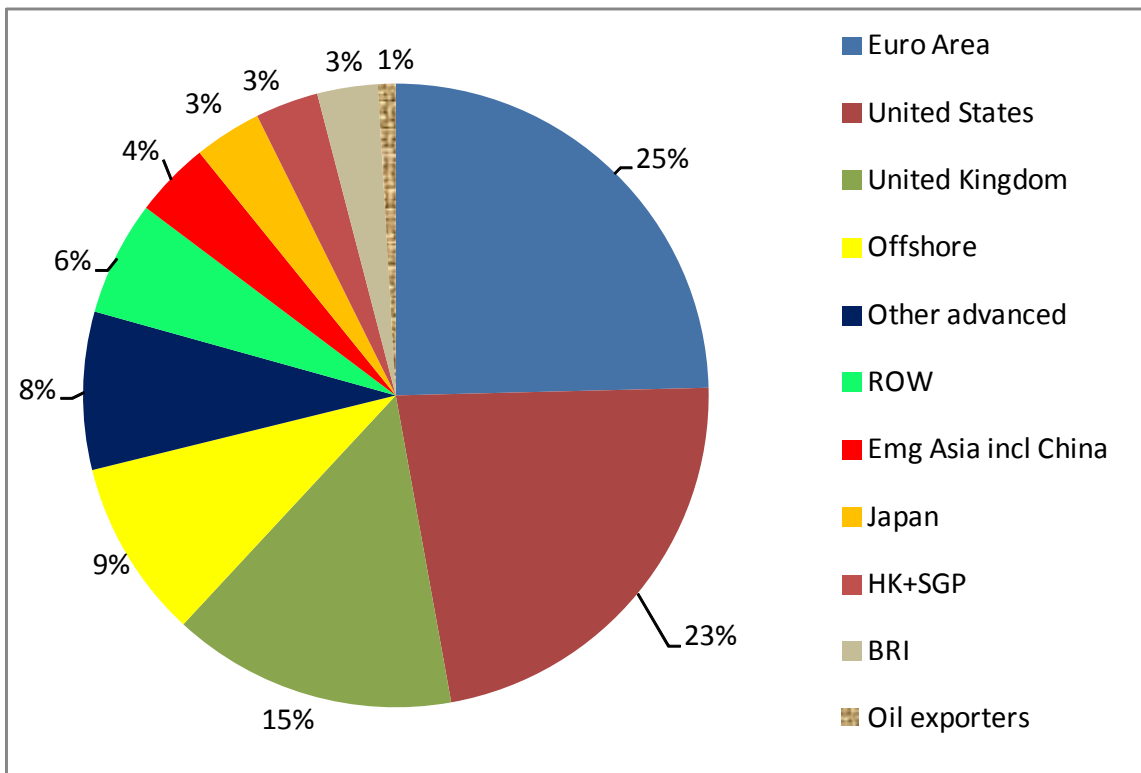
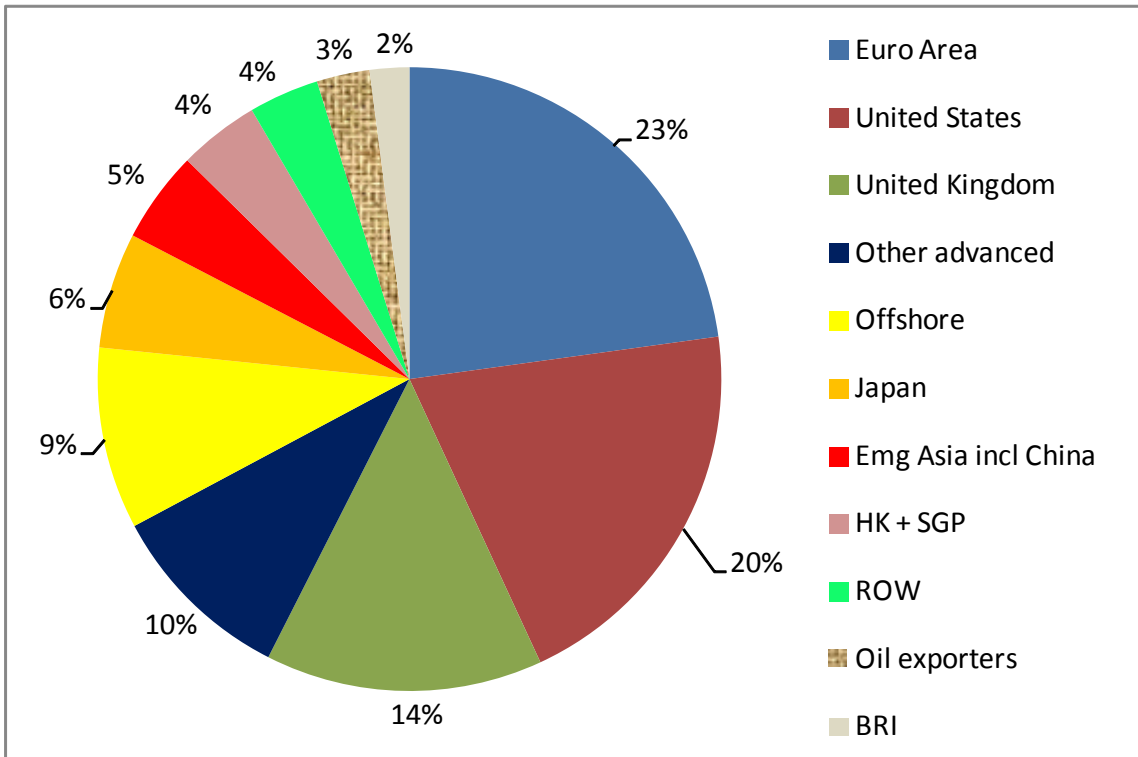
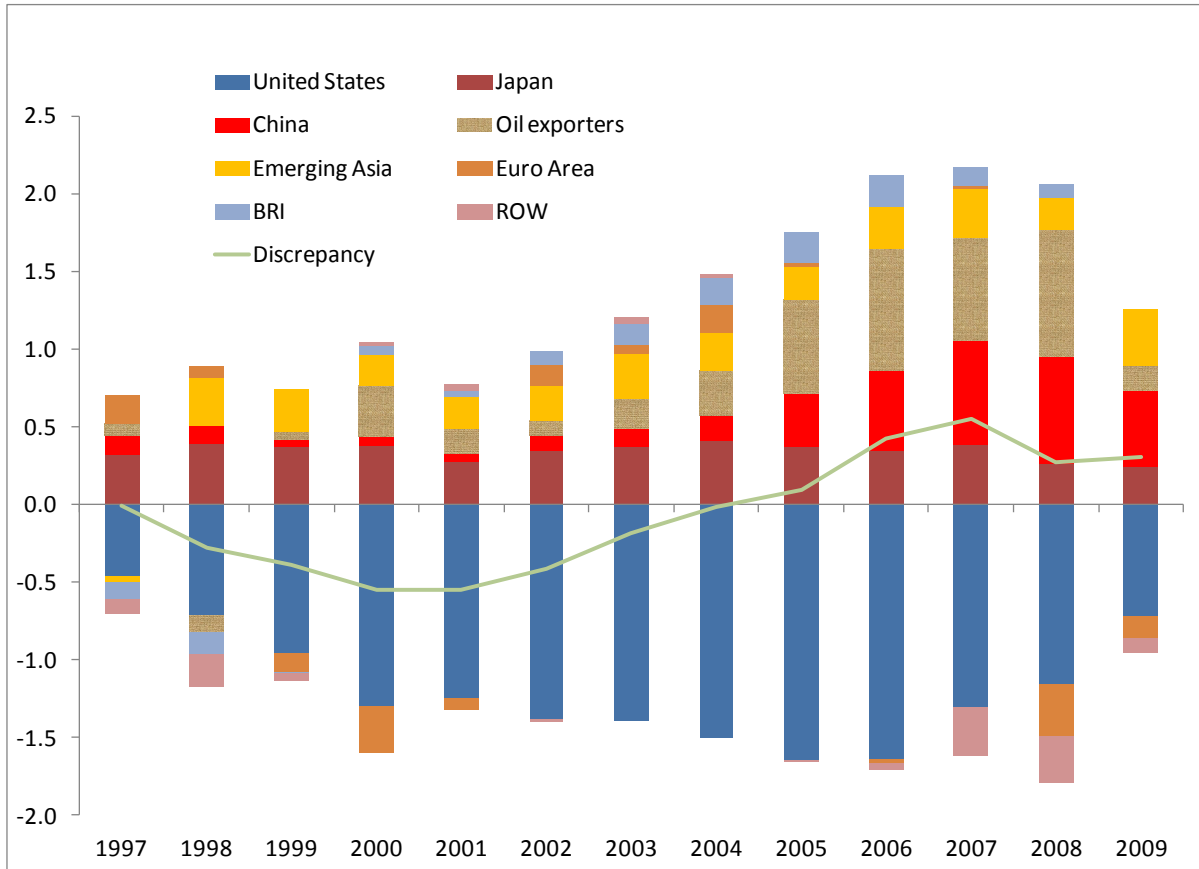


Figure 3. Financial integration: share of world external assets and liabilities, 2007



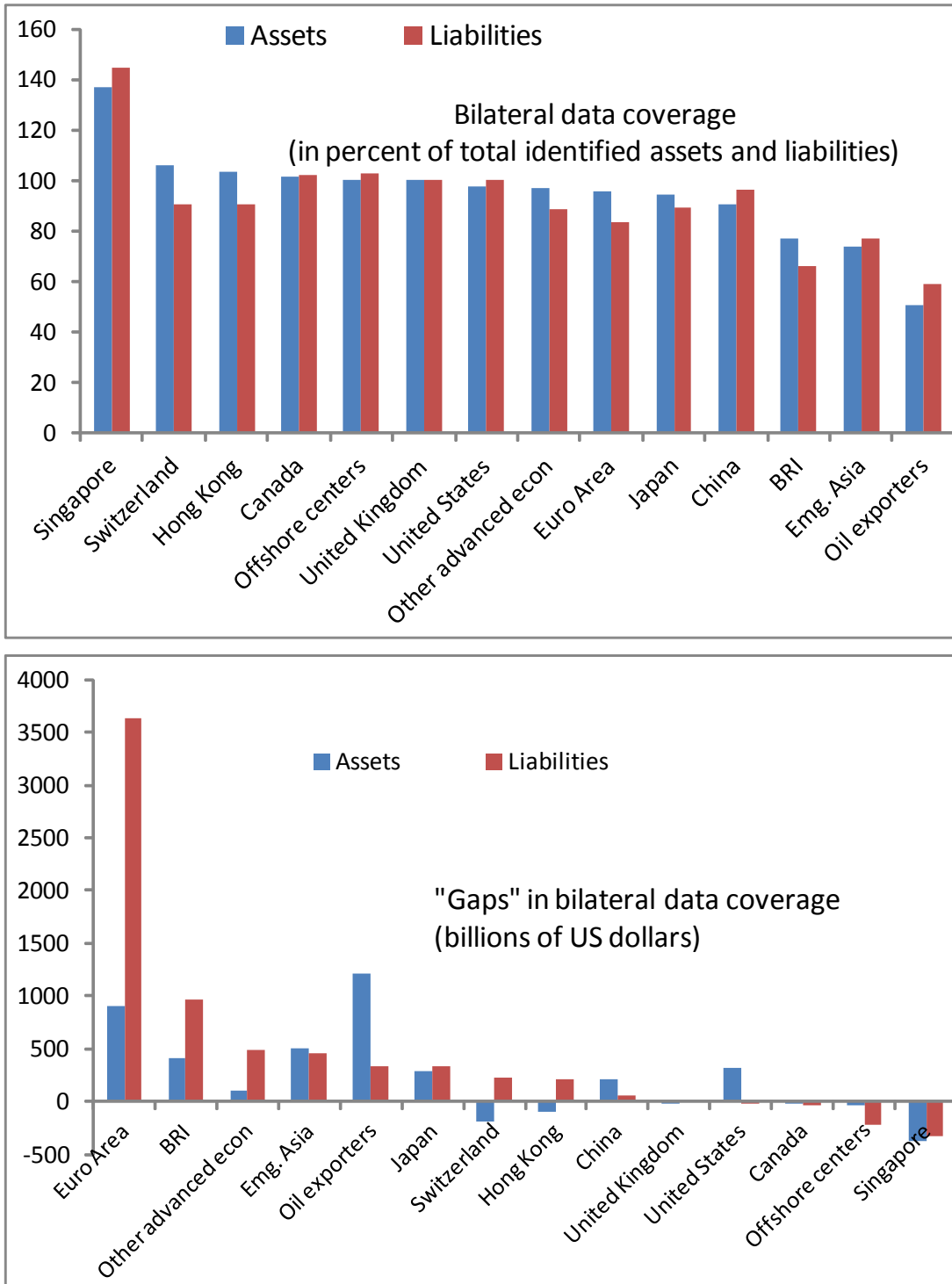
Note: the “other advanced” group includes Canada and Switzerland (in addition to Australia, Denmark, New Zealand, Norway, and Sweden).

Figure 4. Global Imbalances (in percent of world GDP)



Note: the figure depicts current account balances in percent of world GDP. The aggregate “emerging Asia” also includes Hong Kong S.A.R. and Singapore. For the definitions of the other country groups, see the Appendix.

Figure 5. Coverage of bilateral data



Note: see Appendix for sample definitions.

Figure 6. United States: Net and Gross External Positions (total, in percent of GDP)

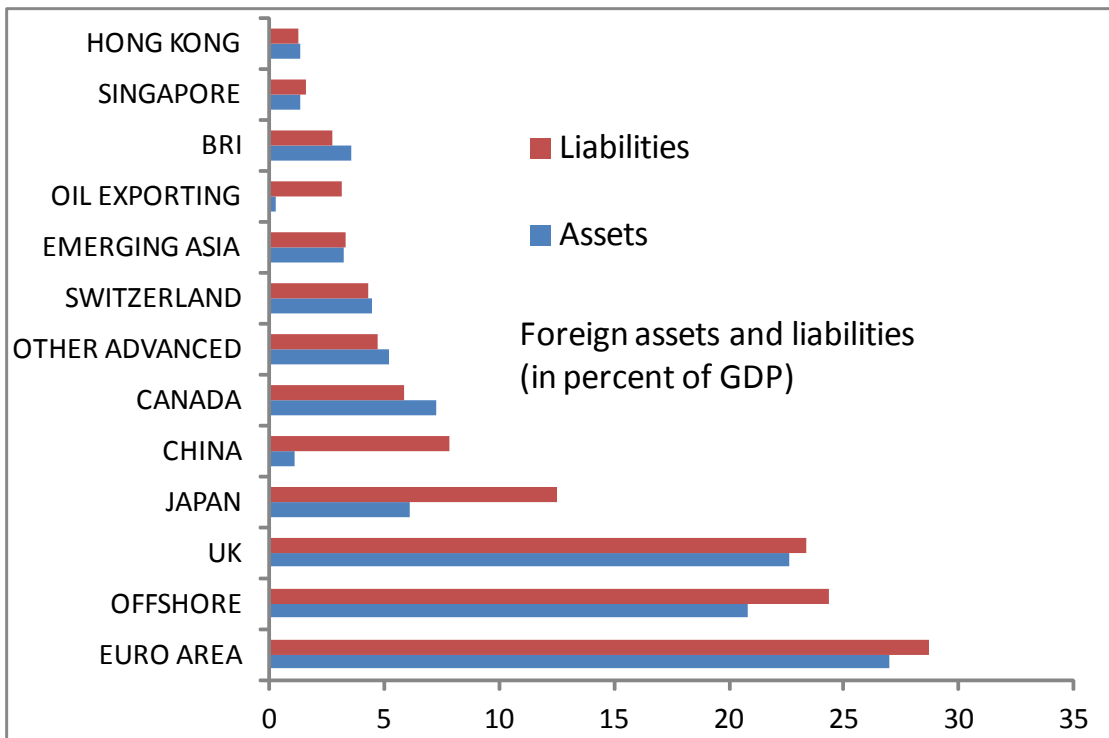
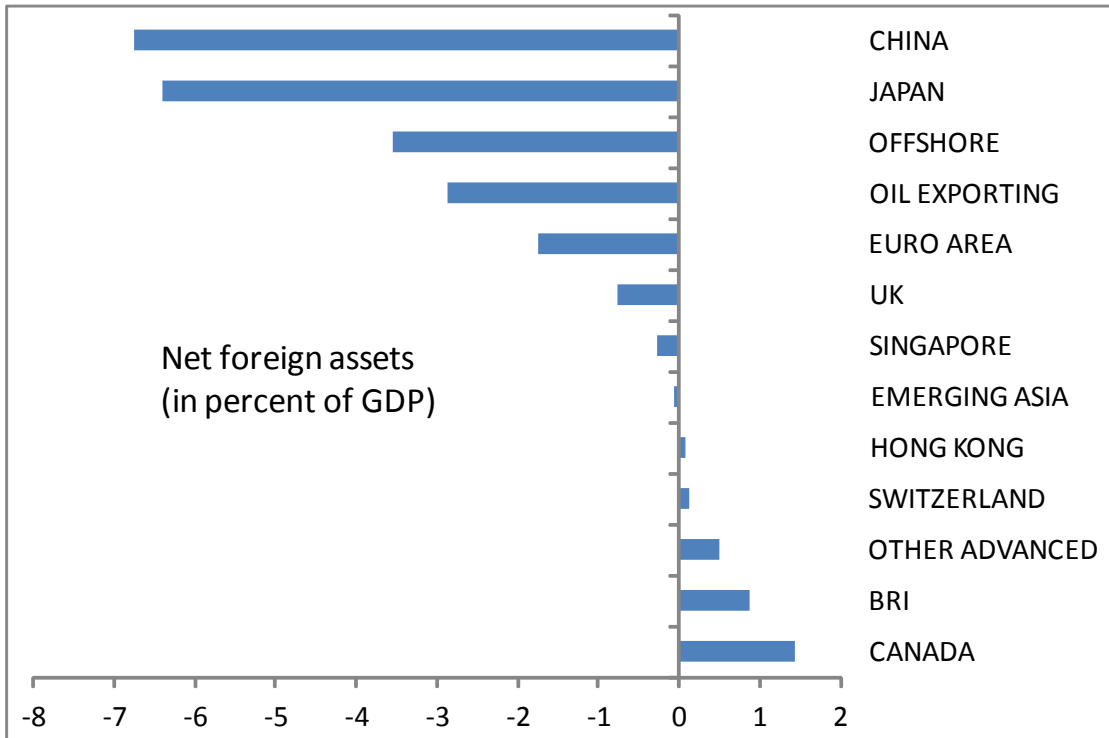




Figure 7. United States: Net and Gross External Positions (composition, in percent of GDP)

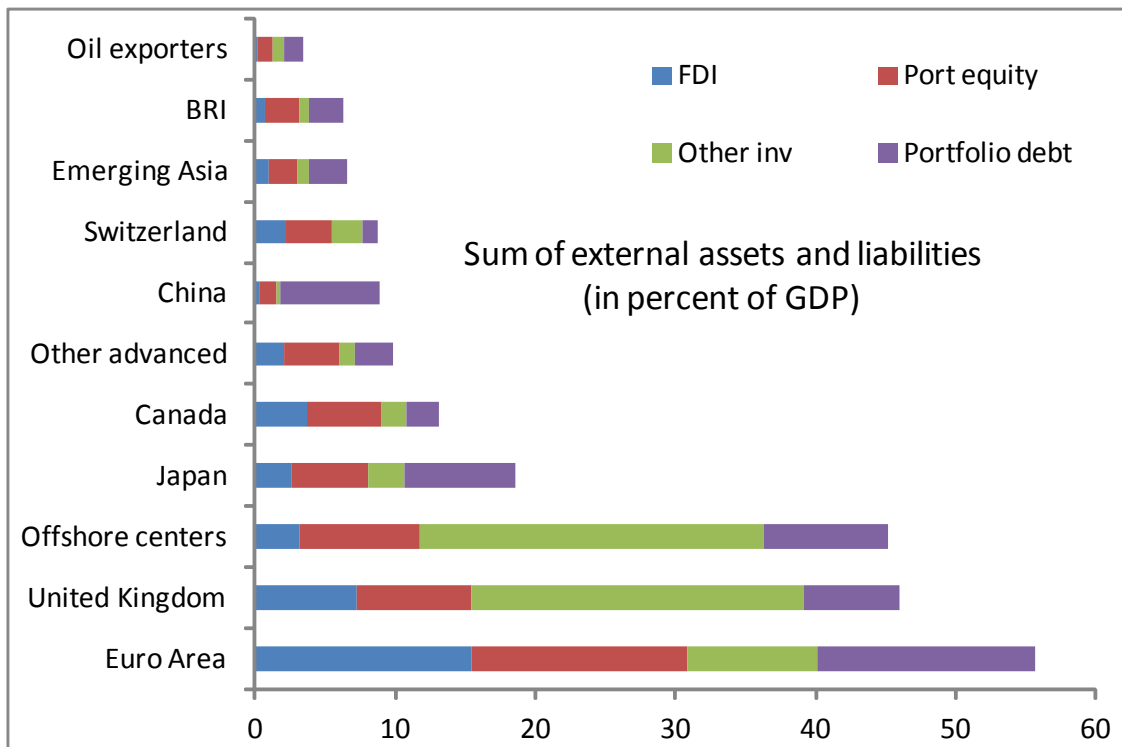
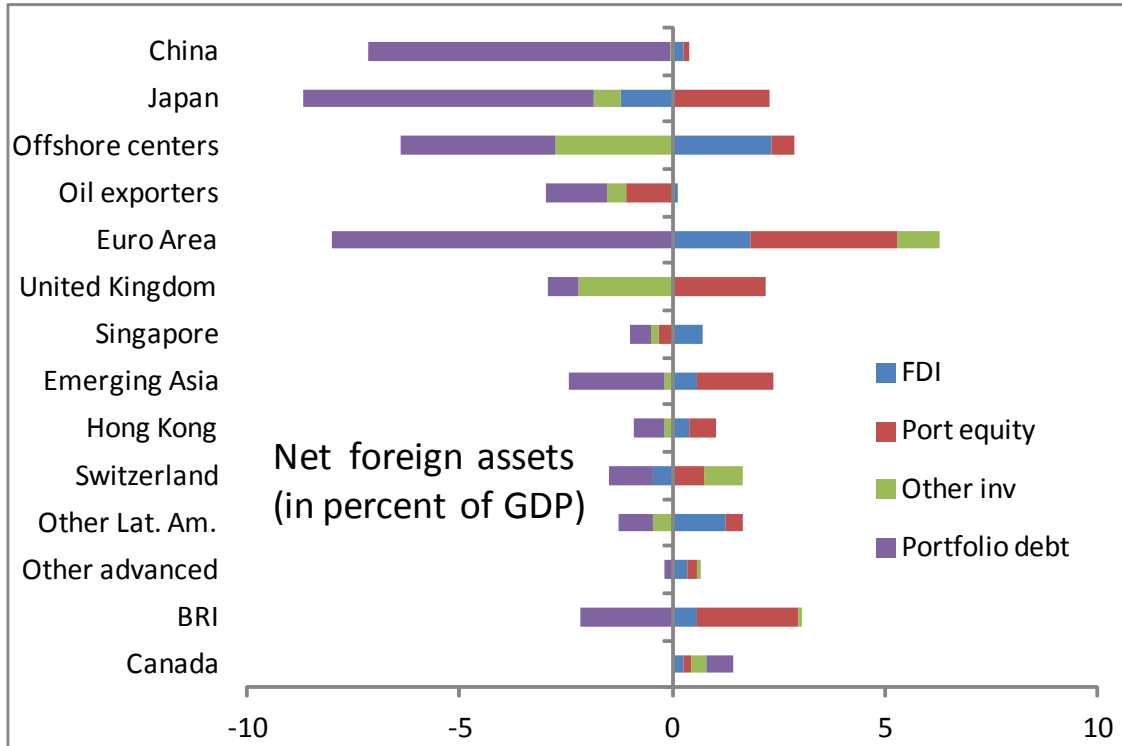


Figure 8. Euro Area: Net and Gross External Positions (total, in percent of GDP)

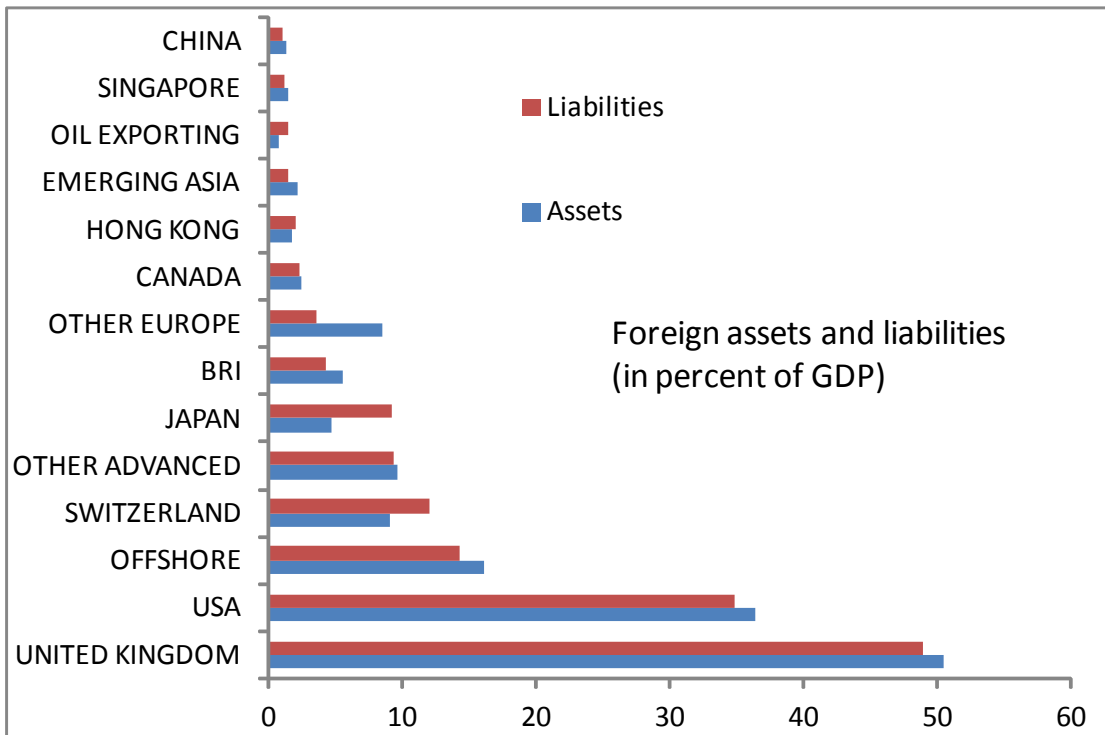
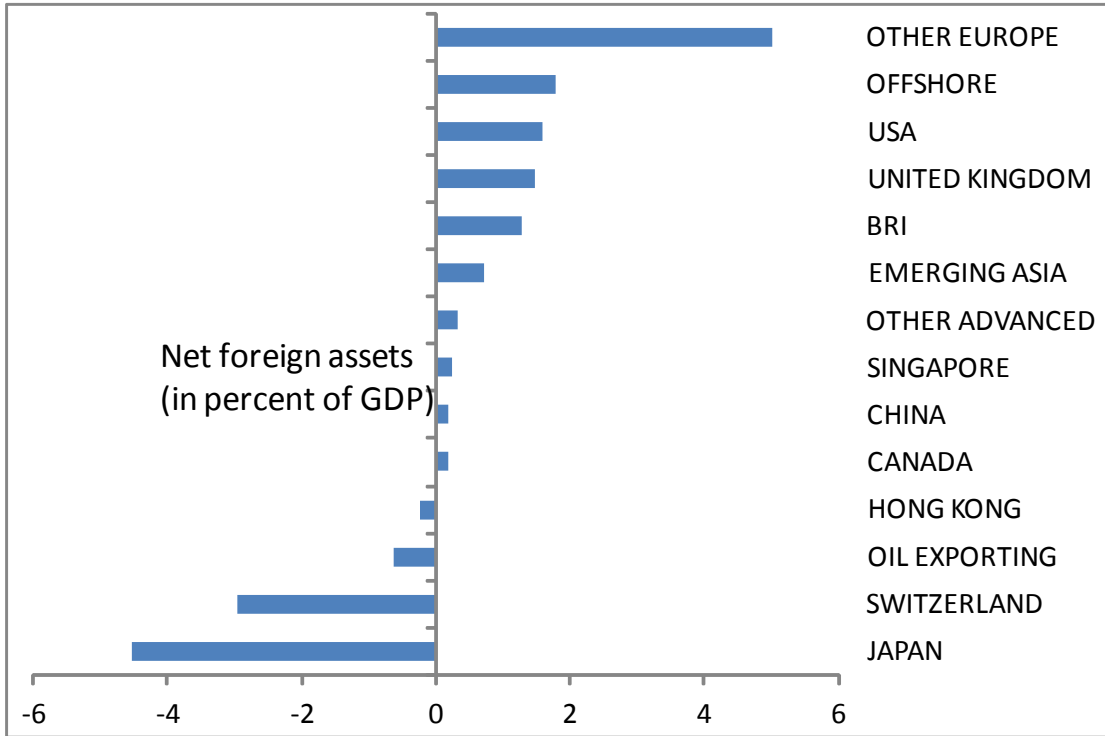


Figure 9. Euro Area Net and Gross External Positions (composition, in percent of GDP)

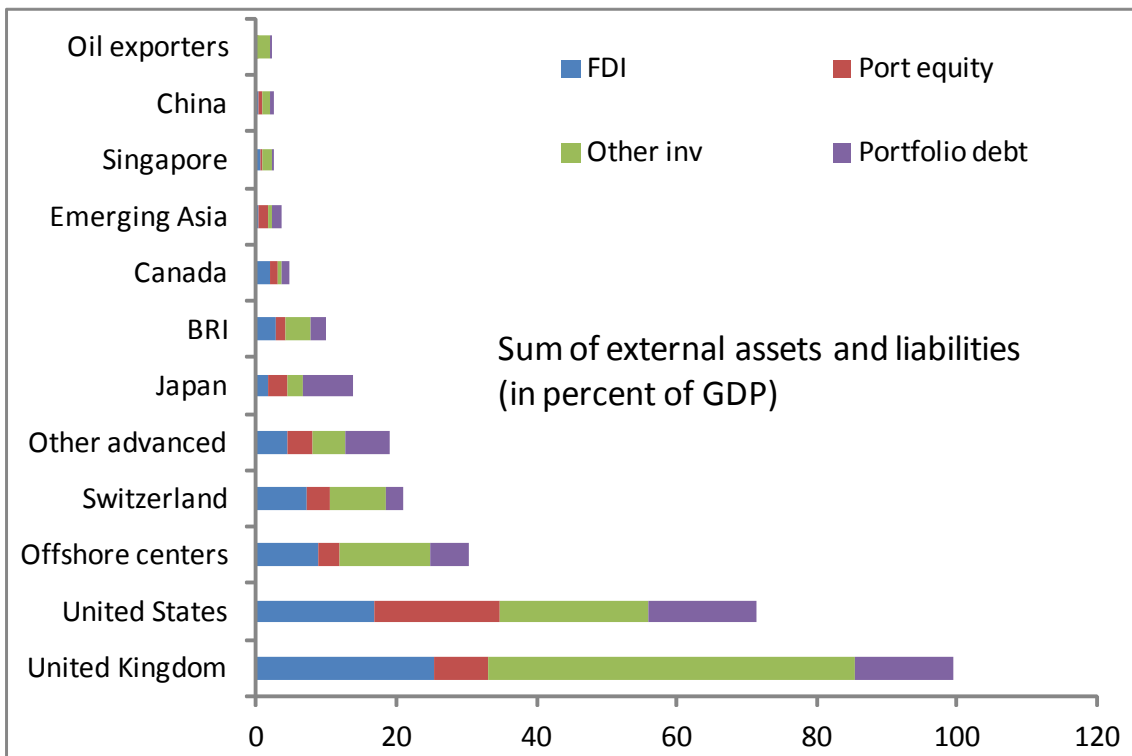
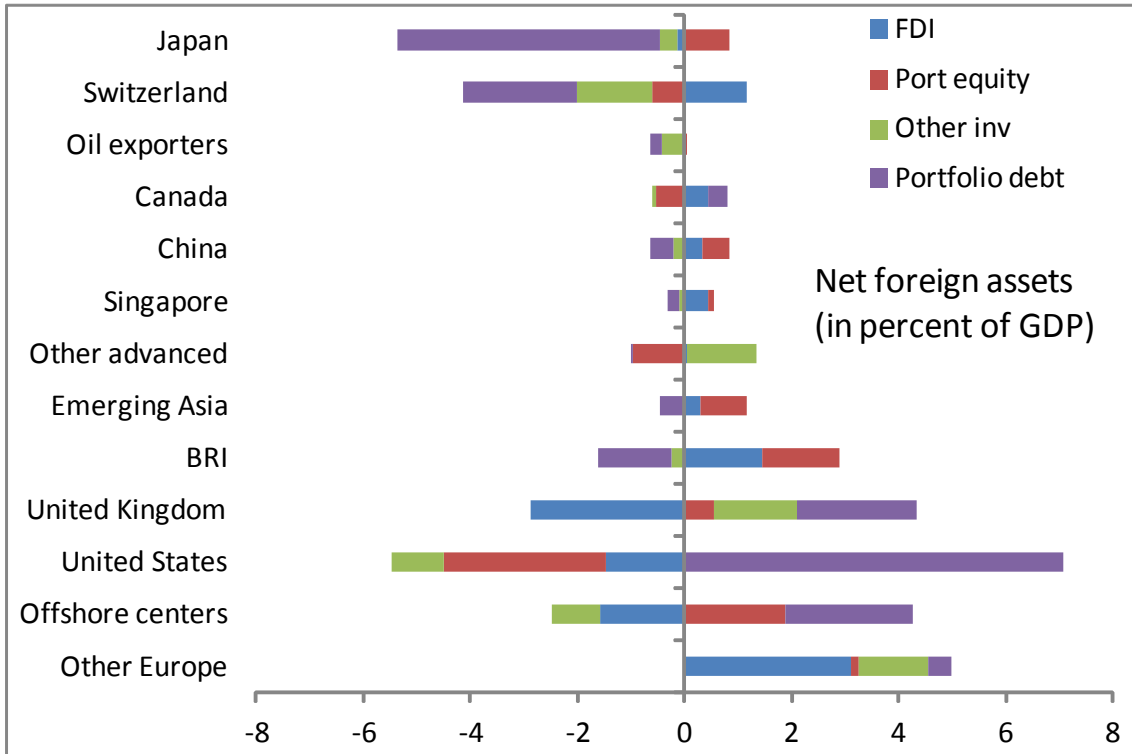


Figure 10. Japan: Net and Gross External Positions (total, in percent of GDP)

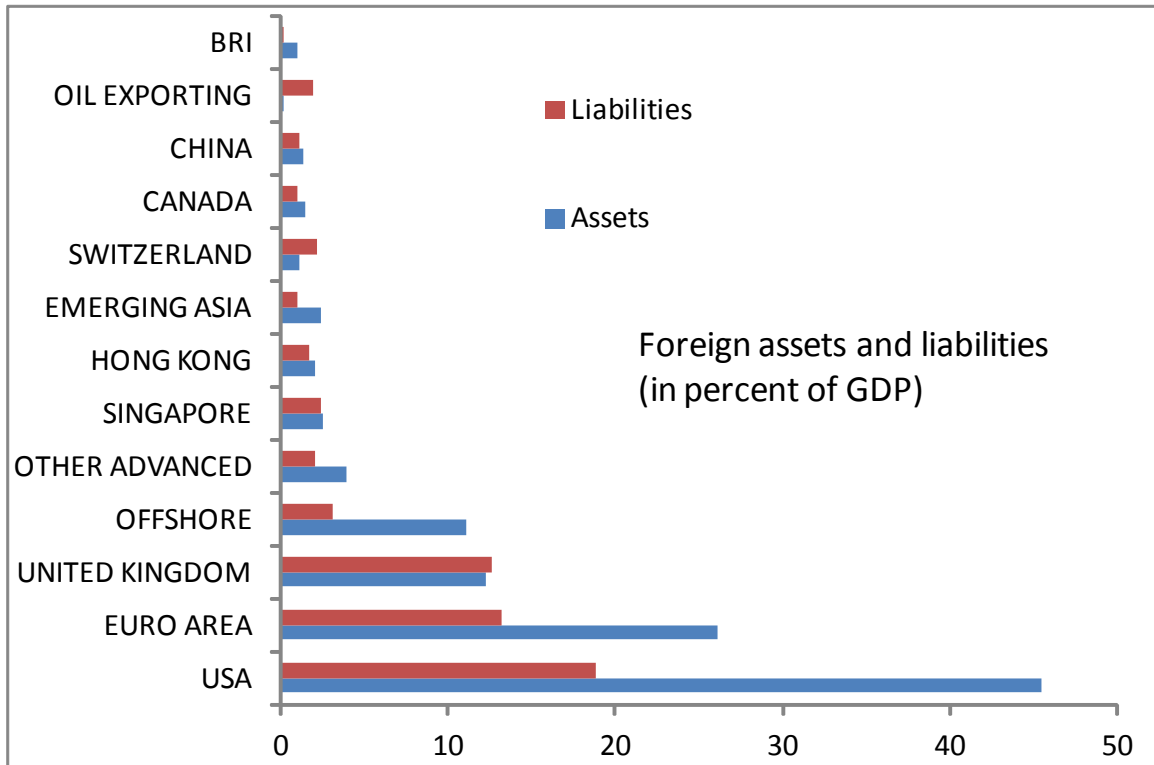
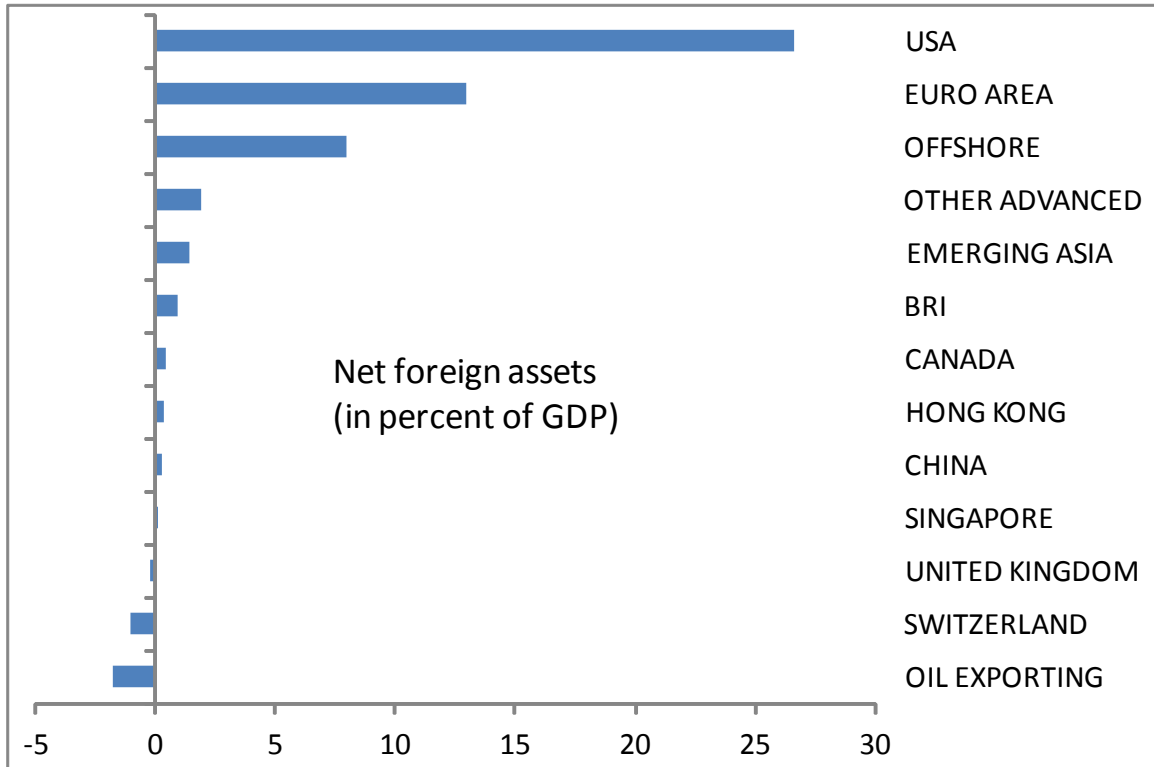


Figure 11. Japan: Net and Gross External Positions (composition, in percent of GDP)

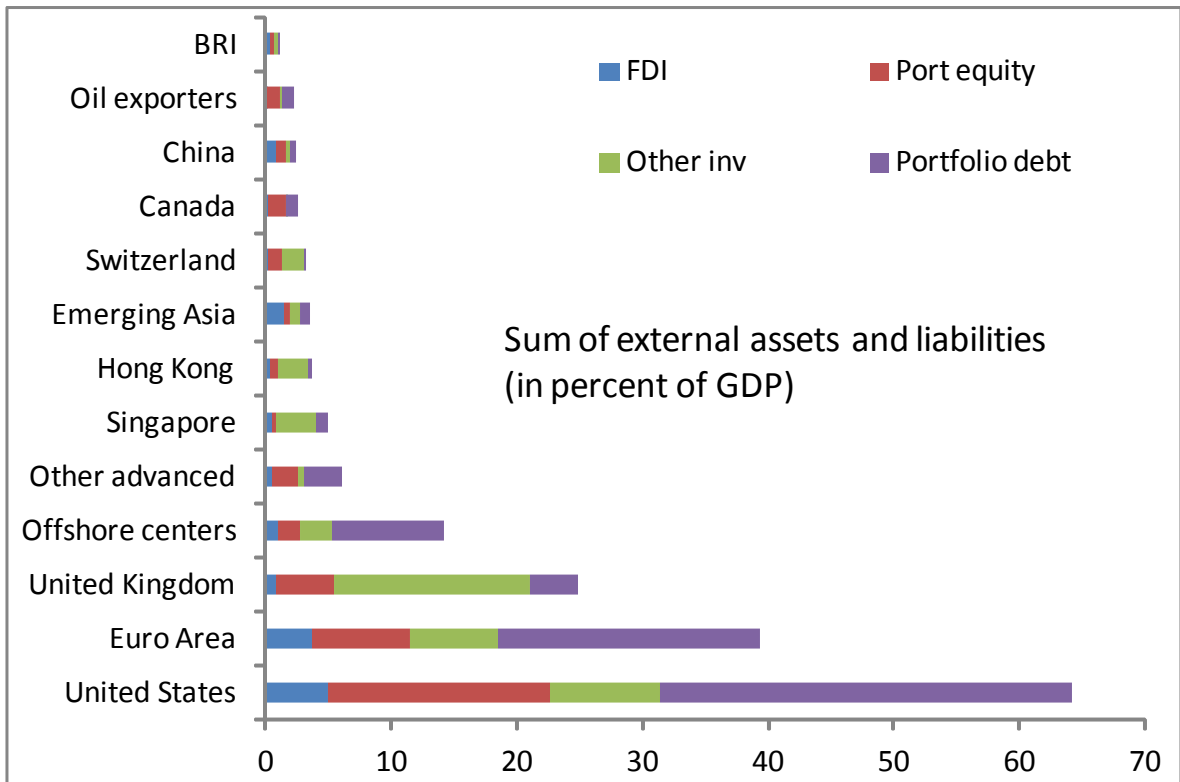
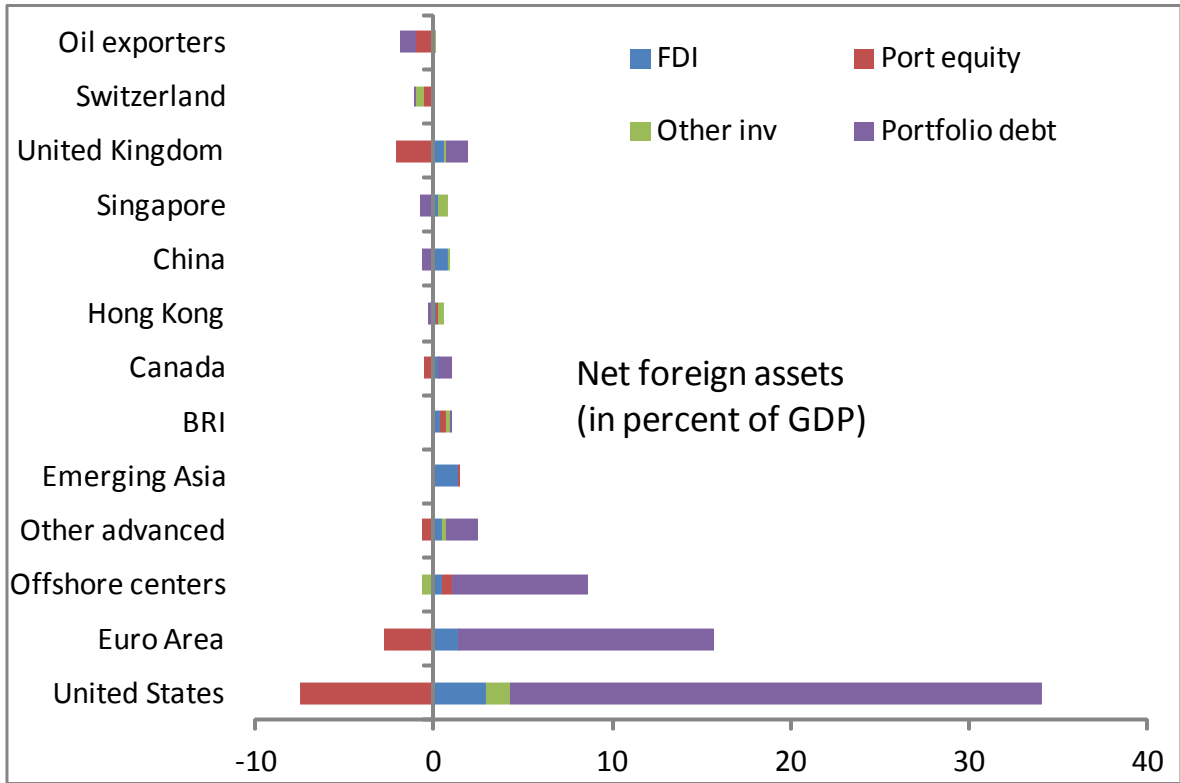


Figure 12. Emerging Markets: External Portfolio

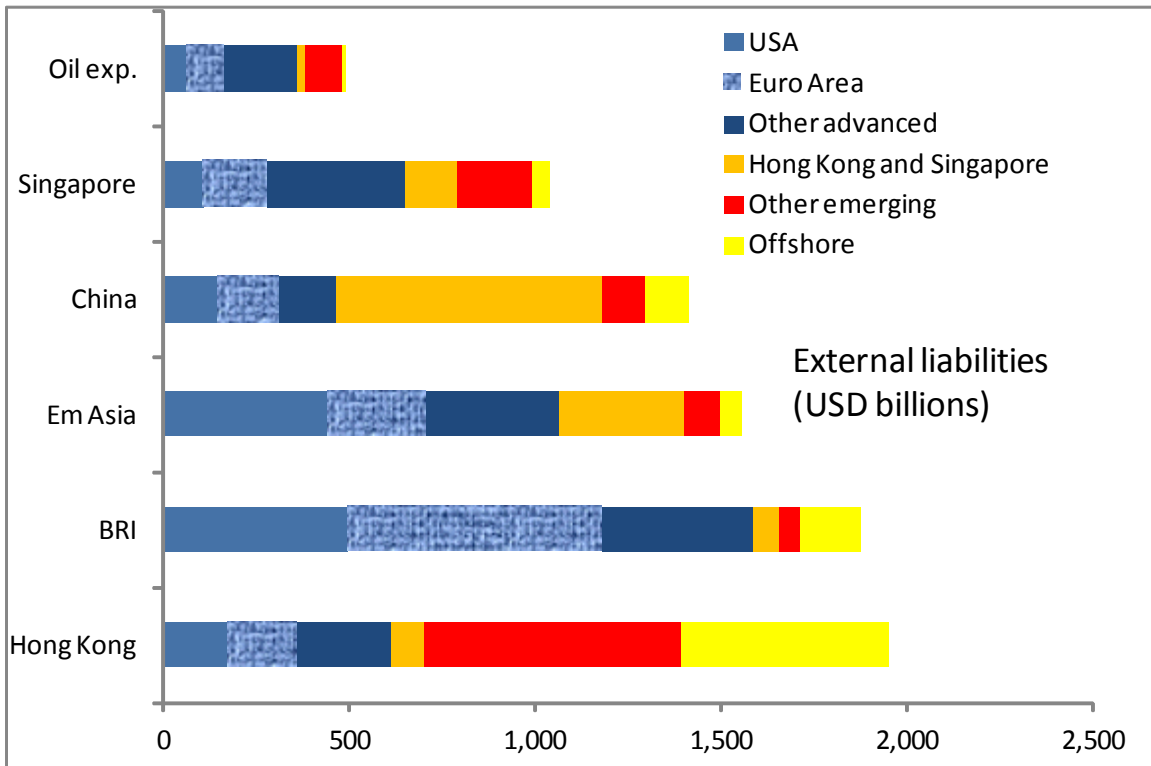
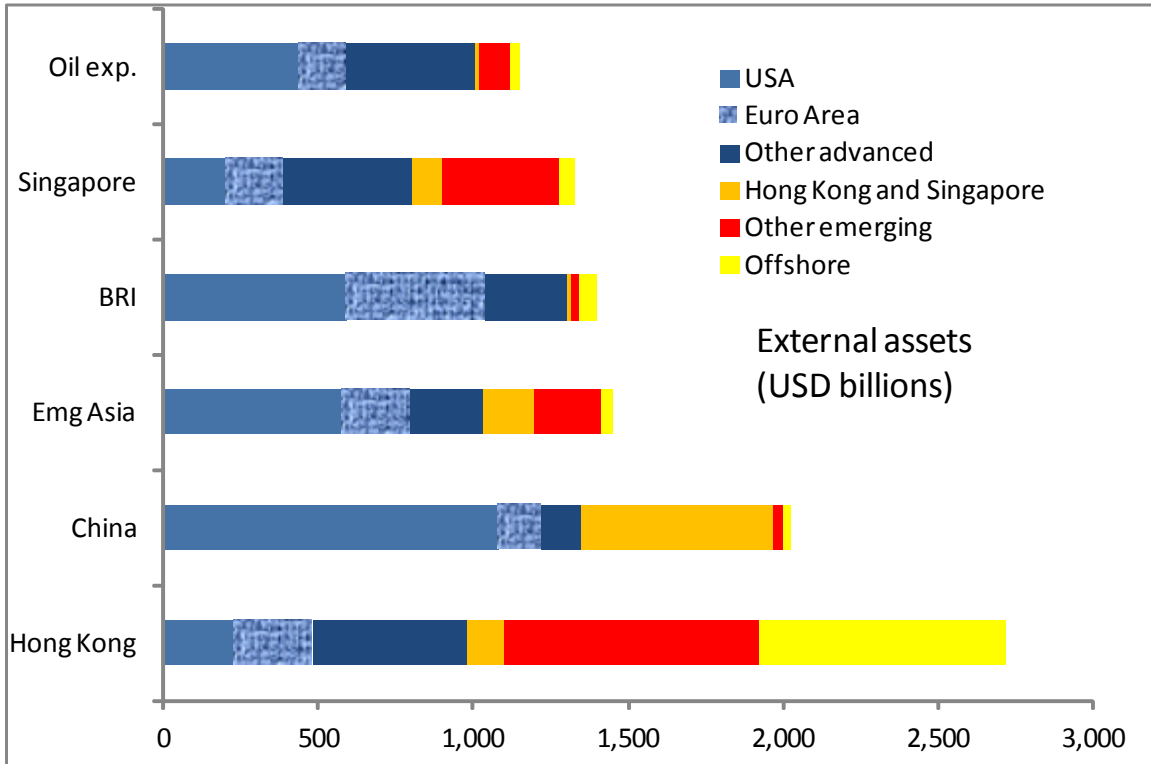


Figure 13. Offshore centers: net and gross external positions

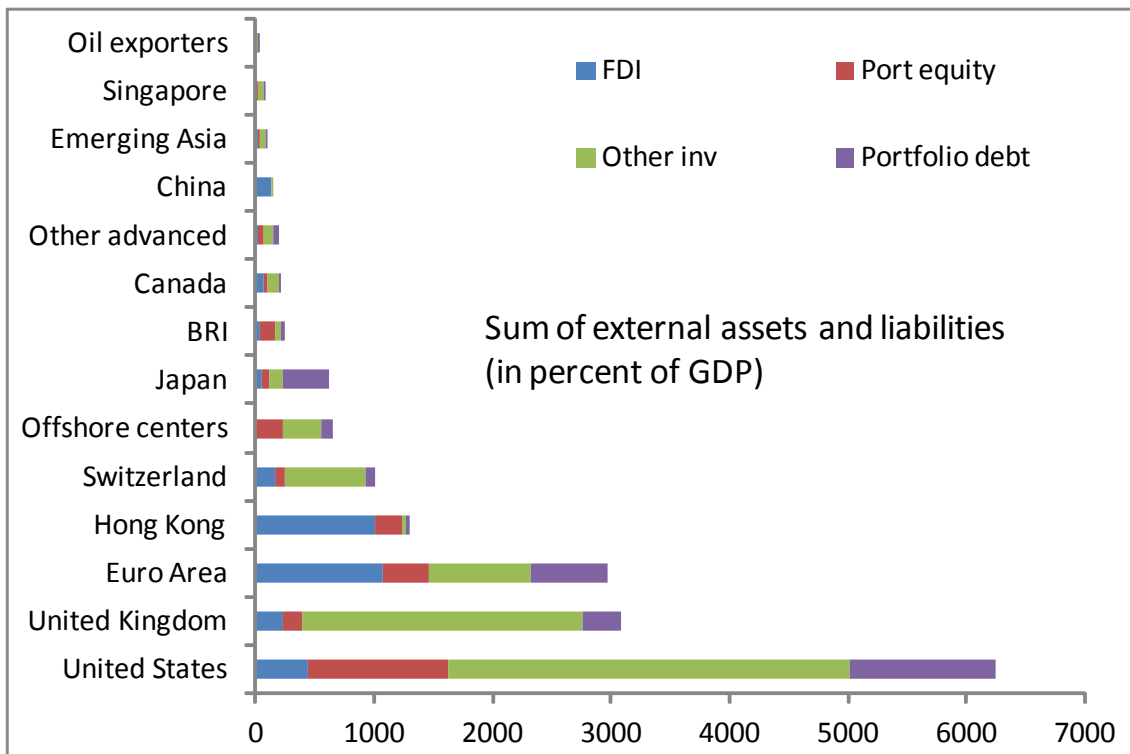
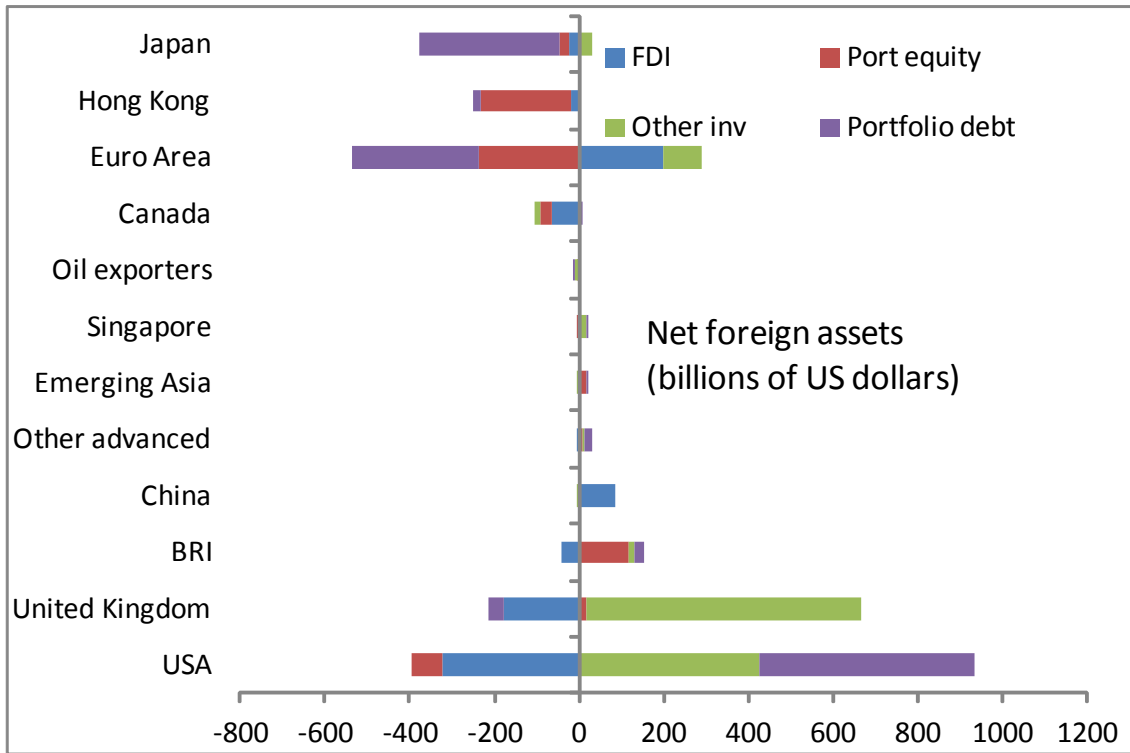
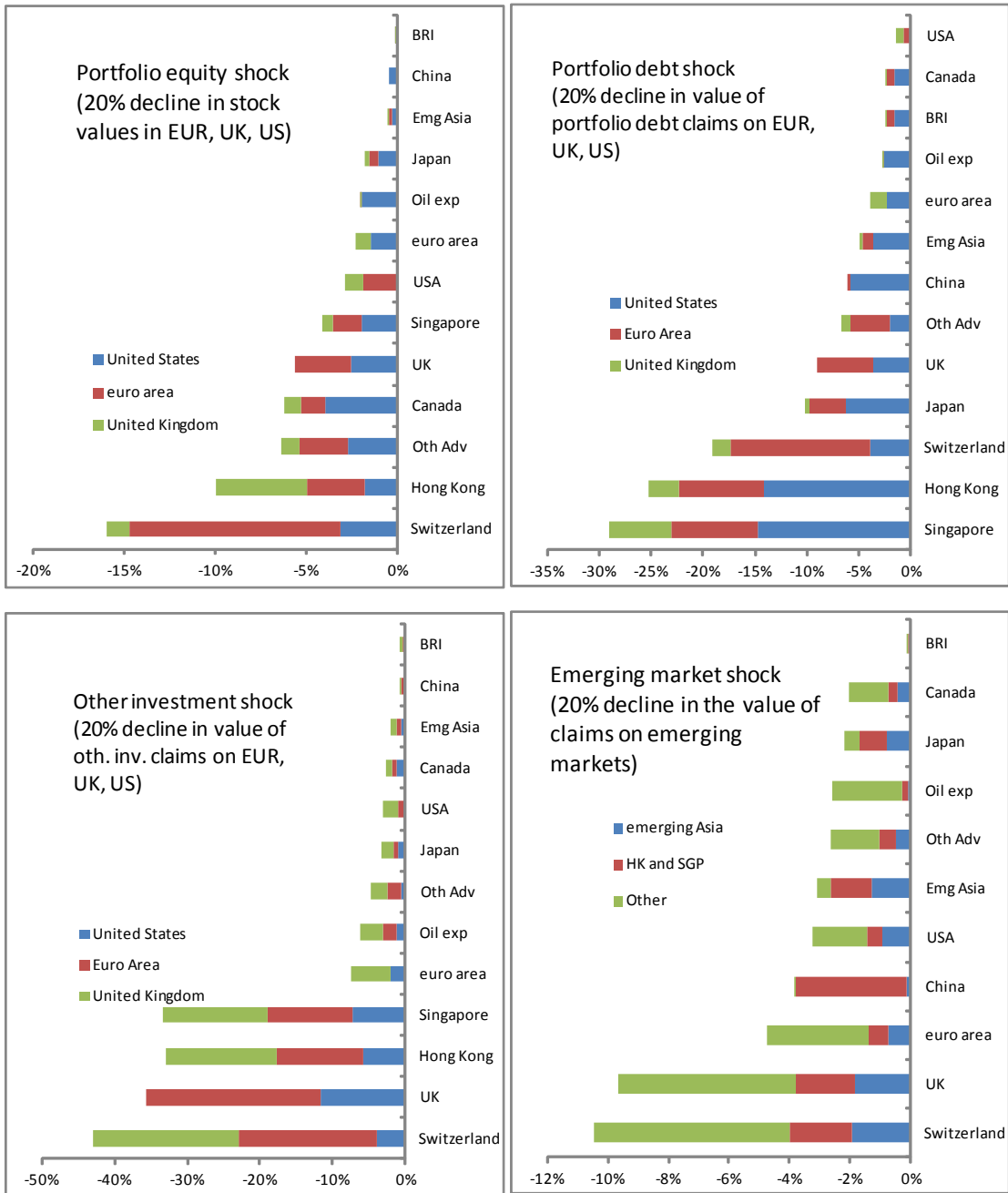


Figure 14. Impact of asset price shocks in partner countries (in percent of domestic GDP)



Note: the charts present the impact on each region’s external assets (scaled by domestic GDP) of a 20 percent decline in the value of claims in the euro area, United Kingdom, and United States (top 2 panels, bottom left panel) and of a 20 percent decline in the value of claims on all emerging markets (bottom right panel). For the bottom right panel, the shock to claims in emerging Asia includes claims on China and on other emerging and developing countries in East Asia. The bottom panel excludes the impact of the emerging market shock on Hong Kong S.A.R. (91% of GDP) and Singapore (57 percent of GDP).



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## APPENDIX I. COUNTRIES AND REGIONAL GROUPS

Our dataset covers 8 individual economies (the United States, Japan, the United Kingdom, Switzerland, Canada, China, Hong Kong S.A.R., and Singapore) and 6 regional groups (euro area, other advanced countries, oil exporters, offshore centers, emerging Asia, and “BRI”). The composition of the regional groups for which we construct bilateral positions is as follows:

Euro area: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Slovenia, Spain.

Other advanced countries: Australia, Denmark, New Zealand, Norway, and Sweden.

Oil exporters: Algeria, Gabon, Libya, Nigeria, Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.

Offshore centers: Aruba, Andorra, Bahamas, Barbados, Bermuda, British Virgin Islands, Cayman Islands, Gibraltar, Guernsey, Isle of Man, Jersey, Lebanon, Macao, Mauritius, Netherland Antilles, Panama, Samoa, Vanuatu, West Indies, Liechtenstein, Vatican, San Marino, Monaco.

Emerging Asia: Indonesia, Korea, Malaysia, Philippines, Taiwan province of China, and Thailand

BRI: Brazil, Russia, and India.

In addition, we calculate bilateral external assets and liabilities vis-à-vis another set of partner countries, for which we don’t assemble a full “external balance sheet.” These groups are:

Other European countries (including countries in Central and Eastern Europe as well as Turkey);

Other Latin American countries (including Argentina, Mexico, and others);

Other African and Middle-Eastern countries (including countries such as Egypt and South Africa);

Other Asian countries (including countries such as Bangladesh and Vietnam).

## APPENDIX II. DATA SOURCES AND ADJUSTMENTS

TO BE COMPLETED.