

# The External Wealth of Nations Revisited: International Financial Integration in the Aftermath of the Global Financial Crisis

Philip R. Lane<sup>1,2,3</sup> · Gian Maria Milesi-Ferretti<sup>3,4</sup>

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**Abstract** This paper documents the evolution of international financial integration since the global financial crisis using an updated dataset on external assets and liabilities, covering 212 economies for the period 1970–2015. It finds that the growth in cross-border positions in relation to world GDP has come to a halt. This reflects much weaker capital flows to and from advanced economies, with diminished cross-border banking activity, and an increase in the weight of emerging economies in global GDP, as these economies have lower external assets and liabilities than advanced economies. Cross-border FDI positions have continued to expand, unlike positions in portfolio instruments and other investment. This expansion reflects primarily positions vis-à-vis financial centers, suggesting that the complexity of the corporate structure of large multinational corporations is playing an important role. The paper also explores the cross-country drivers of foreign ownership of domestic debt securities, highlighting in particular the role of the euro debt crisis in explaining its evolution.

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✉ Gian Maria Milesi-Ferretti  
gmilesiferretti@imf.org  
Philip R. Lane  
governor@centralbank.ie

<sup>1</sup> Central Bank of Ireland, Dublin, Ireland

<sup>2</sup> Trinity College Dublin, Dublin, Ireland

<sup>3</sup> London-based Centre for Economic Policy Research, London, United Kingdom

<sup>4</sup> International Monetary Fund, Washington, DC, USA

**JEL Classification** F31 · F32**1 Introduction**

In this paper, we document the evolution of cross-border holdings of financial assets and liabilities, which we refer to as international financial integration, since the onset of the global financial crisis, and relate it to the main macroeconomic and financial developments affecting the world economy over the past decade. These include: (1) the global financial crisis, resulting in a protracted period of deleveraging by large international banks; (2) the euro area crisis of 2010–2012, and the ensuing scaling down of cross-border integration within the euro area; (3) the boom in capital flows to emerging markets in the aftermath of the crisis; and (4) the increase in China's size and role in the global economy.

We show that the growth in cross-border positions in relation to world GDP has come to a halt, reflecting primarily two factors. The first is much weaker capital flows to and from advanced economies, including financial centers, and in particular diminished cross-border activity by banks in advanced economies, including within the euro area. The second is an increase in the relative weight of emerging economies in global GDP, since these economies have lower ratios of external assets and liabilities to GDP relative to advanced economies.

We also document how cross-border FDI positions have continued to expand, unlike positions in portfolio instruments and other investment. This increase is primarily explained by FDI positions vis-à-vis financial centers, which include an important role for so-called special purpose vehicles. This suggests that the increased complexity of the corporate structure of large multinational corporations is playing an important role in this respect. More generally, the disproportionate role of international assets and liabilities intermediated by financial centers—large and small—makes it extremely difficult to separate “genuine” financial integration from positions reflecting the corporate structures of large multinational firms or the domicile of investment fund vehicles.

Finally, we look more closely at cross-border holdings of portfolio debt instruments. These have received much attention in recent years, in light of the increased demand for “safe” assets after the global financial crisis, the impact of the euro area crisis on nonresident holdings of debt securities of the most affected economies in the region, and the rise in foreign ownership of debt securities issued by emerging markets. We show that the share of domestic debt securities held by nonresidents is negatively related to the size of the domestic debt market and positively related to the level of GDP per capita. We also show that the positive impact of a common currency on foreign holdings of domestic debt securities has diminished substantially for the countries more severely affected by the euro area crisis.

In Lane and Milesi-Ferretti (2007), we profiled the evolution of financial globalization over 1970–2004 for a set of 145 countries. We highlighted the rapid growth in cross-border financial positions since the mid-1990s and also the asymmetric nature of financial globalization during the so-called Great Moderation

period, with advanced economies “long equity, short debt” and emerging/developing economies “long debt, short equity.” While the general profile of pre-crisis cross-border financial positions (and the implications for the international propagation of the crisis) is well understood, it is timely to examine the reconfiguration of financial globalization since the onset of the crisis. By now (mid-2017), there have been several phases of post-crisis adjustment. First, there was an initial acute period in which capital flows and asset values dramatically declined during 2008–2009, with significant repatriation of capital, particularly by advanced economies (Milesi-Ferretti and Tille 2011). Second, there was an asymmetric recovery phase during 2010–2013, during which capital flows to emerging markets picked up strongly, but flows to and from advanced economies remained weak. This period was also characterized by increasing financial fragmentation among euro area economies. The period since mid-2013 has seen greater volatility in emerging market flows (with capital outflow episodes during the “taper tantrum” in the summer of 2013 Taper Tantrum and in late 2015/early 2016) and only tentative signs of a more robust recovery in capital flows to and from advanced economies.

Throughout the post-crisis period, the level and composition of capital flows have been substantially different relative to pre-crisis patterns. The shrinking of balance sheets for many large international banks has implied a substantial pullback from cross-border banking. This has been partly replaced by an increase in international bond issuance (Shin 2013; IMF 2014). In relation to sectoral composition, there has been a sharp increase in official flows along several dimensions. As a funder, the official sector has played a key role in Europe, with large-scale cross-border net Eurosystem liquidity flows during the euro area crisis and some countries relying on large-scale EU/IMF bailout loans. As a borrower, the surge in public debt in many countries means that cross-border debt liabilities are increasingly concentrated in the form of sovereign debt.

In characterizing and analyzing global trends in cross-border holdings, the paper focuses in particular on financial centers. This group—comprising both advanced economies such as Ireland, Luxembourg, the Netherlands, Switzerland, and the UK and small offshore centers such as the Bermuda and the Cayman Islands—accounts for a disproportionately large share of external asset and liability holdings, far in excess of its share in world GDP. In previous work, we had documented the very large size of external balance sheets in small, offshore financial centers (Lane and Milesi-Ferretti 2011a), but to understand the evolution of cross-border positions since the crisis it is important to focus on a broader set of financial centers.

This paper connects to a variety of strands in the literature. The collapse in capital flows during the global financial crisis was analyzed by Milesi-Ferretti and Tille (2011) and Lane (2013a). Bussière and others (2016) provide an update to the former study that includes the post-crisis period, while Chapter 2 in IMF (2016) analyzes post-crisis capital flows to emerging economies.<sup>1</sup> Other relevant recent contributions include the analysis of the cross-border valuation effects associated with the decline in the US asset-backed securities market in 2008 provided by

<sup>1</sup> On the evolution of net external positions see, among others, Lane and Milesi-Ferretti (2012, 2015).

Gourinchas and others (2012) and the literature on the measurement and interpretation of international financial data (Lane 2014; Borio and Disyatat 2015; Avdjiev and others 2016).<sup>2</sup> McKinsey Global Institute (2017) provides a recent overview of financial globalization.

The structure of the rest of the paper is as follows. Focusing on group-level data, Section II briefly describes the new dataset. Section III presents evidence on the main shifts in international balance sheets in the aftermath of the global financial crisis, and Section IV relates these shifts to the main macroeconomic and financial trends since the crisis. Section V provides a more in-depth treatment of the role of foreign investors as holders of portfolio debt securities, which has seen considerable changes in recent years. Finally, Section VI discusses the future evolution of cross-border positions and offers some conclusions.

## 2 The Dataset

The dataset presented in this paper contains estimates of external assets and liabilities (the international investment position—IIP) for 212 economies, for the period 1970–2015. The main novelties relative to its previous version (Lane and Milesi-Ferretti 2007) are: its virtually universal coverage, now including small offshore financial centers such as the Cayman Islands and the British Virgin Islands (following Lane and Milesi-Ferretti 2011b); a longer time period; and increased emphasis on the breakdown of portfolio debt instruments from other investment instruments (previously aggregated as debt assets and liabilities).

The database has been helped substantially by the large increase in the number of economies now reporting international investment position statistics to the International Monetary Fund (currently over 150 economies, up from 113 economies in 2007), as well as increased availability of bilateral data on portfolio, FDI, and bank holdings which help improve the estimates of external portfolios for countries not reporting those statistics. The data presentation follows the standard decomposition of assets and liabilities according to the Balance of Payments Statistics Manual 6. Specifically, assets and liabilities are divided in the following categories: foreign direct investment; portfolio equity; portfolio debt; other investment; and financial derivatives; plus foreign exchange reserves on the asset side. We exclude gold holdings from foreign exchange reserves, which are included in official IIP statistics, as these are not financial claims on another economy.

When international investment position data are not available, estimates are constructed from a variety of sources, as discussed in detail in Lane and Milesi-Ferretti (2007) and as documented for each asset category on a country-by-country

<sup>2</sup> The macro financial implications of high levels of financial globalization in relation to crisis dynamics are also studied in Obstfeld (2012a, b, 2013). Shin has provided an array of papers on the role of cross-border banking in international capital flows, with his recent work also highlighting the role of bonds in the “second wave” of global liquidity (Shin 2013). The analysis in this paper is framed by the research agenda studying the implications of the size and composition of international balance sheets for macroeconomic outcomes and macroeconomic policy (see, among others, Gourinchas and Rey 2014; Obstfeld 2015).

basis in the metadata accompanying the dataset. For the special case of small financial centers not reporting international investment position or balance of payments data, such as the Cayman Islands or the Channel Islands (Guernsey, Jersey, and Isle of Man), the estimates of external assets and liabilities are constructed from reported data on specific external assets and liabilities (such as portfolio assets reported to the IMF's Coordinated Portfolio Investment Survey) as well as mirror data from financial trading partners (see Lane and Milesi-Ferretti 2011a). These small financial centers are primarily financial intermediaries and hence have very large gross positions, but net positions that are negligible from a global perspective. As incomplete data coverage implies sizable measurement error on gross positions, for these centers we only report estimates of identified total external assets and liabilities, but not estimates of the net position.

Relative to the previous release of the database, we have also extended the split of total debt claims and liabilities into portfolio debt and other investment (previously available only for countries and years with published international investment position data) to the period 1995–2015. This allows us to examine separately the dynamics of these two categories, which have moved differently since the global financial crisis.

To construct estimates of portfolio debt liabilities for economies that do not report them, we use four sources of data: the stock of debt securities held by nonresidents as reported in the country's external debt statistics; the stock of international debt securities issued by that country's residents, reported by the BIS; holdings of a country's debt securities derived from the IMF's Coordinated Portfolio Investment Survey (CPIS); and the sum of foreign-held long-term bonds issued by the private and public sector, reported by the World Bank. Among the economies that do not report IIP statistics, the economy with the largest estimated debt liabilities is the Cayman Islands; others include small financial centers such as Guernsey and Jersey as well as economies in the Middle East such as Qatar and the United Arab Emirates.

The construction of data for portfolio debt assets is more difficult. The most reliable source of data is the CPIS, but reporters only include a subset of the economies for which IIP data on portfolio debt claims is missing.<sup>3</sup> The only sources of partner country data are a few annual surveys of portfolio debt liabilities (for the USA and Japan), but those data include positions held as foreign exchange reserves, which complicate the estimation of portfolio debt assets (excluding reserves). The economies with the largest estimated holdings of debt securities, but no IIP or full CPIS reporting include Qatar and the United Arab Emirates. These are also economies for which the overall estimate of external assets—and not just the split between portfolio debt and other investment claims—is subject to very substantial uncertainty.

In terms of presentation of the data, we aggregate economies into three groups:

<sup>3</sup> Among CPIS reporters that do not provide comprehensive IIP statistics, those with the highest estimated stocks of debt assets are Bermuda, Guernsey, and Jersey (Bermuda reports IIP statistics, but they exclude the offshore sector). For the Cayman Islands, which has by far the largest estimated stock of debt assets among countries not reporting IIP statistics, reporting of securities holdings by the very large investment fund industry is only available for 2015.

1. Financial centers. These economies, selected on the basis of their ratios of external assets and liabilities to GDP, include advanced economies with sizable financial center activity (Belgium; Hong Kong S.A.R.; Ireland; Luxembourg; Netherlands; Singapore; Switzerland; and the UK), emerging economies with similar features (Mauritius, Panama) and small financial centers (such as Bermuda and the Cayman Islands);
2. Other advanced economies<sup>4</sup>;
3. Emerging and developing economies. We also present data for China separately in light of its size relative to the country group.

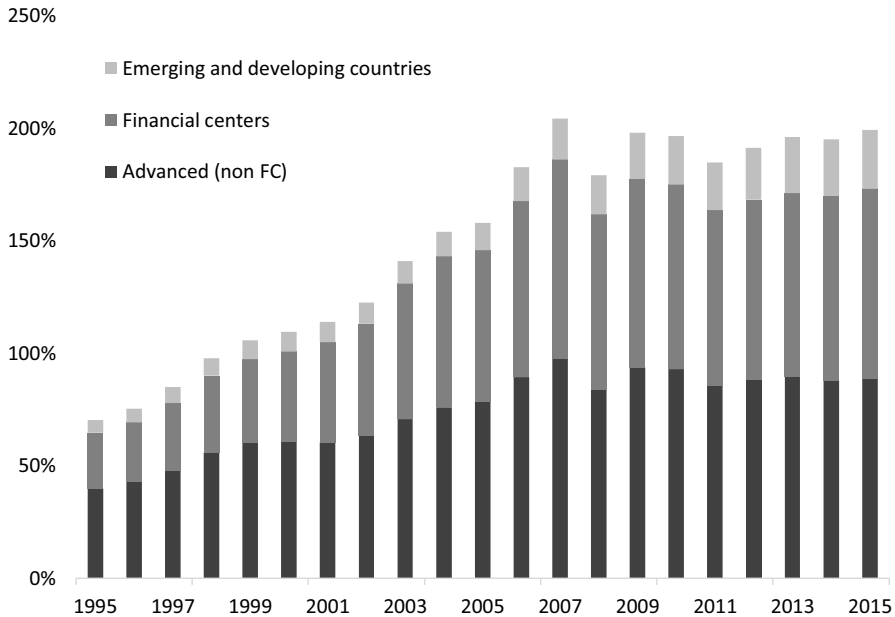
One rationale for the division is to highlight the role of pure international financial intermediation, which has increased substantially in recent years, in addition to financial market integration. An example of the former would be the purchase by, say, a German pension fund of a mutual fund domiciled in Luxembourg that invests in US equities, while an example of the latter would be a direct purchase by the same German pension fund of US shares. In the first case, the size of cross-border assets and liabilities increases by twice as much as in the second case. These phenomena apply to all categories in the balance of payments: portfolio investment (as in the previous example), other investment (when banking flows are channeled through financial centers—for instance, euro area banks conducting US business through their London branches and affiliates), as well as foreign direct investment, as discussed more extensively in the next section.

### 3 Dynamics of International Financial Integration

Has financial globalization been “in retreat” since the global financial crisis? Figure 1 shows the evolution of world external assets for the three country groups described above over the past 25 years (the figure for world liabilities is analogous). It shows how, after a remarkable expansion in cross-border positions up to a peak in 2007, these have declined slightly in relation to world GDP.<sup>5</sup> If we consider the euro area as a whole, netting out intra-euro area holdings, the general pattern remains the same, but external assets and liabilities as a share of world GDP in 2015 are virtually the same as in 2007, rather than slightly lower, since intra-euro area holdings have declined in relation to world GDP. The figure also underscores the important role played by financial centers in the global expansion of cross-border positions, as well as in the post-crisis slowdown. Emerging markets and developing economies account for a small, albeit growing share of cross-border holdings. One interpretation of these findings is that the global financial crisis has “undone” the

<sup>4</sup> We use the IMF’s classification of advanced economies. See “Appendix 1” for a complete list of countries.

<sup>5</sup> Using a sample of countries for which data are available continuously since 1995, excluding holdings of financial derivatives, which have typically been reported only during the past decade, and excluding the coverage of special financial institutions in the Netherlands (which started in 2003), yields a somewhat smaller expansion in the sum of cross-border assets and liabilities since 2002 (133 vs 175 percentage points of global GDP), but an unchanged modest decline since the global financial crisis.



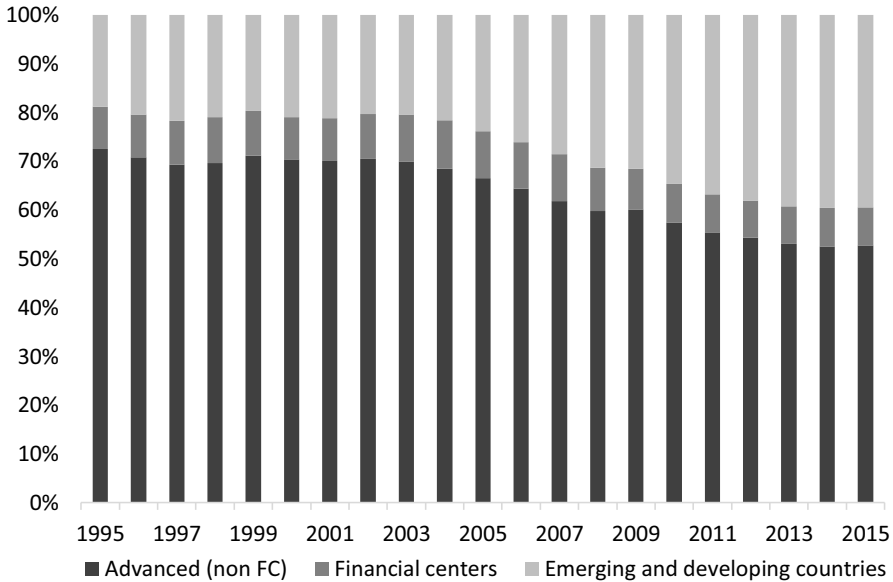
**Fig. 1** Global external assets (ratio of world GDP). *Source:* authors' calculations based on revised and extended EWN database

very rapid expansion in cross-border holdings which occurred between 2003 and 2007, with global financial integration returning to the trend prevailing during the previous decade.

Figure 2 depicts the evolution in the corresponding shares of world GDP: It vividly underscores the increasing weight of emerging and developing economies since the crisis. Together, Figs. 1 and 2 highlight the disproportionate role of financial centers in cross-border holdings: As of 2007, these accounted for close to 10 percent of world GDP, but over 43 percent of global financial assets. By 2015, their share in world GDP had declined to 8 percent, but their global share of external assets remained around 43 percent. Conversely, emerging and developing economies accounted for some 30 percent of world GDP in 2007, but only 10 percent of cross-border financial assets. As of 2015, the world GDP share of emerging and developing economies had increased to around 40 percent at market exchange rates, but their share of external assets had expanded only to 13 percent.

Figure 3 illustrates changes in external positions as a share of world GDP between 2007 and 2015 by type of instrument and group of countries.<sup>6</sup> It documents that the slowdown in cross-border holdings reflects primarily a contraction in the size of debt instruments relative to world GDP, offset in part by a large increase in FDI and a smaller increase in financial derivatives. We discuss those developments

<sup>6</sup> While valuation changes play an important role in explaining year-to-year fluctuations in external positions, especially when equity prices and exchange rates move substantially, cumulative financial flows generally match the changes in positions reported in Fig. 3.



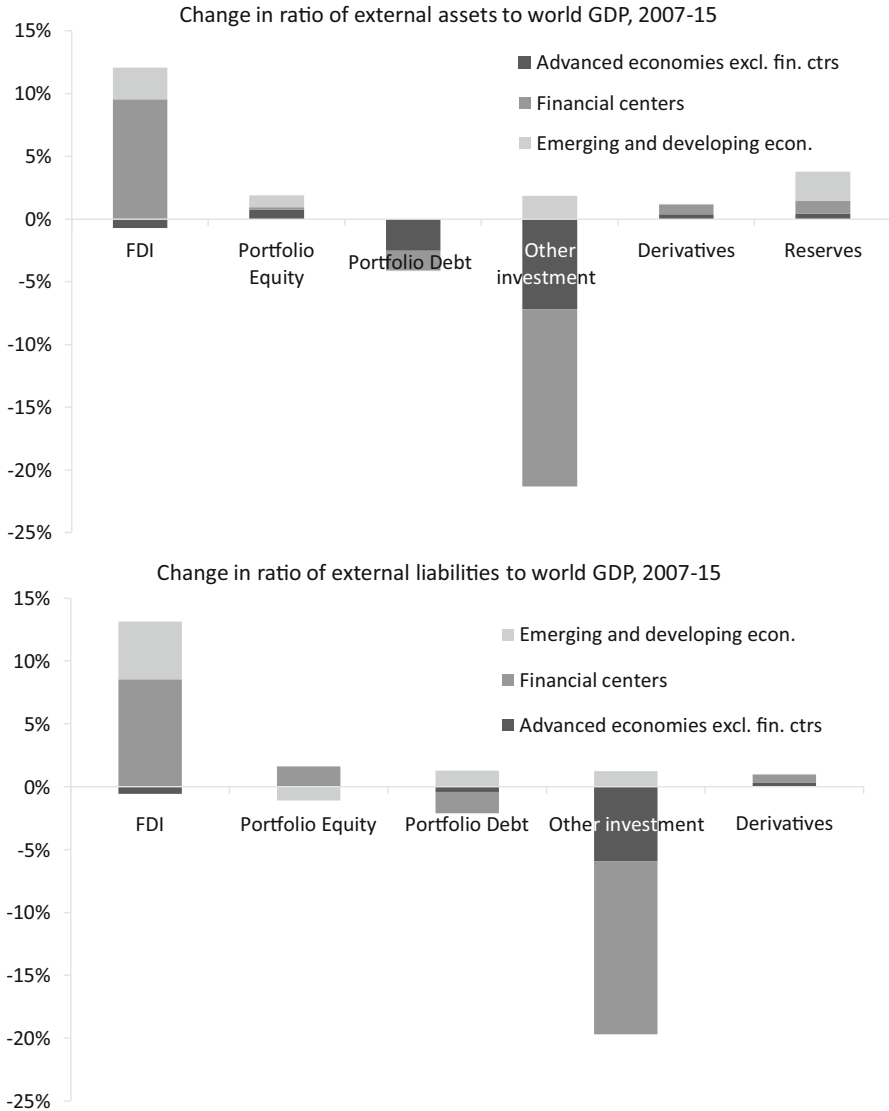
**Fig. 2** Composition of World GDP (shares of world GDP). *Source:* authors' calculations based on World Economic Outlook database

further below. But looking at the evolution of GDP in the different country groups (Fig. 2), together with evidence from Fig. 1 on the smaller size of cross-border holdings of emerging and developing economies in relation to their GDP when compared with advanced economies, suggests a second factor explaining lower cross-border holdings in relation to world GDP. This is the increase in the global share of GDP of emerging and developing economies, which have smaller ratios of external assets and liabilities to GDP relative to advanced economies.

In terms of external balance sheets by group of countries, a few stylized facts stand out:

- For financial centers, the first is the sharp contraction in “other investment” (where loans and deposits figure prominently), closely related to the scaling down in cross-border activities of large international banks. The second is the large increase in their FDI claims and liabilities. As we discuss below, this development is linked to the increased complexity in the cross-border corporate structures of large multinational companies, as well as with their choices of domiciliation for headquarters.
- For advanced economies excluding financial centers, there is also a shrinking in “other investment” claims and liabilities. The decline of portfolio debt holdings (Fig. 3, first panel) was attenuated on the liabilities side by the buildup of foreign exchange reserves by emerging and developing economies.
- For emerging and developing economies, the largest change on the asset side is the increase in reserves, while on the liabilities side it is the increase in FDI. Unlike advanced economies and financial centers, emerging and developing



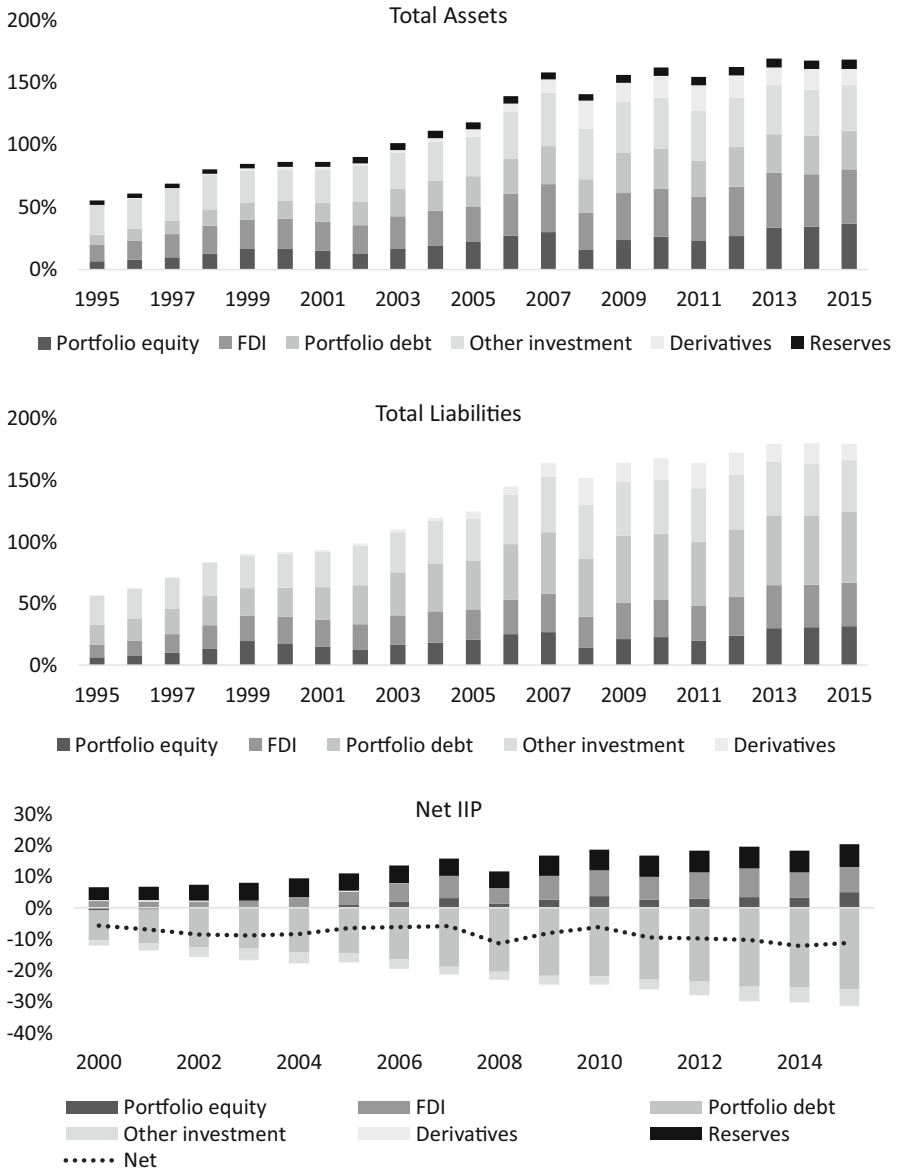


**Fig. 3** Changes in external assets and liabilities, 2007–2015 (percent of world GDP). *Source:* authors' calculations based on revised and extended EWN database

economies also experienced an increase in claims and liabilities in the form of debt instruments—both portfolio debt and other investment.

We turn next to a time series decomposition for external assets, external liabilities, and the net external position for the three groups of countries in relation to their GDP. Regarding advanced economies that are not financial centers (Fig. 4),





**Fig. 4** Gross and net external positions, advanced economies excluding financial centers (ratio of group GDP). *Source:* authors' calculations based on revised and extended EWN database

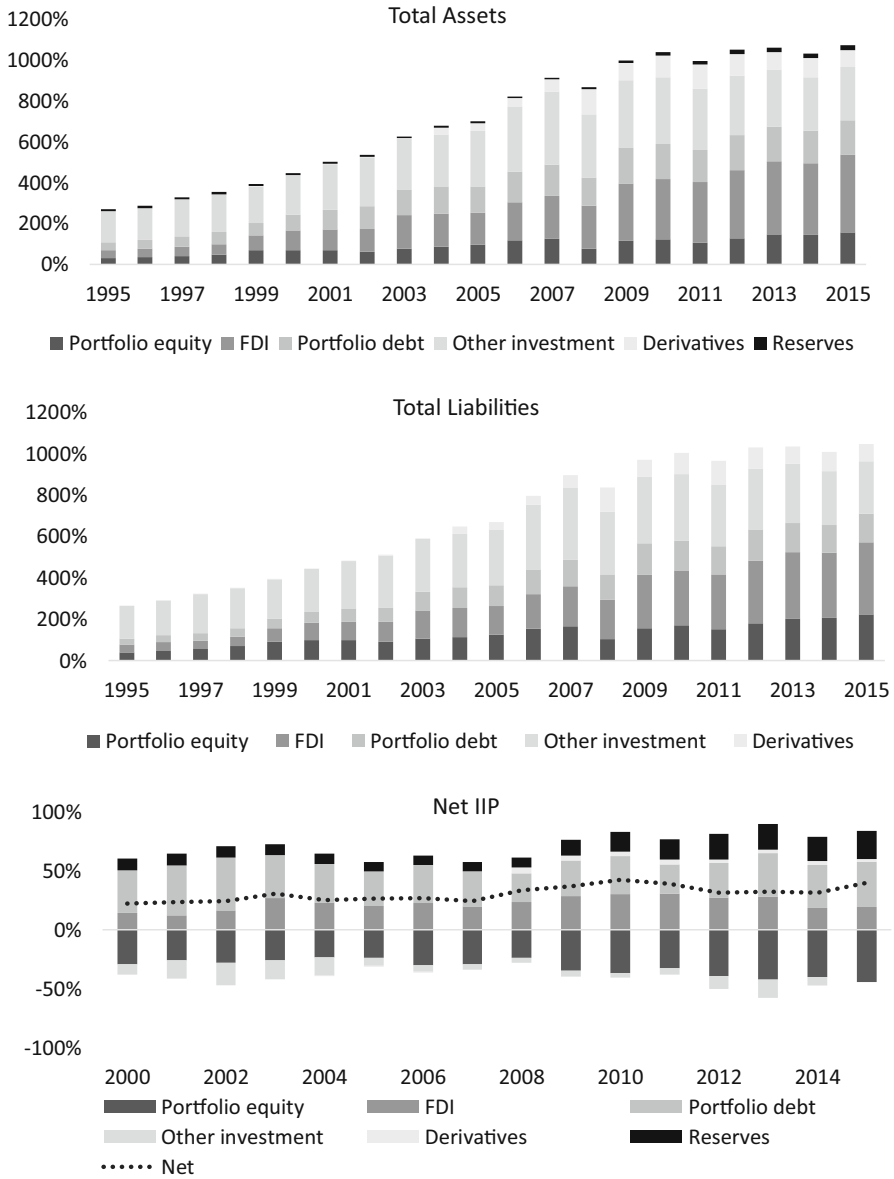
the already mentioned decline in claims and liabilities in the form of other investment since the crisis implies that the largest asset category is now FDI, with portfolio equity claims roughly the same size as other investment claims. On the liabilities front, portfolio debt has expanded further, reflecting to an important extent

increased holdings of foreign exchange reserves, especially by emerging and developing economies. The net position shows a gradual deterioration, with rising net claims in equity instruments (portfolio equity and FDI) more than offset by rising net portfolio debt liabilities. As shown in the working paper version of this paper (Lane and Milesi-Ferretti 2017), the deterioration in the net external position of this country group reflects entirely developments in the USA: For other advanced economies, the net external position has been improving. A common pattern in the external position of these economies is the persistent “long equity, short debt” pattern (already discussed in Lane and Milesi-Ferretti 2007) with net FDI and portfolio equity claims, but net liabilities in terms of portfolio debt and (to a lesser extent) other investment.

For financial centers (Fig. 5), other investment claims and liabilities represented the largest share of the external portfolio pre-crisis, reflecting the role of these economies as banking centers. Since the crisis, those claims and liabilities have shrunk dramatically, but at the same time there has been a surge in FDI, which represent now the largest component of their external portfolio (some 350 percent of these economies’ GDP). These economies in the aggregate are net creditors, with a positive net FDI position as well as sizable foreign exchange reserves. They also have a net creditor position in portfolio debt and a net debtor position in portfolio equity, reflecting the substantial presence of investment funds in some of these economies (especially Luxembourg and Ireland, but also the Cayman Islands). Shares of these funds held by nonresidents are portfolio equity liabilities for the domestic economy, but these funds invest in a variety of instruments, including debt securities, thus explaining the apparent asymmetry in these countries’ external balance sheet.<sup>7</sup>

Finally, Fig. 6 for emerging and developing economies shows a much lower stock of external assets and liabilities when compared to the size of these economies (around 60 percent of GDP). Foreign exchange reserves are an important component of their external assets, and on the liabilities front the relative importance of debt instruments relative to equity instruments has been declining. The net position shows a trend improvement over time, notwithstanding a spike in the net position in 2008–09 driven by valuation effects, as these countries’ currencies depreciated and stock market valuations declined sharply. As noted in Lane and Milesi-Ferretti (2017), China has been a net creditor throughout the period, while other emerging and developing economies have been net debtors.

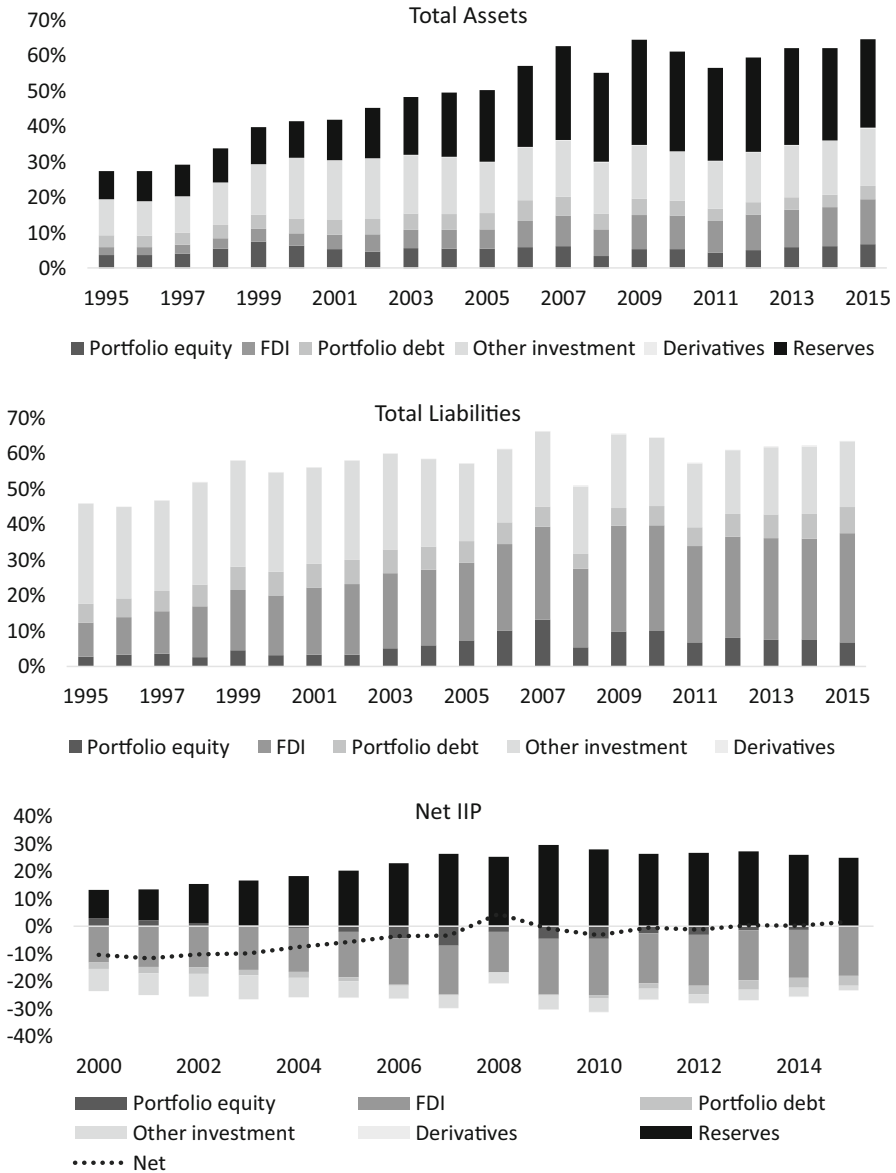
<sup>7</sup> For a few small offshore centers, such as the British Virgin Islands and the Cayman Islands we use estimates of their gross external assets and liabilities in calculating total claims and liabilities of financial centers, but we don’t use their difference to calculate a net position. The reason is the sizable measurement error in assets and liabilities, together with their large size. In practice, the net external position of these centers is close to zero, given that they are virtually pure intermediaries and that the absolute size of their economies is minimal.



**Fig. 5** Gross and Net External Positions, Financial Centers (ratio of group GDP). *Source:* authors' calculations based on revised and extended EWN database

#### 4 External Balance Sheet and Global Macro-Financial Trends

The evolution of external balance sheets since the crisis has been shaped by global and regional macro-financial trends. For advanced economies and financial centers, the first trend is the large reduction in cross-border banking activity following the



**Fig. 6** Gross and net external positions, emerging and developing economies (ratio of group GDP). *Source:* authors' calculations based on revised and extended EWN database

global financial crisis and associated hit on large international banks; and the second is the euro area crisis of 2010–2012, resulting in a scaling down of cross-border integration within the euro area. About emerging and developing economies, the main factors at play in explaining the evolution of cross-border balance sheets were the post-crisis boom in emerging markets and associated large capital inflows, and



subsequent fading thereof, and the rapid increase in China's size and role in the global economy. We examine these developments in turn.

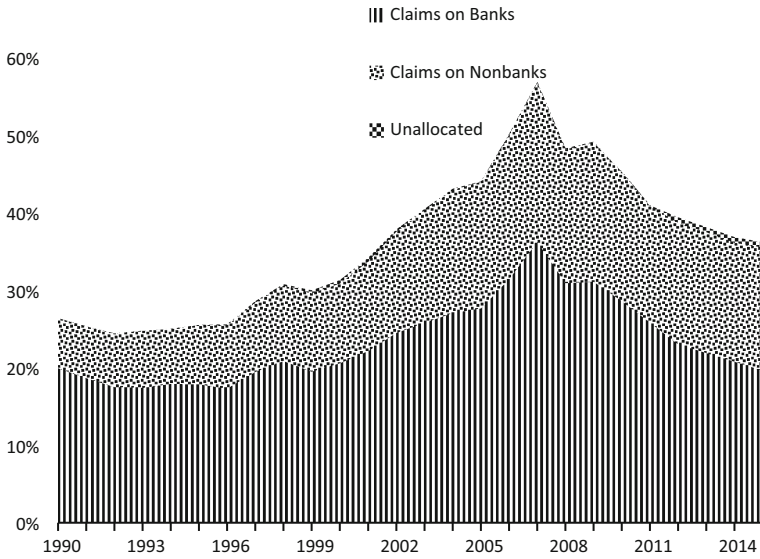
#### 4.1 Banks

Large international banks played a key role in pre-crisis capital flows. In part, this reflected the capacity of these banks to use internal channels to arbitrage differences in funding conditions around the world (Cetorelli and Goldberg 2012). A prominent example is provided by the active participation of large European banks in the dollar funding market during the mid-2000s, to fund both US-located assets and European-located assets (Acharya and Schnabl 2010; Bruno and Shin 2015; Ivashina and others 2015). It is also plausible that the incentive structures facing banks encouraged a scaling up in the size of balance sheets, fueling cross-border expansion (Committee on Global Financial Stability 2010; Allen and others 2011). With the freezing of inter-bank and wholesale funding markets during 2008–2009 and large-scale credit losses, banking and regulatory models have been overhauled in response to the global financial crisis. One by-product is that most large global banks, especially those from the euro area, the UK, and Switzerland, have undertaken a substantial retreat from cross-border banking activities.

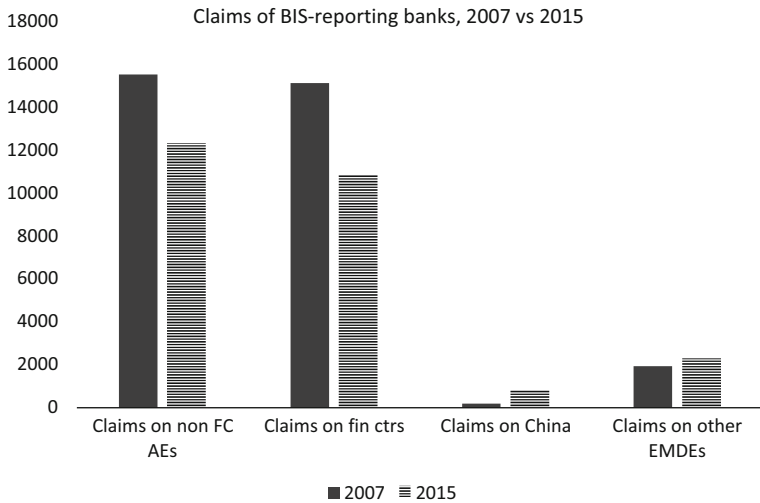
This retreat is illustrated in Figs. 7 and 8. Figure 7 shows that in 2007 the external claims of BIS-reporting banks on a locational basis accounted for some 56 percent of world GDP (and 28 percent of global external assets). By 2015, these claims accounted for 36 percent of world GDP and less than 20 percent of all global external claims. Figure 8 shows the decline in claims between 2007 and 2015 by country group of destination: The decline is concentrated in advanced economies, and especially financial centers. In contrast, claims on emerging and developing economies have risen in dollar terms and as a share of world GDP. However, these have declined as a share of GDP in emerging and developing economies, a further sign of the diminished role of international banks.

Two points need to be underscored. First, these aggregate trends in cross-border banking mask some regional differences (see also Bouvatier and Delatte 2015). Among advanced economies, Japanese, Canadian and Australian banks have increased their cross-border claims as a share of their GDP and so have banks from Scandinavian countries. Among emerging and developing economies, Chinese banks have, for instance, undertaken a sizable overseas expansion. On a smaller scale, banks from other emerging markets have expanded regionally—for instance, Colombian banks in Central America.

Second, as noted by Claessens and Van Horen (2015), foreign bank presence in domestic markets, which importantly include locally funded subsidiaries, has declined by much less than cross-border banking activity. Here again there are differences across banks from different regions, with banks from OECD countries reducing their presence in foreign markets since the crisis, while banks from non-OECD countries expanded theirs.



**Fig. 7** External assets of BIS-reporting banks (ratio of global GDP). *Source:* Bank for International Settlements, Locational Banking Statistics



**Fig. 8** Claims of BIS-reporting banks by destination (billions of US dollars). *Source:* Bank for International Settlements, Locational Banking Statistics

#### 4.2 The Euro Area Crisis

The decline in cross-border banking is also an important element of the euro area crisis that took hold during 2010–2012. While the 2008–2009 global financial crisis had a significant impact in those countries most affected by the sudden stop in



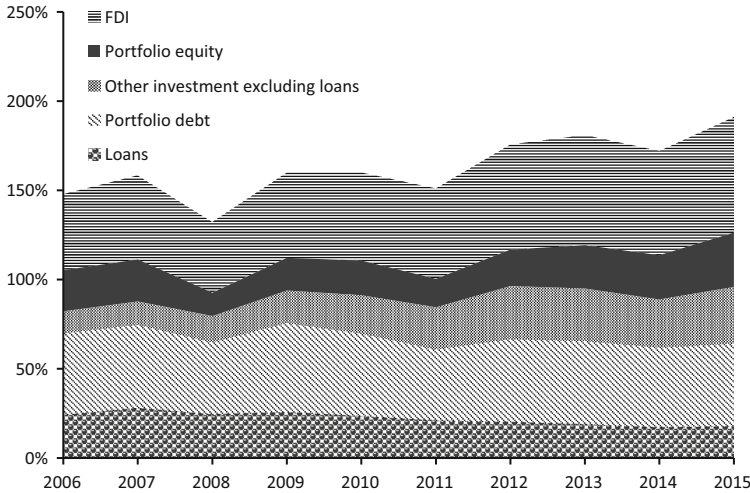
financial markets (those with large current account deficits and/or managing the fallout from property boom–bust cycles), the euro area had also initially been buffeted by the operation of automatic Eurosystem liquidity flows and the absence of volatility in national-level currency markets. Rising sovereign debt, disappointing growth, and the systemic implications of the emerging Greek crisis led to a more widespread questioning of the sustainability of the common currency during 2010–2012, with a rise in national sovereign spreads and active management of redenomination risk. While existential uncertainty about the future of the euro was ultimately addressed by the ECB's OMT program in September 2012, the crisis exposed the fragile design of the euro area and the nonequivalent status of resident versus nonresident financial entities, even inside a monetary union. The deviation from full financial union was further underlined by the imposition of capital controls in Cyprus and Greece.

Since the euro area had experienced by far the strongest growth in cross-border financial integration during the pre-crisis period, the crisis-induced retreat from cross-border asset trade among private sector participants has been substantial (Lane 2013b). Several underlying driving forces have been at work in the boom–bust cycle in capital flows within the euro area. First, the widening and narrowing in the dispersion of current account balances induce shifts in the asset and liability positions of creditor and debtor countries, especially given the multilateral nature of financial intermediation (Obstfeld 2012b; Hale and Obstfeld 2016). Second, the crisis-related fragmentation in the inter-bank market in the euro area gave rise to a contraction in private sector cross-border positions (Garcia-de-Andoain and others 2014). However, as noted above, the retreat in private sector asset trade was in part offset by Eurosystem liquidity flows. Third, the easy credit conditions of the pre-crisis periods had enabled some national banking systems to expand rapidly by tapping cross-border funding markets. The post-crisis deleveraging and restructuring of these banking systems involved a downsizing in cross-border positions.

Given the distorted incentives facing banks and other institutions in the pre-crisis period in relation to overborrowing, some proportion of the decline in cross-border positions can be interpreted as part of a welcome correction of oversized balance sheets. However, the available data are not sufficiently rich to enable a precise decomposition between welfare-reducing fragmentation and welfare-enhancing correction of unsustainable positions. Moreover, Eurosystem liquidity flows and EU-IMF official funding flows mean that aggregate cross-border positions do not reveal the full scale of the shift in the cross-border strategies of private sector agents.

Figure 9 shows the evolution of intra-euro area holdings over the past decade, calculated as the difference between the sum of external assets across all euro area countries and total external assets for the euro area as a whole. It shows how such holdings have continued to rise primarily because of FDI and nonbank other investment, while portfolio debt holdings and bank loans have shrunk as a share of euro area GDP. The increase in FDI is related to the expansion in special purpose vehicles, discussed in more detail in the next subsection. More generally, the increased complexity in the financial structure of large multinational corporations is also contributing to the rising trend in nonbank other investment, together with





**Fig. 9** Intra-euro area assets (percentage of euro area GDP). *Source:* authors' calculations based on revised and extended EWN database. *Note:* Intra-euro area assets are calculated as the sum of external assets of individual euro area countries minus the external assets of the euro area as a whole

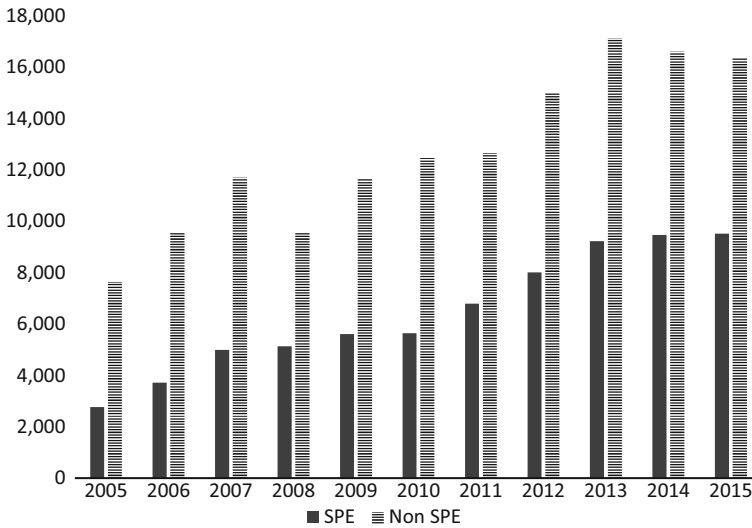
official lending programs. The decline in cross-border loans reflects the general downsizing in international banking activity, and so does to some extent the decline in intra-euro area-border portfolio debt holdings, a topic we discuss more extensively in Section V.

### 4.3 FDI Measurement Issues

As of end-2007, residents of financial centers held some 43 percent of the world's FDI claims abroad, and FDI in financial centers accounted for around 40 percent of the global total. By end-2015, FDI claims by financial centers had risen to over half of the world total and liabilities to 47 percent.<sup>8</sup> And, as shown in Fig. 3, global FDI was the only asset category that expanded substantially as a share of global GDP since the crisis, and especially so in financial centers. While the main financial centers have important multinational corporations with extensive cross-border activities, other factors play an important role in explaining both the size and composition of FDI claims and liabilities as well as their dynamics.

The first is the growing importance of Special Purpose Entities. These are legal entities with "little or no employment; or operations, or physical presence in the jurisdiction in which they are created by their parent enterprises which are typically located in other jurisdictions (economies)" (OECD 2008). Such vehicles are used to raise capital or hold assets/liabilities and generally perform no production activities.

<sup>8</sup> In relation to the size of financial centers, these claims and liabilities are each three times GDP. Blanchard and Acalin (2016) document a very strong correlation between FDI inflows and FDI outflows across a range of emerging economies, which they interpret as suggesting that an important proportion of measured FDI inflows are "pass-through" flows going in and out of the country on their way to their final destination, with the stop due in part to favorable corporate tax conditions.



**Fig. 10** FDI claims by OECD countries and selected emerging markets: The role of special purpose vehicles billions of US dollars, 2005–2015. *Source:* authors' calculation based on OECD foreign direct investment statistics. Note: countries included in the sample for FDI excluding SPEs are OECD countries plus Brazil, India, Indonesia, Russia, Saudi Arabia, and South Africa. Countries with available data on SPEs include Austria, Belgium, Chile, Denmark, Hungary, Luxembourg, the Netherlands, Poland, Portugal, and Sweden

Statistics on the relative importance of SPEs in total FDI are available from the OECD for a limited set of countries (Fig. 10), including the Netherlands and Luxembourg, which are the countries with the largest stocks of FDI claims and liabilities after the USA.<sup>9</sup> Most of their FDI claims and liabilities (over  $\frac{3}{4}$  for the Netherlands and over 90 percent for Luxembourg) are indeed by SPEs. Total FDI claims by SPEs for just these two countries have grown by over \$3.5 trillion between 2007 and 2014—over  $\frac{1}{4}$  of the increase in the stock of global FDI claims during the same period.

The second factor is the increased tendency of multinational companies to move their domicile to a financial center. To the extent that the company is moving from a country where it has larger production facilities than in the financial center, this will generally increase the stock of global FDI (think, for instance, of a US pharmaceutical company with important local production facilities moving its headquarters to Ireland).<sup>10</sup> In that case, global FDI would increase by the value of the US production facilities minus the value of any facility previously located in Ireland. Indeed, the stock of FDI claims overseas by Ireland has increased by \$600

<sup>9</sup> Other countries reporting sizable FDI claims and liabilities by SPEs include Austria, Belgium, Hungary, and Ireland. SPEs likely play an important role in FDI claims and liabilities of Bermuda, the British Virgin Islands, and the Cayman Islands (which together account for over 5 percent of global FDI claims in our estimates).

<sup>10</sup> We are abstracting here from changes in the mix of financing which weaken the link between the value of production facilities and FDI. See Jayaswal and others (2006) for an example related to FDI in Denmark.

billion between 2007 and 2014, and by that date it was over 5 times Irish GDP. The counterpart to an increase in FDI assets in the countries hosting re-domiciled firms is a matching increase in foreign portfolio equity liabilities, given that the underlying shareholders of the entities remain the same.

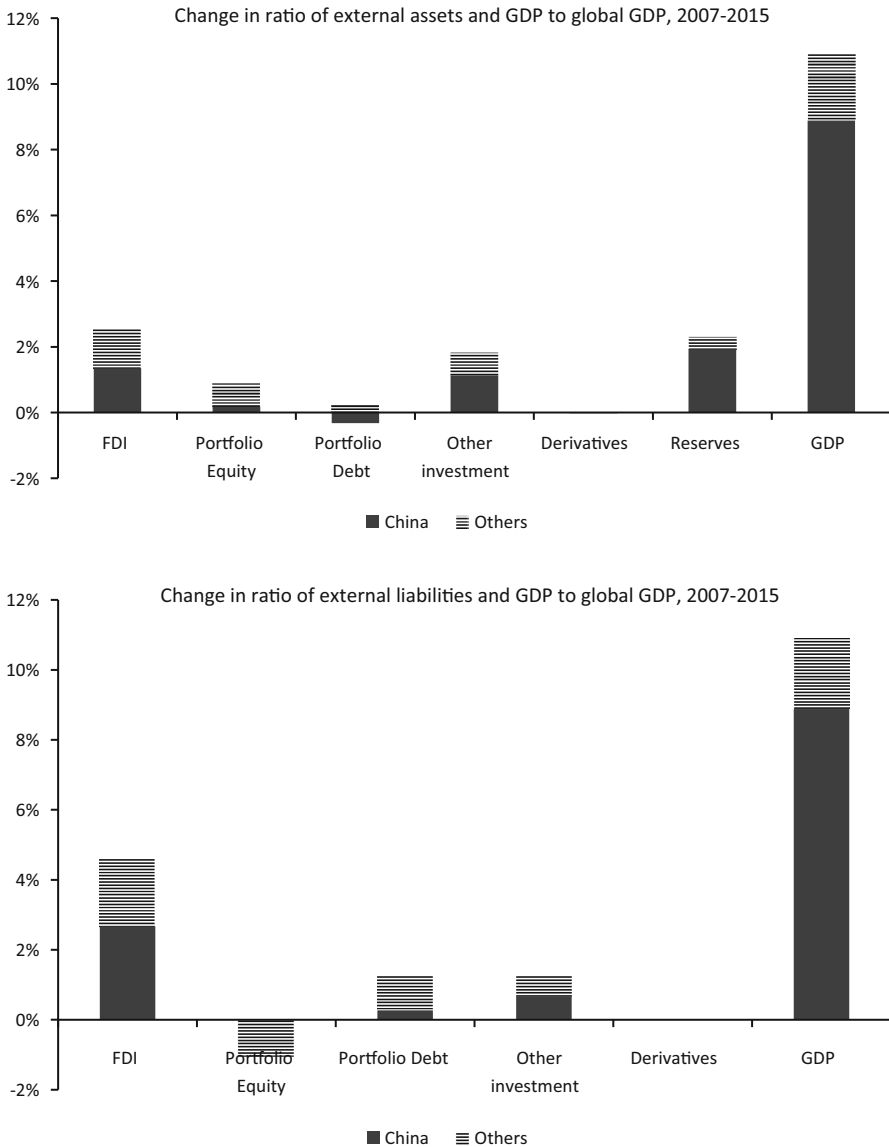
More generally, multinational companies can respond to differences in financial conditions and tax systems across countries through a range of intra-firm cross-border balance sheet operations. Popular strategies include intra-firm lending and borrowing across affiliates in recognition of differences in the tax treatment of debt interest payments across countries and the relocation of intellectual property assets to those jurisdictions that offer a better tax treatment of such assets. Financial centers can play an important intermediation role in such treasury and asset management practices by multinational firms.

#### 4.4 Emerging and Developing Economies and the Role of China

Since the global financial crisis, emerging and developing economies have become increasingly prominent in the global financial system. At a basic level, this reflects their growing importance in global GDP, in view of the substantial growth differential over the last decade between emerging and advanced economies. Across emerging markets, there have also been significant changes in the structure of international balance sheets. These include the much discussed increase in portfolio liabilities as emerging market sovereigns and corporates have increased issuance and gained favor among global investors. It also reflects the rise of emerging economies as outward investors, as is evident in the increased scale of capital outflows. These include not only increased holdings by the official sector (foreign exchange reserves; sovereign wealth funds), but also an increased presence of corporations and institutional investors in international capital markets.

Within the emerging market group, China plays an especially important role. While the ratio of external assets and liabilities to GDP in China has not changed dramatically since the pre-crisis period, the very large increase in its share of the aggregate GDP of emerging economies implies that it now plays a large role in shaping global aggregate trends in their financial integration, particularly for foreign exchange reserves, FDI, and other investment.

These developments are illustrated in Fig. 11, which has the same structure as Fig. 3, but focuses on data for emerging and developing economies only, separating out China from other countries. As of 2015, China accounted for close to 40 percent of the GDP for this country group, calculated at market exchange rates, up from 22 percent in 2007. The figure shows how developments in China played a big role in explaining the increase in foreign exchange reserves, but also the increase in inward and outward FDI and other investment. For portfolio instruments, changes were larger in absolute terms for other emerging and developing economies, given the relatively limited access of international portfolio investors to Chinese markets. Regarding those categories, the decline in portfolio equity is related to the weakening in equity valuations, while the increase in portfolio debt liabilities will be discussed extensively in the next section.



**Fig. 11** Emerging and Developing Economies: Changes in Share of External Assets, Liabilities, and GDP to Global GDP 2007–2015. *Source:* authors' calculations based on revised and extended EWN database

## 5 Foreign Holdings of Portfolio Debt Securities

A logical next step to the stylized facts presented so far is an empirical analysis of factors associated with changes in cross-border holdings across countries. However, this exercise is difficult to undertake for some categories of external assets and

liabilities. Difficulties include the importance of financial engineering for FDI, the distortions to the measurement of foreign ownership of domestic shares introduced by the concentration of the investment fund industry in a few financial centers, and the very general nature of the “other investment” category, which includes trade credits, bank loans and deposits, as well as other financial exposures. In this paper, we therefore limit our analysis to portfolio debt instruments issued by the government. For these financial instruments, the link between the issuer and the country is immediate—while this is not necessarily the case for securities issued by the private sector, since corporate entities can issue bonds offshore. The analysis is made possible by the increased availability of country data providing a breakdown of total portfolio debt liabilities (reported in our dataset) by the sector of the issuer.

Portfolio investment in debt securities has been the object of much discussion and commentary on capital flows in recent years. This reflects several important developments in portfolio debt markets: a relative shift from international bank-intermediated debt liabilities to international portfolio debt liabilities, resulting in an increase in issuance of portfolio debt instruments by emerging economies and higher foreign participation in their securities markets; a reduction in foreign holdings of domestic debt securities for euro area countries more severely affected by the euro area crisis of 2010–2012; an increase in demand for safe assets (such as US Treasury bonds and German bunds) by international investors, including importantly foreign central banks; and increased holdings of government debt securities by central banks in several advanced economies, associated with quantitative easing.

Our empirical analysis examines the covariates of the degree of foreign investor participation in government debt markets in 2007 and in 2015. Our dependent variable is the ratio of foreign holdings of government debt securities over total government debt securities outstanding. In aggregate terms, the stock of cross-border holdings of portfolio debt instruments increased by over \$6 trillion for the period 2007–2015, as shown in the bottom panel of Fig. 3. The importance of increased holdings of safe assets in explaining this increase is immediately obvious if one compares this figure with the much lower increase in portfolio debt claims (around \$2 trillion), which exclude holdings of securities as foreign exchange reserves. Figures 3 and 6 highlight the increase in foreign holdings of portfolio debt instruments issued by emerging and developing economies. In the aggregate, the ratio of portfolio debt liabilities to GDP for emerging and developing economies has risen by 2 percentage points between 2007 and 2015, with considerable cross-country heterogeneity.

Table 1 provides some stylized facts on the size and evolution of global debt securities markets between 2007 and 2015. Over that period, the size of markets relative to world GDP shrank, but this reflects entirely composition effects. Specifically, the size of the markets for debt securities relative to each country group’s GDP went up, but the global total shrank because of the rising weight of emerging markets in general, and China in particular, which have smaller debt securities markets in relation to GDP when compared to advanced economies. Within total debt securities, the share of government debt securities has been increasing, both within-country groups and at the global level. Table 2 presents

**Table 1** Size of global debt securities' markets: 2007 versus 2015. *Source:* Bank for International Settlements, Debt Securities

|   | 2007              |                   | 2015              |                   |
|---|-------------------|-------------------|-------------------|-------------------|
|   | Pct. of group GDP | Pct. of world GDP | Pct. of group GDP | Pct. of world GDP |
| <i>Total debt securities</i>              |                   |                   |                   |                   |
| Financial centers                         | 193.7             | 18.8              | 225.6             | 17.8              |
| Non-FC advanced economies                 | 165.0             | 103.3             | 180.3             | 96.4              |
| Emerging and developing economies         | 36.2              | 10.0              | 50.3              | 19.4              |
| China                                     | 48.1              | 3.0               | 70.5              | 10.7              |
| Others                                    | 32.7              | 7.0               | 37.2              | 8.7               |
| Total                                     | 132.1             | 132.1             | 133.6             | 133.6             |
| <i>General government debt securities</i> |                   |                   |                   |                   |
| Financial centers                         | 35.1              | 3.4               | 60.4              | 4.8               |
| Non-FC advanced economies                 | 63.0              | 39.5              | 91.9              | 49.1              |
| Emerging and developing economies         | 23.5              | 6.5               | 21.3              | 8.2               |
| China                                     | 20.3              | 1.3               | 14.2              | 2.2               |
| Others                                    | 24.5              | 5.2               | 25.8              | 6.1               |
| Total                                     | 49.4              | 49.4              | 62.1              | 62.1              |

Statistics; national sources; and Arslanalp and Tsuda (2014a, b)

**Table 2** Share of debt securities held by nonresidents: 2007 and 2015. *Source:* Bank for International Settlements, Debt Securities

|                               | Advanced economies |        | Emerging markets |        |
|-------------------------------|--------------------|--------|------------------|--------|
|                               | Mean               | Median | Mean             | Median |
| 2007                          |                    |        |                  |        |
| General government securities | 0.48               | 0.50   | 0.31             | 0.27   |
| Total debt securities         | 0.44               | 0.50   | 0.26             | 0.25   |
| Observations                  | 32                 |        | 25               |        |
| 2015                          |                    |        |                  |        |
| General government securities | 0.51               | 0.54   | 0.36             | 0.35   |
| Total debt securities         | 0.45               | 0.44   | 0.35             | 0.40   |
| Observations                  | 33                 |        | 32               |        |

Statistics; national sources; and Arslanalp and Tsuda (2014a, b)

summary statistics on the share of debt securities held by nonresidents in advanced economies and emerging markets. The share is higher in the former and for government securities when compared to total debt securities, but it has risen for emerging markets since the crisis.

We turn next to an empirical cross-country examination of factors explaining the share of foreign ownership of government debt securities. Among the covariates, we consider macroeconomic variables, structural factors (for example, capital controls), domestic financial development, as well as euro membership. Related papers include Burger and Warnock (2006), Lane and Milesi-Ferretti (2008), Horioka and others (2015), Du and Schreger (2016), and especially Arslanalp and Tsuda (2014a, b), who assembled a comprehensive cross-country dataset on holders of general government debt for both advanced economies and emerging markets.

To capture pre-crisis and post-crisis patterns, we examine the covariates of foreign holdings in 2007 and 2015.<sup>11</sup> The regression specifications are

$$FORSHARE_i^{2007} = \alpha^{2007} + \beta^{2007} Z_i^{2007} + \varepsilon_i^{2007}$$

$$FORSHARE_i^{2015} = \alpha^{2015} + \beta^{2015} Z_i^{2015} + \varepsilon_i^{2015}$$

where FORSHARE is the share of foreign investors in total holdings of domestic government debt securities, which is calculated as the ratio of portfolio debt liabilities (from our database) to total debt securities outstanding (calculated using data from the Bank of International Settlements complemented with national sources and data from Arslanalp and Tsuda (2014a, b)).

The set of regressors Z includes the following variables<sup>12</sup>:

- Market size (log of bond market capitalization measured in US dollars). All else equal, we would expect the share of foreign holdings to be inversely correlated with the size of the market. For instance, with full global diversification nonresidents would hold a share of 50 percent in a country accounting for the issuance of half of global debt securities, but a share of close to 100 percent for small countries.
- Level of development (GDP per capita in US dollars). We would expect more developed countries to have a higher share of foreign ownership.
- Common currency. We would expect a higher foreign share if foreign investors do not have to bear exchange rate risk. In practice, for our sample these considerations are particularly relevant for euro area countries. Within those, we distinguish three groups: economies more severely affected by the euro area crisis (Greece, Ireland, Italy, Portugal, and Spain), smaller economies that joined the euro area in 2007 or thereafter (Cyprus, Estonia, Latvia, Lithuania, Slovak Republic, and Slovenia), and the remainder (Austria, Belgium, Finland, France, Germany, Luxembourg, and Netherlands).
- Net external position. We expect net borrowers to have higher recourse to external finance and hence a higher share of foreign ownership in domestic debt markets.
- Capital controls. We expect the foreign share to be lower in countries with more restrictions on capital inflows, and especially more restrictions on bond inflows.

<sup>11</sup> In the working paper version of this article, we also report regressions for the change in the change in the foreign share between 2007 and 2015 and panel regressions for the period 2006–2015. Furthermore, results for foreign holdings of total debt securities are analogous and are available upon request.

<sup>12</sup> See Appendix 1 for variable definitions and sources.

Table 3 Drivers of foreign share of government debt securities, 2007 versus 2015 cross-sectional regressions

|                         | 2007                 |                      |                      | 2015                 |                      |                   |
|-------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-------------------|
|                         | (1)<br>All           | (2)<br>AE            | (3)<br>EM            | (4)<br>All           | (5)<br>AE            | (6)<br>EM         |
| Log GDP per capita      | 0.11***<br>(5.66)    | 0.23***<br>(4.53)    | 0.10***<br>(3.50)    | 0.09***<br>(2.70)    | 0.11<br>(1.09)       | 0.10*<br>(1.84)   |
| Log market size         | -0.071***<br>(-5.75) | -0.055***<br>(-5.05) | -0.095***<br>(-3.43) | -0.042***<br>(-3.28) | -0.050***<br>(-3.07) | -0.025<br>(-0.80) |
| Euro_core dummy         | 0.42***<br>(10.28)   | 0.40***<br>(12.25)   |                      | 0.37***<br>(8.07)    | 0.38***<br>(7.07)    |                   |
| New euro members        | -0.23***<br>(-3.07)  | -0.19***<br>(-3.72)  |                      | 0.10<br>(0.83)       | 0.13<br>(0.77)       |                   |
| Euro crisis dummy       | 0.28***<br>(5.48)    | 0.26***<br>(4.45)    |                      | 0.015<br>(0.20)      | 0.033<br>(0.28)      |                   |
| Ratio NFA/GDP           | -0.14***<br>(-5.33)  | -0.15***<br>(-6.60)  | -0.034<br>(-0.28)    | -0.12***<br>(-3.78)  | -0.12***<br>(-2.73)  | -0.20<br>(-1.51)  |
| Bond restrictions       | 0.17<br>(1.25)       | 0.44**<br>(2.85)     | 0.12<br>(0.93)       | 0.12<br>(0.90)       | 0.13<br>(0.67)       | 0.13<br>(0.82)    |
| Overall restrictions    | -0.14<br>(-0.90)     | 0.32<br>(1.03)       | -0.13<br>(-0.84)     | -0.19<br>(-1.02)     | -0.29<br>(-0.55)     | -0.23<br>(-0.92)  |
| Constant                | 0.073<br>(0.28)      | -1.48***<br>(-2.94)  | 0.46<br>(1.15)       | 0.013<br>(0.05)      | -0.10<br>(-0.10)     | -0.28<br>(-0.64)  |
| Observations            | 51                   | 28                   | 23                   | 59                   | 28                   | 31                |
| Adjusted R <sup>2</sup> | 0.75                 | 0.89                 | 0.50                 | 0.54                 | 0.6                  | 0.22              |

Dependent variable is the ratio of foreign holdings of general government debt securities to GDP in 2007 (columns 1–3) and 2015 (columns 4–6)

AE advanced economies; EM emerging markets

Robust standard errors, t-statistics in parentheses. \* $p < 0.10$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$



The variables we use (one for total restrictions on capital inflows, the other for restrictions on bond inflows) come from Fernandez and others (2015). To measure the intensity of restrictions, we use the average level of the variable for the preceding 3 years.<sup>13</sup>

In the working paper version of this article (Lane and Milesi-Ferretti 2017), we also consider the role of securities' holdings by central banks. We expect the foreign share to be lower, the higher the share of debt securities held by the central bank. Given the more limited sample of countries for which the data are available, that analysis is restricted to panel regressions examining within-country variation in foreign holdings of government debt securities.

The results of cross-sectional regressions for the foreign share of government securities are presented in Table 3 for the entire sample as well as advanced economies and emerging economies separately. The results show that the share of domestic government debt securities owned by nonresidents is negatively correlated with market size, positively correlated with the level of development, and negatively correlated with the net external position, both for 2007 and for 2015. The results for the euro area dummies are consistent with our priors. Nonresidents tend to hold higher shares of government debt securities in "core euro" countries, after controlling for other fundamentals, and the coefficient remains stable between 2007 and 2015. For the countries more severely affected by the euro crisis, the coefficient for 2007 is positive and significant, albeit lower than for core countries. But the coefficient drops drastically for the 2015 regression, and loses statistical significance.

Finally, for smaller countries that joined the euro area later the coefficient is, as expected, much higher for 2015 than for 2007 (it switches from negative in the first period to positive in the second period) reflecting the increased integration of their securities markets with those in the rest of the euro area. Both measures of capital controls are generally statistically insignificant and occasionally with the "wrong" sign. Our interpretation of this finding is that these measures are poor proxies of the intensity of capital controls: For instance, for 2015 the bond restrictions variable takes the same value for China and India (where foreign access to the domestic government debt securities market is restricted and the foreign share is hence tiny) and Indonesia, where nonresidents hold 65 percent of government debt securities.

In sum, the level and evolution of foreign holdings of government debt securities are remarkably well explained by a parsimonious set of variables. For advanced economies, euro area membership and the euro area debt crisis play an important role, in addition to market size. For emerging and developing economies, the level of development and the net external position play an important role in explaining foreign holdings. The time series analysis in Lane and Milesi-Ferretti (2017) also highlights that within countries the foreign share tends to rise with an economy's growth rate as well as with capital account liberalization, while for advanced economies it declines as the share of central bank holdings increases.

<sup>13</sup> The dataset goes only until 2013, so for the year 2015 we use that observation.

## 6 Conclusions

In this paper, we have characterized the evolution of cross-border holdings of financial instruments since the financial crisis. We have shown how the very fast growth in cross-border positions in relation to global GDP has come to a halt since the financial crisis, reflecting both a retrenchment of cross-border banking activity and the increased weight of less financially-integrated emerging and developing economies in global GDP. Across country groups, we have documented the disproportionate role played by financial centers—both small offshore centers and a few larger advanced economies—in total holdings, and the growing, but still modest role played by emerging and developing economies. Across financial instruments, the retrenchment in cross-border banking and the much more modest increase in portfolio positions relative to pre-crisis trends has been offset by rapidly increasing FDI positions. These have reflected to an important extent claims on and from financial centers, where pass-through financial vehicles as well as the shifting domiciles of multinationals have played a crucial role.

One concern highlighted by the data analysis in the paper is the increasing difficulty in properly assessing external exposures (total and especially bilateral), particularly, but not exclusively in light of the size of cross-border asset trade intermediated by financial centers (see also Avdjiev and others 2016). This difficulty affects virtually all categories of cross-border holdings: other investment positions by banks (often reflecting positions taken by affiliates of foreign banks); portfolio equity positions (which include investment fund shares, where the underlying funds may be investing in bond instruments or other financial assets); portfolio debt positions (for countries where offshore issuance is sizable); and increasingly FDI positions (given the role of pass-through financial vehicles and re-domiciliation of multinational companies, as discussed above). And while for bank positions the availability of consolidated data provides useful additional information to better identify exposures, the same is not true for portfolio equity positions in investment fund vehicles or for FDI positions. There is clearly scope for progress on improving data on this front.

More generally, a key question is how the measures of external assets and liabilities presented in this paper relate to “international financial integration” as economists typically define it and model it, as well as how this concept relates to welfare more generally. An important component of international financial integration is portfolio diversification—for instance, pension funds in the Netherlands investing in other countries on behalf of Dutch savers. This component has clearly continued to increase. Another much examined aspect of integration is greenfield foreign direct investment, or the acquisition of a foreign firm by a domestic one. A third direct link relates to government investment—for instance, holdings of foreign exchange reserves or sovereign wealth funds. This has also shown an upward trend, reflecting primarily increased holdings by emerging market governments.

But other factors have also contributed to the growth in cross-border holdings to an extent that overstates both the level and composition of underlying cross-border

financial linkages. In relation to the level of cross-border positions, tax management practices and regulatory arbitrage give rise to round tripping arrangements by which foreign assets and foreign liabilities essentially offset each other, with no true cross-border financial linkage. In relation to geographical composition, the location of financial intermediaries for portfolio investment has tended to concentrate in specific jurisdictions—such as Ireland and Luxembourg for mutual funds, or the Cayman Islands for hedge funds. Hence cross-border holdings have grown reflecting the “passage” of investments through these financial centers en route to their final destination. In related manner, the composition of cross-border positions across categories (debt, equity, FDI) is affected by the rise of mutual fund vehicles (the liabilities of even bond-only mutual funds are portfolio equity liabilities) and balance sheet optimization by multinational firms which can generate corporate inversions and re-domiciliations, such that the host country sees a matched expansion in FDI assets and portfolio equity liabilities.

Turning to the boom–bust cycle in international bank-related flows, it is important to appreciate that the volume of cross-border bank assets and liabilities is not a helpful indicator of the extent of international risk sharing or intertemporal smoothing. Rather, to the extent that part of the mid-2000s expansion in cross-border banking was driven by distorted incentives to expand bank balance sheets (on the part of both net lenders and net borrowers in the inter-bank market), the post-crisis reversal can be interpreted as a welcome correction.

The preceding analysis provides some guidance about the factors that could shape the future of international financial integration. These include international banking, the institutional framework for the euro area, the global economic and financial shift toward emerging economies, but also balance sheet management by large financial and nonfinancial corporations.

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## Appendix 1: Data and Country Classification

### Classification of Economies

1. Financial centers: Bahrain, Belgium, Cyprus, Hong Kong S.A.R. of China, Ireland, Luxembourg, Macao S.A.R. of China, Malta, Netherlands, Singapore, Switzerland, UK, Andorra, Bahamas, Barbados, Bermuda, British Virgin Islands, Cayman Islands, Curaçao, Gibraltar, Guernsey, Isle of Man, Jersey, Mauritius, Netherlands Antilles, Panama, San Marino, Turks and Caicos.

2. Other advanced economies: Australia, Austria, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Israel, Italy, Japan, Korea, Latvia, Lithuania, New Zealand, Norway, Portugal, Slovak republic, Slovenia, Spain, Sweden, Taiwan province of China, USA.

Emerging and developing economies: Afghanistan, I.R. of; Albania; Algeria; Angola; Anguilla; Antigua and Barbuda; Argentina; Armenia; Aruba; Azerbaijan; Bangladesh; Belarus; Belize; Benin; Bhutan; Bolivia; Bosnia and Herzegovina; Botswana; Brazil; Brunei Darussalam; Bulgaria; Burkina Faso; Burundi; Cambodia; Cameroon; Cape Verde; Central African Rep.; Chad; Chile; China; Colombia; Comoros; Congo, Dem. Rep. of; Congo, Republic of; Costa Rica; Croatia; Côte d'Ivoire; Djibouti; Dominica; Dominican Republic; Ecuador; Egypt; El Salvador; Equatorial Guinea; Eritrea; Ethiopia; Fiji; French Polynesia; Gabon; Gambia; Georgia; Ghana; Grenada; Guatemala; Guinea; Guinea-Bissau; Guyana; Haiti; Honduras; Hungary; India; Indonesia; Iran, Islamic Republic of; Iraq; Jamaica; Jordan; Kazakhstan; Kenya; Kiribati; Kosovo; Kuwait; Kyrgyz Republic; Lao People's Dem. Rep; Lebanon; Lesotho; Liberia; Libya; Lithuania; Macedonia; Madagascar; Malawi; Malaysia; Maldives; Mali; Marshall Islands; Mauritania; Mauritius; Mexico; Micronesia; Moldova; Mongolia; Montenegro; Montserrat; Morocco; Mozambique; Myanmar; Namibia; Nauru; Nepal; New Caledonia; Nicaragua; Niger; Nigeria; Oman; Pakistan; Palau; Panama; Papua New Guinea; Paraguay; Peru; Philippines; Poland; Qatar; Romania; Russia; Rwanda; Samoa; Saudi Arabia; Senegal; Serbia; Seychelles; Sierra Leone; Sint Maarten; Solomon Islands; Somalia; South Africa; South Sudan; Sri Lanka; St. Kitts and Nevis; St. Lucia; St. Vincent & Grenadines.; Suriname; Swaziland; Syrian Arab Republic; São Tomé & Príncipe; Tajikistan; Tanzania; Thailand; Timor-Leste; Togo; Tonga; Trinidad and Tobago; Tunisia; Turkey; Turkmenistan; Tuvalu; Uganda; Ukraine; United Arab Emirates; Uruguay; Uzbekistan; Vanuatu; Venezuela, Rep. Bol.; Vietnam; West Bank and Gaza; Yemen; Republic of; Zambia; Zimbabwe.

### Variable Definitions (Regressions in Section V)

*Market size* log of government bond market capitalization measured in US dollars. Source: Bank for International Settlements, Debt Securities Statistics; Arslanalp and Tsuda (2014a, b); and national sources.

*Level of development* log GDP per capita in US dollars. Source: IMF, World Economic Outlook database.

*Euro core* dummy taking the value of 1 for Austria, Belgium, Finland, France, Germany, Luxembourg, and the Netherlands.

*Euro crisis* dummy taking the value of 1 for Greece, Ireland, Italy, Portugal, and Spain.

*New euro members* dummy taking the value of 1 for Cyprus, Estonia, Latvia, Lithuania, Malta, Slovak Republic, and Slovenia for all years they were part of the euro as well as for the year before joining.

*Ratio of NFA to GDP* net external position divided by domestic GDP. Source: Lane and Milesi-Ferretti, External Wealth of Nations database.

*Bond restrictions* index of restrictions on foreign purchases of debt securities issued by the country. To measure the intensity of restrictions, we use the average level of the variable for the preceding 3 years. Since the dataset goes only until 2013, we use data for that year for the 2014 and 2015 observations. Source: Fernandez and others (2015).

*Overall restrictions* index of restrictions on foreign purchases of domestic assets. To measure the intensity of restrictions, we use the average level of the variable for the preceding 3 years. Since the dataset goes only until 2013, we use data for that year for the 2014 and 2015 observations. Source: Fernandez, and others (2015).

*Central bank share* Central bank holdings of domestic government debt securities as a share of total government debt securities outstanding. Sources: Arslanalp and Tsuda (2014a, b), International Financial Statistics, and national sources.

### Regression Sample (Section V)

Advanced economies: Australia, Austria, Belgium, Canada, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hong Kong S.A.R., Ireland, Israel, Italy, Japan, Korea, Latvia, Netherlands, New Zealand, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland, UK, USA.

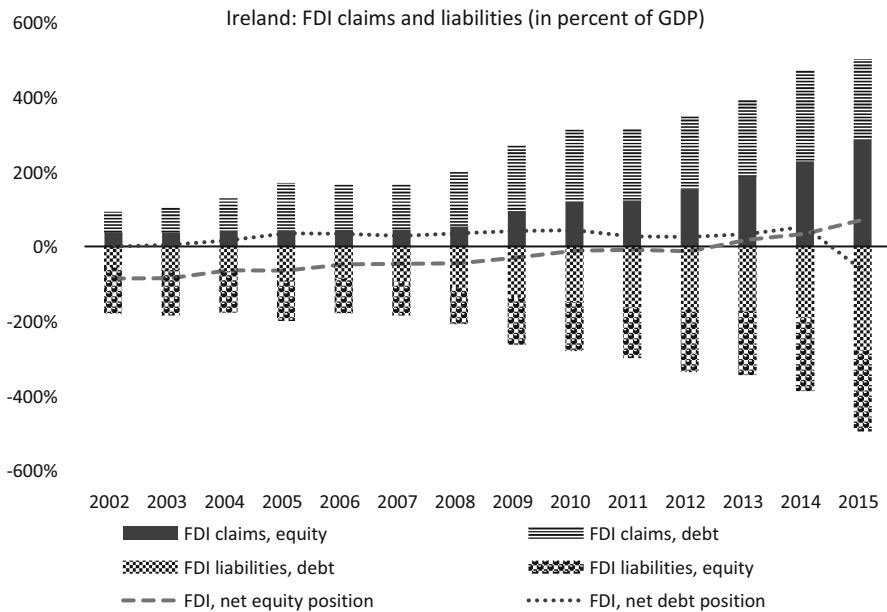
Emerging economies: Argentina, Bangladesh, Brazil, Bulgaria, Chile, China, Colombia, Costa Rica, Dominican Republic, Egypt, El Salvador, Georgia, Guatemala, Hungary, India, Indonesia, Malaysia, Mexico, Nigeria, Pakistan, Paraguay, Peru, Philippines, Poland, Romania, Russia, South Africa, Thailand, Turkey, Ukraine, Uruguay.

## Appendix 2: FDI in Financial Centers: the Cases of Ireland and the Netherlands

In “Appendix 2”, we briefly discuss the expansion in FDI claims and liabilities in Ireland and the Netherlands—two countries which contribute to an important extent to the aggregate trend for these balance sheet items in financial centers.

### Ireland

For decades, Ireland has been well known as an export platform location for multinational firms. In 2000, the net FDI position in Ireland amounted to minus 98 percent of GDP, primarily in the form of net equity liabilities. While the underlying role of multinational firms in the Irish export sector has continued to expand in recent years, Fig. 12 shows that the net FDI position has been transformed, with net FDI equity assets turning positive from 2012 onwards and the net FDI debt position in positive territory between 2003 and 2014. A further shift took place in 2015, with a discrete jump in net FDI debt liabilities associated with the financial restructuring of some global firms. Behind these net figures, the scale of gross FDI positions has expanded: FDI assets increased from 28 percent of GDP in 2000 to 319 percent of



**Fig. 12** FDI Positions in Ireland

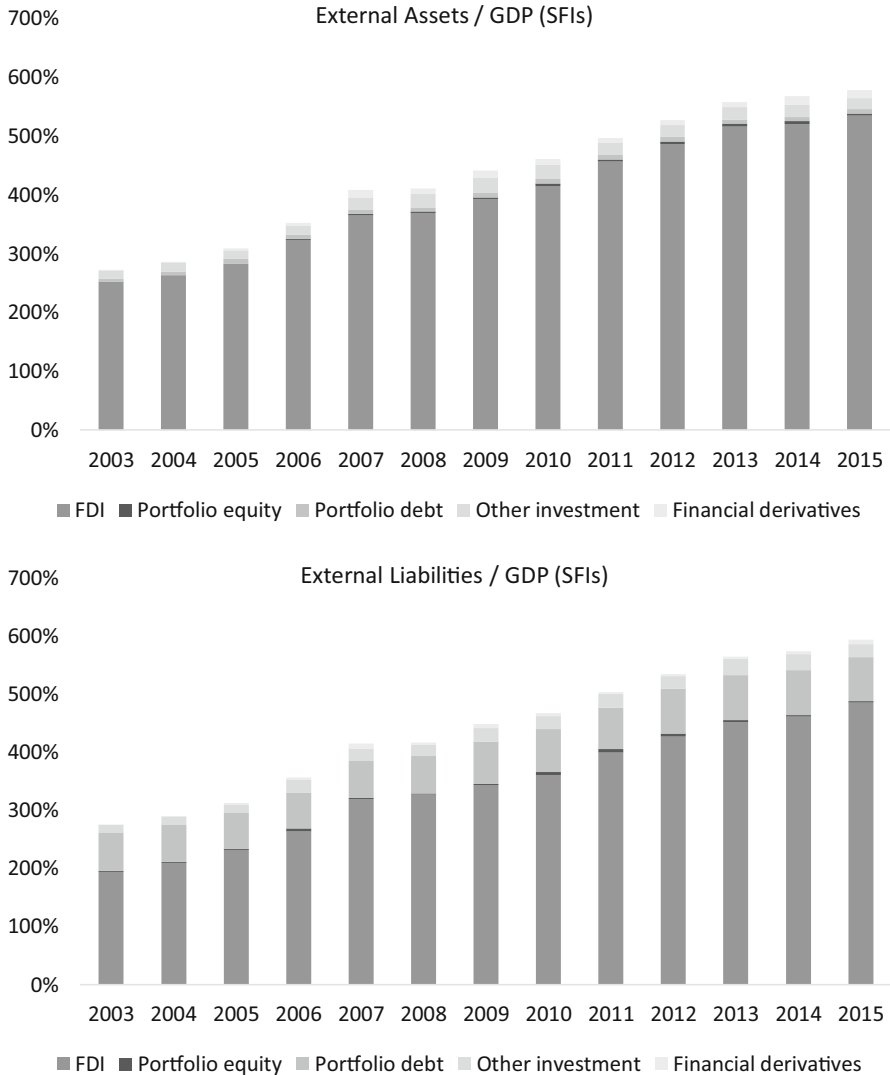
GDP in 2015, while FDI liabilities shifted from 126 percent of GDP in 2000 to 311 percent of GDP in 2015.

A substantial proportion of the increase in gross positions reflects stock-flow adjustments due to internal balance sheet reclassifications inside global firms and inversions. In relation to the former, the transfer of intangible capital assets (such as intellectual property) between affiliates of global firms is funded by parallel FDI recalculations; in relation to the latter, the inversion of a global firm into a domestically resident firm enlarges FDI assets with a matching increase in foreign portfolio equity liabilities (since the investors owning shares in the new entity are mainly nonresident). The rise in net FDI debt assets during 2003–2014 also reflects the strategies of various firms to retain accumulated funds in Ireland resident affiliates that are recycled through intra-firm loans to other units in the global firm or held in the form of bank deposits and marketable debt instruments.

## The Netherlands

The Netherlands provides a useful decomposition of its International Investment Position which allows the separate identification of claims and liabilities associated with “special financial institutions” (SFIs).<sup>14</sup> In turn, the decomposition shows how

<sup>14</sup> As noted in the Netherlands’ IIP statistics, “Special Financial Institutions (SFIs) are resident Dutch enterprises or institutions, fully owned by foreign direct investors, that act as financial intermediary between other parts of the group to which they belong. The financial assets and liabilities of these institutions usually are related to direct investment via the Netherlands in third countries or are connected to the channeling of funds collected in the direction of the foreign investor.”

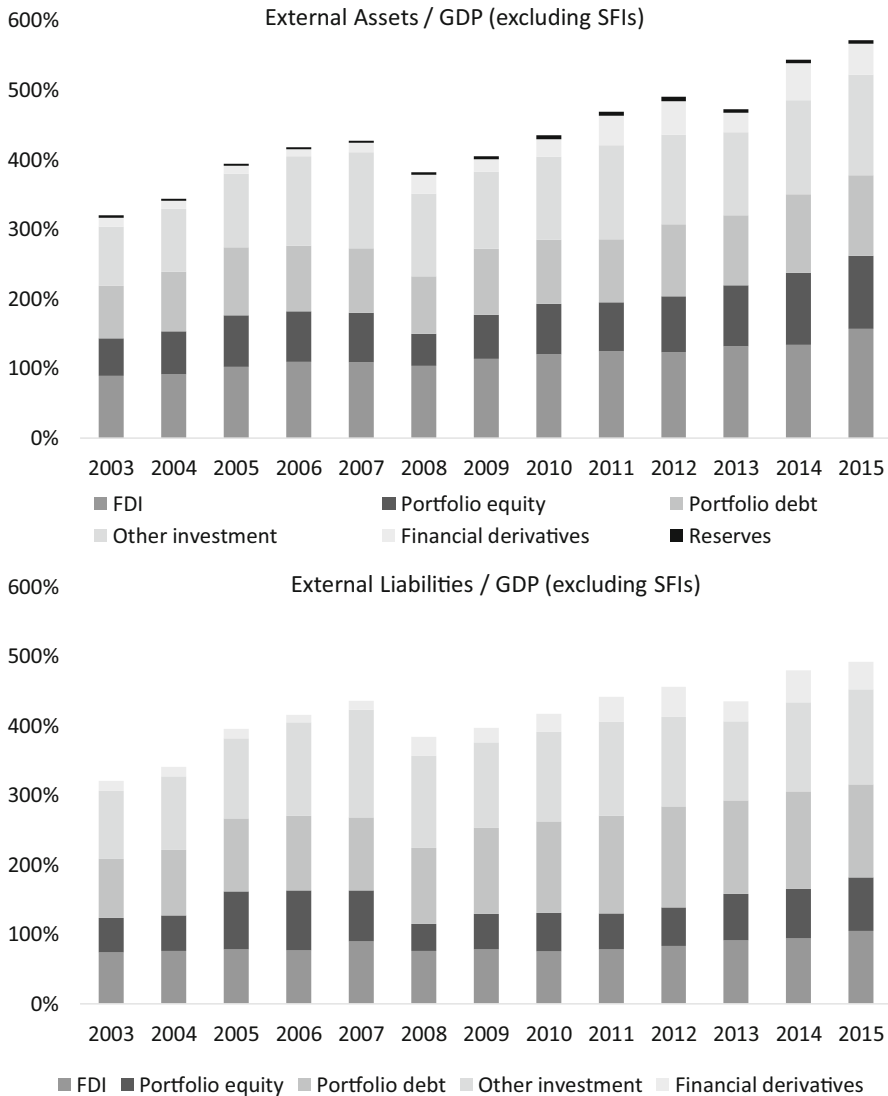


**Fig. 13** Netherlands: external assets and liabilities, special financial institutions (ratio of GDP). *Source:* De Nederlandsche Bank. *Notes:* Special Financial Institutions (SFIs) are resident Dutch enterprises or institutions, fully owned by foreign direct investors that act as financial intermediary between other parts of the group to which they belong

the increase in external claims and liabilities reflects both “financial engineering” by multinational firms and genuine international financial integration in the form of rising portfolio diversification.

Figures 13 and 14 show the external position of Dutch Special Financial Institutions (SFIs), as well as the external position of the Netherlands excluding these institutions. Of note in Fig. 13 is the rapid run-up in the size of SFI claims and liabilities: As of end-2015, they were around \$4 trillion dollars, with the lion’s share





**Fig. 14** Netherlands: external assets and liabilities, excluding special financial institutions (ratio of GDP) *Source:* De Nederlandsche Bank. Note: Special Financial Institutions (SFIs) are resident Dutch enterprises or institutions, fully owned by foreign direct investors, that act as financial intermediary between other parts of the group to which they belong

in FDI claims and liabilities. Figure 14 also shows an increase in Dutch liabilities and (especially) claims since the crisis, albeit to a smaller extent than for SFI balance sheets. The increase in claims reflects the rising net external position of the Netherlands, following several years of large current account surpluses, and the size of the external balance sheet also reflects the size of pension funds.



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**Philip R. Lane** is Governor of the Central Bank of Ireland.

**Gian Maria Milesi-Ferretti** is Deputy Director of the IMF's Research Department.

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