



## Cross-Cutting Themes in Advanced Economies with Emerging Market Banking Links<sup>1</sup>

11/14/2011

The most recent decade has seen a growing presence of banks headquartered in advanced economies (AEs) expanding into emerging markets (EMs). These expansions have brought some benefits to both home and host countries, but the global financial crisis has also unmasked significant vulnerabilities inherent in such relationships.

In keeping with past cross-cutting themes papers, this paper focuses on the experiences of four medium-sized “home countries,” each with significant retail banking links to EMs—Austria, Belgium, the Netherlands, and Spain. These countries were chosen because of their banks' diverse approaches to EM expansion (including the centralization of their funding models) and equally diverse crisis outcomes (fears over Eastern European exposures resulted in extraordinary policy efforts to maintain bank lending), providing fertile ground for analysis and for drawing lessons in the future. For comparison with advanced economy expansions, a Box discusses the cross-border banking relationship between Australia and New Zealand.

Three central questions are explored:

- Did the presence of AE banks benefit EM banking systems?
- Do AE banks exploit a funding cost advantage, and what are its implications?
- Did banking links increase the transmission of macro-financial risks between AEs and EMs?

The presence of banks from AEs helped modernize the banking systems in EM Europe, and revive the post-crisis banking systems in Latin America in the 1990s. However, it may be that the welfare gains in EMs largely accrue to the banks. In this sense, EM banking sector efficiency may have been improved, but only up to a point. Further, if external wholesale funding markets misprice the risks of parent banks, or if parent banks benefit from implicit sovereign support, the funding cost advantages enjoyed by EM subsidiaries of AE banks can lead to excessive credit growth, and may increase the transmission of macro-financial risks between home and host economies. Decentralized liquidity management may therefore have its advantages, especially in the absence of a credible liquidity backstop—a lesson worth keeping in mind as banks are likely to expand into other emerging and frontier markets.

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<sup>1</sup>At the time of privatization of its banks, the Czech Republic was classified as an emerging economy. It is now classified as an advanced economy.

Approved By  
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This report was prepared by a team comprising Phil de Imus, Manju Ismael, Philip Liu, Anna Ter-Martirosyan (all SPR), and Padamja Khandelwal (MCD), led by Srikant Seshadri and Martin Mühleisen. Significant inputs were received from Ivailo Arsov (MCM). Tola Oni (SPR) provided able research assistance. The report draws on findings of a mission to Austria, Belgium, Hungary, Netherlands, Spain, and the United Kingdom that benefitted from participation by Jérôme Vacher (EUR) on the Spanish leg, and Iryna Ivaschenko (Resident Representative in Hungary), on the Hungarian leg. The team interviewed officials from ministries of finance, central banks, regulators, senior bankers, banking and currency strategists, rating agencies, and independent consultants.

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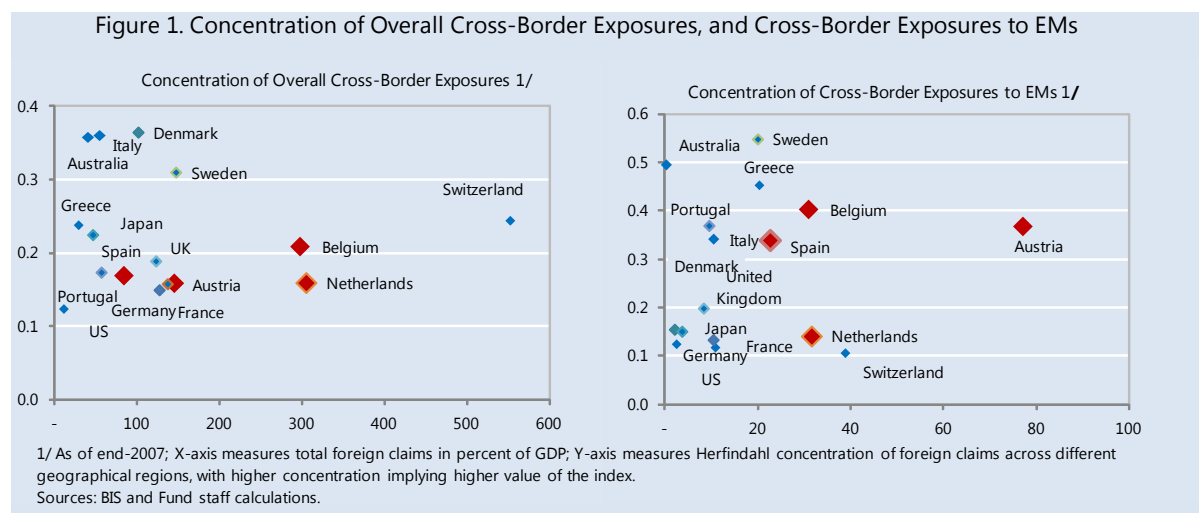
## I. INTRODUCTION

**1. The growth of capital flows from advanced to emerging economies has been reflected in a strengthening of banking sector links.** Fueled by a wave of mergers and acquisitions, bank-to-bank links between advanced economies (AEs) and emerging market countries (EMs) have grown rapidly in recent years. BIS data indicate that consolidated bank claims on emerging and developing economy banks grew by roughly 3 times the rate of real GDP growth of these economies between 1995 and 2008. The literature suggests that these cross-border links generally developed out of regulatory liberalization, increased economic integration, lower information costs, and higher profit opportunities in EMs (e.g., Soussa, 2004).

**2. The global financial crisis has highlighted the macro-financial vulnerabilities inherent in AE-EM banking links.** It is well-known that emerging markets are on the receiving end of both trade and funding shocks from advanced economies, all of which have been manifest since 2008. Perhaps a less researched phenomenon (at least since the Latin American debt crisis wound down) is the potential for shock transmission from EMs back to AEs. Banks and countries with exposures to Eastern Europe were under considerable market pressure in 2008/09, requiring a broad-based policy response to ward off potentially systemic consequences. This latter feedback loop is one of the main objects of this paper—EM banking is likely to remain an attractive business for banks in advanced economies, and the recent experience may provide policy lessons on how to conduct such expansions in the future.

**3. This paper looks into the experience of four “home countries”—Austria, Belgium, the Netherlands, and Spain.** As in previous cross-cutting themes papers, staff chose a group of medium-sized economies which share some similarities, but also had different policy backgrounds and crisis experiences. Apart from being medium-sized, the banks of all these economies expanded into EMs, growing a significant retail component in their business.

- Banks in two countries—Austria and Spain—expanded into regions with which they had strong historical ties, but employed very different business models. Either as a matter of choice, or because they had ample lending opportunities at home, the Spanish banks employed a model of locally funded subsidiaries, while the Austrian banks developed a more centralized funding model. In the end, while Eastern Europe and Latin America offered economic diversification prospects, Austria’s EM links proved to be more challenging. Having weathered the crisis, both Austrian and Spanish banks are looking to solidify and grow their EM exposures as a source of long-term profits.
- The banks in the other two countries—Belgium and the Netherlands—did not share such historical ties, and initially expanded across a wider range of EM regions, with relatively small bilateral exposures to individual countries. Unlike Austria and Spain, EM exposures were a small share of overall exposures. Relative to Belgium, the Netherlands had stronger trade ties with many of the EMs into which it expanded. As banks in both countries have received public capital, they have now reduced their EM exposures, in some cases substantially.
- Just prior to the outbreak of the crisis, the four selected economies had exposures to EMs above 20 percent of GDP, but varied significantly in terms of size and diversification (Figure 1). The average exposure to EMs was one-sixth of the total exposures, but for Austria EM exceeded that to AEs. At the other end of the spectrum, while Spain had the lowest EM



(and overall cross-border) exposure, it was also regionally concentrated. Belgium and the Netherlands were intermediate cases in terms of both the size of their EM exposures and diversification, with Belgium far more concentrated on EM Europe.

- Other examples could have included, e.g., Sweden's links with the Baltic countries, Greek banks in Southeastern Europe, or the United States and Mexico. While the paper needed to remain selective, it does draw a comparison with one advanced economy example—namely, the cross-border banking relationship between Australia and New Zealand (Box 2).

**4. The paper is based on feedback from authorities and market participants, underpinned by staff analysis.**<sup>2</sup> The paper draws on interviews with senior bankers, regulators, policy makers, and market participants who were directly involved in the decisions that drove the diverse experiences of these countries. Their perspectives, coupled with independent analysis, provide a perch from which to examine the strengths and weaknesses of such AE-EM banking relationships, the implications of the crisis, and policy priorities for the future.

## II. THE EXPANSION PHASE

### A. Bank structure, liquidity, and funding

**5. The expansion of advanced economy banks into emerging markets took place in waves, driven by business strategies that evolved over time:**

- In the first wave of the 1980s and early 1990s, many banks followed their corporate clients by establishing representative offices or branches.

<sup>2</sup>This paper also draws on Financial Stability Reports of our home countries, as well as a broader literature on AE-EM relationships, including CGFS (2010), Kamil and Rai (2010), McCauley and others, (2010), Demirguc-Kunt, Detragiache, and Merrouche (2010), and Tressel and Detragiache (2008).

- The second phase started in the latter part of the 1990s, coinciding with large scale deregulations and privatizations, particularly in Latin America and Eastern Europe.<sup>3</sup> The large expansion coincided with local privatization and the withdrawal of U.S. banks from the region in 1990s. Since then, Spain has maintained significant presence in the region (cumulative exposures around 30 percent of home GDP) (Figure 2).<sup>4</sup> In Eastern Europe, the end of communism led to a period of financial liberalization and wave of privatizations to attract capital and banking know how to improve state-based institutions. These were viewed as one-time opportunities to gain significant market shares by acquiring large, dominant depository institutions with a retail focus.
- The third and most recent phase from about 2003 to just before the Lehman crisis was characterized by a general ramp-up in bank exposures to EMs. Banks in EM Europe mostly expanded by expanding their balance sheets through higher loan growth funded from abroad, but they also participated in competitive (and increasingly expensive and imprudent) bids for the few remaining privatizations, or through strategic partnerships.

**6. Increasing competition in the EU was an important factor for our sample banks to move into EMs.** Banking markets in advanced Europe were highly competitive, with a large number of banks and limited growth prospects, particularly in the late 1990s. With the introduction of the single banking license in 1989 and the euro a decade later, European banking also became much more integrated, providing fewer profitable niches. Many banks therefore looked to less charted markets to expand.

**7. In Eastern Europe, the parent-subsidiary relationship was strongly influenced by expectations of convergence and euro adoption.** While some banks had maintained decentralized funding policies for local currency exposures, the growth in foreign currency loans in almost all Eastern European countries encouraged or catalyzed the provision of funding from the parent (Box 1). By contrast, the Spanish banks' expansion into Latin America followed the so-called "tequila" crisis, when foreign currency lending for retail banks was neither seen as a viable strategy nor encouraged by regulators.

**8. The banks generally attempted to export existing business lines at home to EMs.** The Spanish and Austrian banks effectively replicated their retail banking models overseas. Dutch and Belgian banks attempted to export the *bancassurance* model. Some banks focused on niche markets like banking services to the food and agricultural industry, or to municipalities. Two

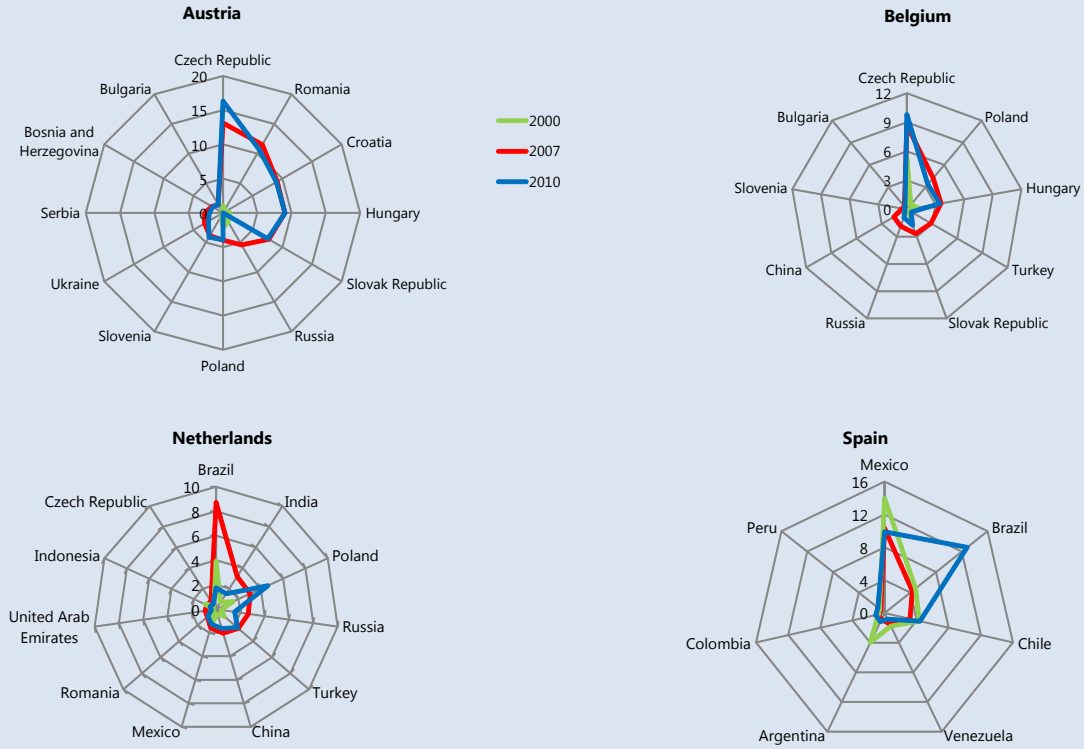
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<sup>3</sup>In the mid 1990s, total acquisition of EM banks by AE investors totaled some \$2 billion. This figure rose to \$17 billion within 5 years before dropping off rapidly, as the wave of privatizations in Emerging Europe and Latin America began to wind down. In some cases, privatizations were specifically aimed at attracting foreign banks when domestic privatizations yielded unsatisfactory results (see CGFS (2004)).

<sup>4</sup>By comparison, in New Zealand, the largest four banks are all Australian owned and account for 90 percent of banking assets. These constitute about 15 percent of Australian bank assets. Australian and New Zealand banking sectors (both with assets around 200 percent of GDP) are smaller than their European counterparts.

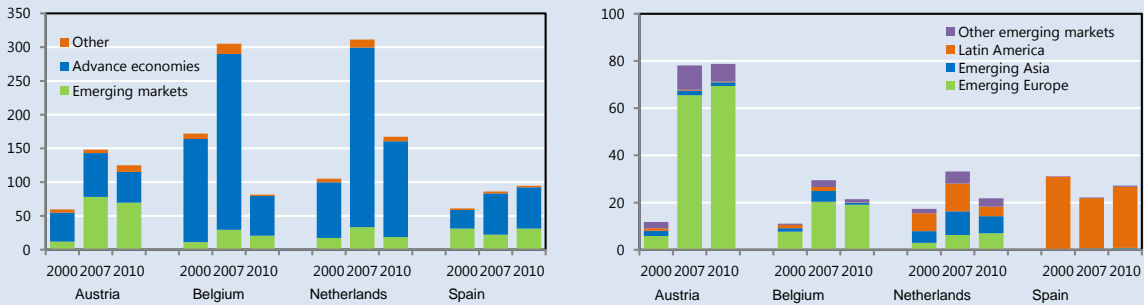
Figure 2. Bilateral Banks' Claims, 2000–10 (in percent of home GDP) 1/

Dutch banks have remained relatively diversified across the regions with country-specific bilateral exposures not exceeding 5 percent of home GDP (except for Brazil in 2007). In contrast, a fast expansion of Austrian banks has been mostly geared toward EM Europe and contributed to a built up of significant bilateral exposures. Spanish banks have also maintained relative high bilateral claims on the key Latin American countries.



While for Belgium and Dutch banks' external exposures represent much higher share of GDP and remain relatively concentrated in advanced economies, Austria and Spain are much more exposed to emerging economies, with geographical concentration in EM Europe and Latin America, respectively.

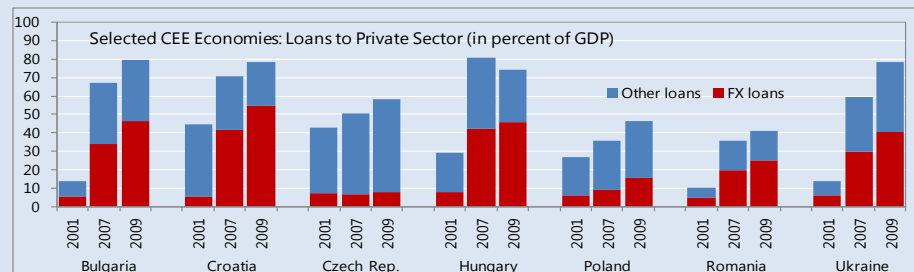
Composition of Cross-Border Exposures (in percent of home GDP) 2/



Sources: BIS consolidated banking statistics; WEO; and Fund staff calculations.  
 1/ Based on top 80 percent of cross-border claims to emerging market economies in 2007.  
 2/ Right panel chart shows only cross-border exposures to emerging market economies.

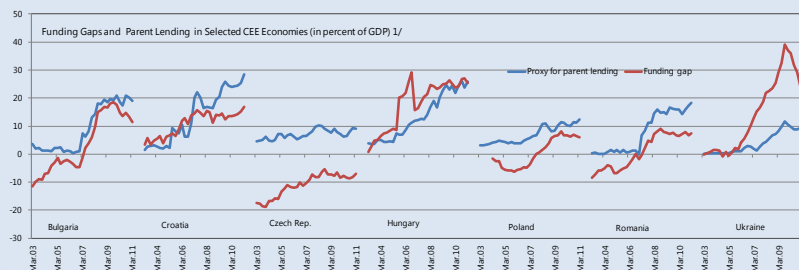
### Box 1. Foreign Currency Lending in EM Europe<sup>1</sup>

Foreign currency lending surged in many CEE economies during the last decade, reflecting both, overall credit growth and increasing currency substitution. The share of foreign currency (FX) loans grew rapidly in Bulgaria, Croatia, Hungary, and Romania, reaching more than 50 percent of total loans by 2007. By contrast, FX lending remained insignificant in the Czech Republic. Foreign loans were mostly denominated in euro. However, Swiss franc loans played a dominant role in Hungary, and were also present in Poland, and to a lesser extent in Croatia.<sup>2</sup> In the Ukraine most of the FX loans were U.S. dollar-denominated.



Recent literature refers to number of factors contributing to the sharp rise in foreign currency loans. Steiner (2011) identifies interest rate differential, EU membership, and inflation as the main factors explaining rapid FX credit growth in the EU accession economies. The study also finds that the difference between margins on domestic and FX loans and regulatory quality (measured as regulatory restrictions on foreign currency lending) are the main supply side factors, while booming consumption and housing prices have been contributing from the demand side. Bakker and Gulde (2010) find bank ownership as one of the key determinants of foreign lending as foreign bank's subsidiaries have better sources to funding abroad from parent banks (see also Walko, 2008, and Lahnsteiner, 2011).

Parent lending had become an increasingly important source of financing during the immediate run up to, and aftermath of the crisis when other funding sources dried up. By 2007 domestic savings become insufficient to finance rapid credit expansion, leading to "funding gaps" in many CEE countries. Croatia and Hungary have been running gaps for longer period, while in Bulgaria, Romania, and Poland strong credit growth pushed the level of credit stock above deposits only around 2007, and in Czech Republic deposit coverage remained high throughout the decade. During the crisis, these financial gaps widened further, partially due to depreciation that increased the weight of FX loans in the stock of credit, raising debt burdens of borrowers more. Parent lending had accounted for a significant and increasing share of financing of these funding gaps.



Sources: BIS, IFS.  
 1/ Funding gaps are measured as a difference between credit to private sector and domestic deposits. It should be noted that this measure can underestimate the size of the gap because at some instances the parent funding was provided through deposits rather than loans. A proxy measure defined by Lahnsteiner (2011) is used to estimate parent lending to its subsidiaries.

<sup>1</sup>Prepared by Anna Ter-Martirosyan.

<sup>2</sup>The share for FX loan for Croatia in 2001 does not include FX-indexed loans, which account for additional 12 percent of loans.

Excessive foreign currency lending to largely unhedged private sector borrowers has led to a significant buildup in vulnerabilities during the run-up to the crisis. The main risks to financial stability were associated with increasingly insufficient domestic funding base, which raised banks dependence on foreign funding, deteriorating quality of bank's assets due to rising loan-to-value ratios, and increasing exposures to the property market. In addition, in many cases banks assumed that the FX risk was borne by the borrower and had not prepared themselves adequately through provisioning and hedging. A sharp increase in NPL ratios has followed a deceleration in credit growth aftermath of the crisis. NPL ratios have more than doubled since 2007 in Bulgaria and Hungary, and skyrocketed to 41 percent of total loans in Ukraine following a sharp depreciation of hryvnia and collapse in housing prices. In 2009, KBC, a Belgian bank, announced that it would stop its foreign currency lending in Hungary. However, other banks continued to do so, and eventually KBC resumed the practice to keep up with its competition, according to senior bank officials.

A number of policy measures to discourage FX lending introduced by domestic regulators in the CEE economies have led to increasing risk premia for banks. Administrative schemes that directly limit the supply of FX loans have been implemented in Romania and a broader-based limit in Croatia. In 2010, Hungary introduced differentiated loan-to-value ratios depending on loan currency denomination. Croatia put in place a voluntary scheme to allow borrowers to pay installments based on a preferential exchange rate for a few years. Poland has recently adopted prudential regulations that effectively lower the amounts that customers can borrow in foreign currency relative to zloty, raising "safety buffers" for FX loans. More drastic remedies to FX indebtedness have been recently introduced in Hungary. This measure allows borrowers to repay FX mortgages at preferential exchange rates, leaving about 25 percent reduction in debt value to be borne by banks.

The European Systemic Risk Board (ESRB) has recently issued a set of recommendations aimed at reducing risks associated with FX lending in the region in a more harmonized way, limiting the potential for cross-border contagion and the possibility of circumvention of national measures. ESRB recommendations include increasing borrowers' awareness of risks embedded in FX lending, ensuring that FX loans are extended only to borrowers that are capable of withstanding exchange rate shocks, and making use of debt-to-income and loan-to-value ratios. On the banks' side, they call for a better incorporation of the FX-related risks in internal pricing and capital allocation strategies. Finally, in case FX-lending leads to excessive overall credit growth, the ESRB recommends consideration to limits on funding and liquidity risks, with particular attention to concentration of funding sources and currency mismatches.

Dutch banks had a greater share of trading and investment bank-like activity, including offering structured product solutions for their more sophisticated corporate clients, but also grew their retail franchises.

**9. Except for Spanish banks, liquidity and funding were generally centralized in the home country.** The two large Spanish international banks and their regulators stated that they have maintained a philosophy of letting their EM subsidiaries largely stand alone for capital and funding, after the initial seeding.<sup>5</sup> On the other hand, Austrian, Dutch, and Belgian banks managed capital and liquidity more centrally where possible.

<sup>5</sup>Banking analysts have recently noted the presence of "reverse repos" of assets for cash between one of the large Spanish banks and its subsidiaries. The bank maintains that the amounts of these transactions are small relative to the size of its balance sheet, and have been done with host country approval.



- The Spanish banks and regulators stated their view that this separation has several advantages for retail-based banks: (i) It lowers contagion risks to the parent when there are EM-specific shocks, and to the EM subsidiary when there are AE shocks; (ii) Over time, the EM subsidiary is made stronger, in part because a stand-alone subsidiary may face stricter market discipline and becomes more self-sufficient; and (iii) Stand-alone subsidiaries make it easier to manage financial distress and resolution in an orderly way.
- An alternative way to interpret the centralization of liquidity management by the Austrian, Belgian, and Dutch banks might be that they had excess deposits that needed an outlet for reasonable returns, and that Spain had a decentralized model as a consequence of large amounts of local lending opportunities, which manifested themselves in current account deficits. Indeed, Spain had the largest credit/housing boom of our four AEs in the pre-crisis period. It is therefore possible that Spanish banks could not fund their subsidiaries from home, rather than choosing not to as a matter of principle. Nevertheless, the Spanish banks and the regulators interviewed for this paper stated that decentralization was an active choice, made in the mid 1990s well prior to the Spanish housing boom, and that this choice has been consistently respected.
- As a point of reference, banks in New Zealand also relied very heavily on overseas and short-term wholesale funding. About 30 percent of banks' funding has come from nonresidents. (Box 2).

## B. Risk diversification

**10. Banks have looked at cross-border expansion, particularly into emerging markets, as a source to diversify macroeconomic risks and profit sources.** To the extent that business cycles are imperfectly correlated across countries, the assets of cross-border banks will be less exposed to country-specific shocks. Moreover, if home and host country shocks are imperfectly correlated, this is likely to increase banks' risk-adjusted returns.<sup>6</sup>

**11. Macro data suggest that such diversification gains were indeed attainable over the past two decades, albeit more for some countries than others.** Figure 3 plots the weighted average correlations of real GDP growth, nominal M2 growth, and equity price growth between each of the home countries and their respective host countries.<sup>7</sup> However, simple correlation

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<sup>6</sup>Using bank-level data covering 38 international banks, Garcia-Herrero and Vasquez (2007) find that parent banks with a larger share of assets allocated to foreign subsidiaries are able to attain higher risk-adjusted returns.

<sup>7</sup>GDP correlations provide a proxy for real activity synchronicity, M2 correlations measure the credit cycle synchronicity, and equity prices measure the asset price cycle synchronicity.

## Box 2. Australian Banks in New Zealand—Policy Coordination During the Crisis<sup>1</sup>

Foreign operations of Australian banks are largely concentrated in New Zealand and the U.K., reflecting geographic proximity and shared colonial ties. Compared with other AEs, consolidated foreign claims of Australian banks are small in relation to the size of the Australian economy— at only about 45 percent of GDP— but have continued to expand at double-digit rates through the financial crisis. Consolidated foreign claims of Australian banks on New Zealand are about 20 percent of home GDP (over 180 percent of New Zealand’s GDP).

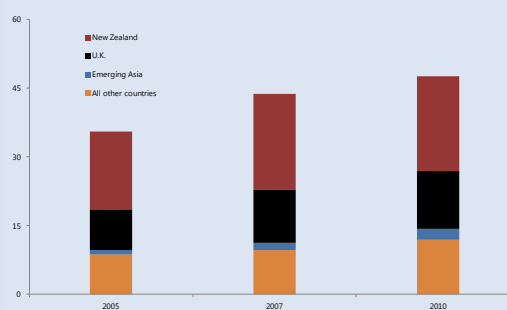
Australian banks weathered the crisis relatively well. The four largest banks’ capital was well above the regulatory minimum with limited exposure to U.S. securitized assets. They remained profitable through the crisis. In response to market pressures, they improved their capital positions through retained earnings and issuance of common equity and reduced reliance on wholesale funding while increasing deposits. These actions helped banks to retain market access.

The authorities of Australia and New Zealand played an important role in safeguarding the banking system during the crisis. The Reserve Bank of Australia (RBA) provided support through various measures in late 2008: it lowered policy rates, and supported a widening in the range of securities eligible for repos, as well as dollar liquidity drawing on temporary reciprocal swap lines with the U.S. Fed. The government introduced a fee-based guarantee scheme for banks’ wholesale borrowing and large deposits. They guaranteed small deposits of Australian banks, building societies, credit unions, subsidiaries, and branches of foreign-owned banks. They also provided direct support in the form of asset purchases in the residential mortgage backed securities market. Similarly, the New Zealand authorities also lowered policy rates and introduced guarantees for retail deposits and wholesale funding, widened the range of securities eligible for repos, and introduced new liquidity facilities for banks, while establishing temporary swap lines with the Fed (these swap lines were not accessed).

A cooperative relationship was maintained between regulators in the two countries through formal arrangements before the crisis. A Trans-Tasman council on banking supervision was set up in early 2005 to facilitate cross-border information sharing and cooperation. Banking legislation was then passed in both Australia and New Zealand in 2006, to give regulators a mandate to support financial stability in each other’s jurisdictions and avoid actions that could be detrimental. In fact, Australia is one of the few jurisdictions in the world that legally mandates the banking authority to cooperate with all financial sector supervisory agencies, regardless of where a financial institution is incorporated. Announcements of deposit insurance were made on October 12, 2008 in both Australia and New Zealand, with both countries including guarantees for deposits of subsidiaries of foreign financial institutions. The RBA and RBNZ also provided fee-based guarantees for wholesale funding. Australian banks provided funding support to their subsidiaries in New Zealand during the crisis. Stress tests have been jointly conducted by the regulators in both countries.

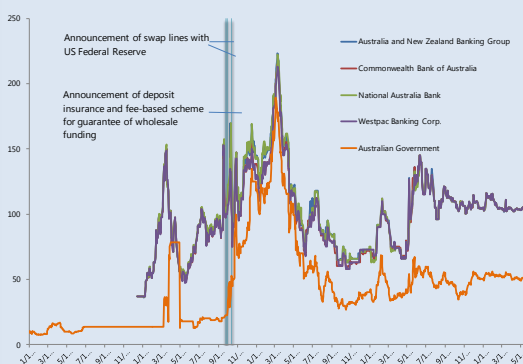
<sup>1</sup>Prepared by Padamja Khandelwal.

Figure 1. Australia: Consolidated Foreign Claims by Region, in percent of GDP



Sources: BIS, Consolidated Statistics, immediate borrower basis.

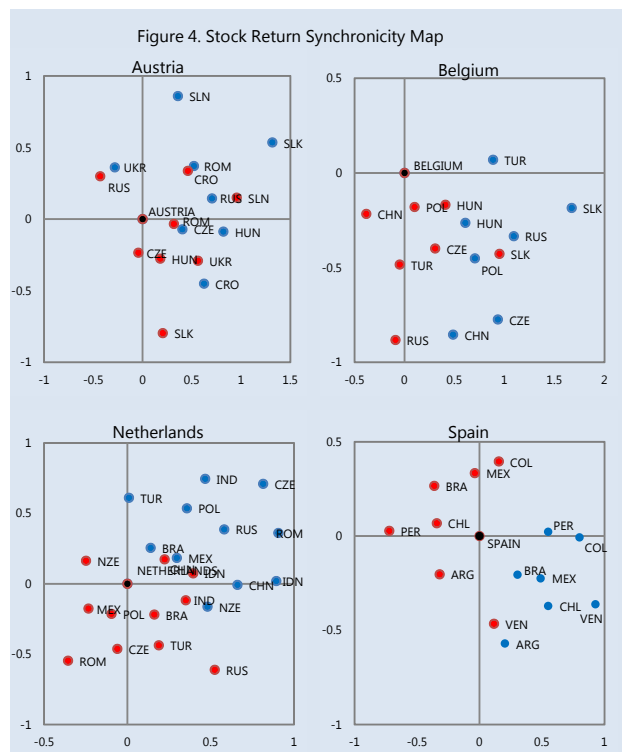
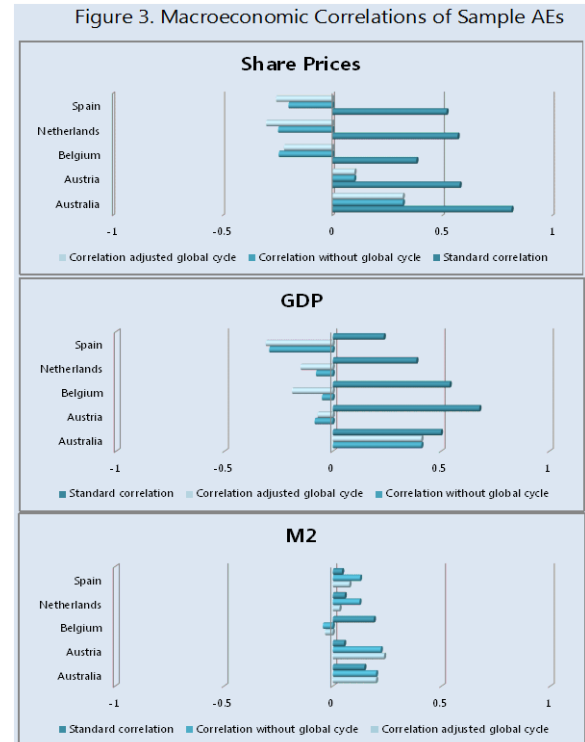
Figure 2. CDS Spreads of Australian banks and Financial Sector Interventions by Reserve Bank of Australia



analysis would not account for the parts of co-movement that can be attributed to either a common global cycle (i.e., the “non-diversifiable” component), or correlation among the EM countries themselves (See Appendix A for details). Figure 3 therefore includes correlation coefficients that adjusted for these two effects. The results suggest that the scope for diversification was strongest in Spain, followed by Belgium and the Netherlands, and lowest in Austria (Table 1).<sup>8</sup> In all cases, however, the gains exceed any diversification gains to be had for Australian banks operating in New Zealand, our reference case.

**12. However, deepening economic and financial ties between advanced economies and emerging markets may have gradually narrowed the room for diversification.** Figure 4 presents the stock price return synchronicity “map” between the home and its host countries. The blue points represent the years 1995–2002; the red points are based on 2003–07 data. The maps indicate that stock returns between the home and host countries have become more synchronized in the latter part of the sample, limiting diversification gains from foreign ventures.

**13. Finally, the 2008 crisis highlighted the risks inherent in AE-EM banking relationships, particularly vis-à-vis Emerging Europe.** As several Eastern European countries were cut off from financial markets, banks with exposures in these countries came under considerable stress.<sup>9</sup> Markets focused particularly on Austria, where it appeared that the risks from EM banking could affect the sovereign balance sheet, stress leading into an adverse



<sup>8</sup>These rankings are with respect to EM exposures only and do not take into account AE exposures.

<sup>9</sup>The Background Paper to the paper “Multilateral Aspects of Capital Flows” (forthcoming) provides a short summary of Austria and Sweden’s experience with EM cross-border banking during the crisis.

Table 1. Ranking for diversification gains in EM exposures 1/

Ranking 2/	Simple correlation	Correlation accounting for the global cycle	Correlation accounting for host dependence
1	Spain	Spain	Belgium
2	Netherlands	Belgium	Spain
3	Belgium	Netherlands	Netherlands
4	Austria	Austria	Austria

1/ The sample period covers quarterly data from 1995 to 2010.

2/ Rankings are computed based on the average diversification ranking of real GDP growth, M2 growth, and stock price returns synchronization between the home and host countries. A higher ranking implies greater diversification gains.

macro-financial cycle that caused sovereign spreads to rise sharply, driving an extraordinary policy response discussed further below. By contrast, the large international Spanish banks weathered the crisis more effectively, as Latin American economies continued to perform relatively well during the crisis. Again, Australia and New Zealand offer an interesting counterpoint. Despite having banks that were exposed to external wholesale funding risks and to downside from domestic real estate markets, the regulatory approach of both authorities required strong capitalization as well as provisioning. Furthermore, both governments had much stronger finances than the European AEs, and were able to put in place credible wholesale and deposit guarantees for their banks with risk-based fees. This allowed the banks to quickly re-access the markets, while sovereign spreads were much less affected.

Table 2. Financial Sector Support Measures in Home and Selected Host Countries

	Extension of retail deposit insurance	Debt Guarantees	Liquidity Support (international)	Liquidity Support (domestic)	Capital Support Schemes 1/	Asset Purchases/ Swaps
<u>Home Countries</u>						
Austria	√	√	√	√	√	
Belgium	√	√	√	√	√	
Netherlands	√	√	√	√	√	
Spain	√	√	√	√	√	√
<u>Host Countries</u>						
Czech Republic	√			√		
Romania	√	√	√	√		
Hungary	√	√	√	√	√	
Poland	√		√	√	√	
Turkey				√		
India				√	√	
Mexico		√	√	√		
Brazil		√	√	√		√

1/ Countries checked here put in place capital support schemes whether capital was injected or not.

**Table 3. Home Country Policy Measures Introduced During the 2008 Crisis****Austria**

The authorities introduced an unlimited deposit guarantee, provided liquidity support to banks through establishing an Austrian Clearing Bank to guarantee the interbank market. Austrian banks also accessed CHF liquidity through the Swiss REPO market. The total initial rescue package size for the banking sector was 100 billion euros. A bank recapitalization fund of 15 billion euros was established to recapitalize credit institutions and insurance undertakings. The recapitalization of Erste Bank and Raiffeisen was preemptively helped maintain funding and provide capital to their Eastern subsidiaries in the context of the Vienna initiative. As these banks were still profitable at the time of the recapitalization, the exercise did not involve any dilution of equity or restrictions on dividends. Further, no asset quality diagnostics or significant restructuring of operations were conducted. In contrast, the nationalization of the Austrian subsidiary of a German bank, Hypo Alpe-Adria in December 2009 was driven by withdrawal of the German parent due to accumulated losses at the bank and hence, involved a complete write-off of private sector equity, although the nationalization helped stabilize the bank's exposures to Eastern Europe. Another medium-sized bank, Kommalkredit was also nationalized. The Austrian debt guarantee scheme lapsed at end-2010.

**Belgium**

Bank deposits were guaranteed up to 100,000 euros, and a guarantee scheme for Dexia SA's liabilities was provided. Government recapitalized Dexia and KBC over a period of several months, while partially nationalizing Fortis (the largest Belgian bank before the crisis). Netherlands bought the Dutch operations of Fortis, eventually merging them with ABN-AMRO. Belgium sold a 75 percent stake in Fortis to BNP Paribas in May 2009, after which the CDS spreads on Fortis finally declined.

**Netherlands**

Deposit insurance was increased up to 100,000 euros, and a 200 billion euros fund was set up to provide liquidity support through guarantees of inter-bank deposits/loans. Authorities also set up a 20 billion euros fund to recapitalize financial institutions, with attached conditions on remuneration and appointment of government representatives in the Boards. Sovereign spreads declined as the guarantee fell into disuse after early 2009 and the guarantee scheme was allowed to expire at end-2010. ING and ABN-AMRO, and other smaller institutions were recapitalized.

**Spain**

Similar to other EU countries, deposit insurance was increased up to 100,000 euros. The authorities also introduced a fee-based scheme to guarantee the liabilities of Spanish-owned banks or Spanish subsidiaries of foreign banks. The guarantee has been continually extended since it was first introduced. In June 2009, authorities also set up the Fund for Orderly Bank Restructuring (FROB) with 9 billion euros in funding. Even though the immediate impact of the crisis on CDS spreads of Spanish banks was not large—relative to Austria, Belgium, and Netherlands—it has continued to build with the more domestically-focused bank spreads wider than those of the two leading banks with substantial emerging market businesses. In fact, the Spanish sovereign CDS spreads are now marginally higher than those of the two banks.

**III. CRISIS AND ITS AFTERMATH****A. Crisis intervention****14. Given the macro-financial feedback loops, significant policy intervention in both home and host countries was needed to stop the crisis from spreading.**

- All of our four home country governments committed large amounts of capital support for their banking systems, increased deposit and bank debt guarantees, and combined intervened to restructure or nationalize several banks (Tables 2–3).<sup>10</sup> The Netherlands and

<sup>10</sup>In Belgium, Dexia and Fortis were restructured, largely along national lines. Dexia has now been nationalized by the government of Belgium. In Austria, the subsidiary of German bank Hypo Alpe-Adria was nationalized.

Belgium had higher direct net costs of financial sector support, compared to Spain and Austria as of end 2010 (IMF, 2011).

- Some host countries in our sample also increased deposit and bank debt guarantees, entered into FX swap arrangements with AE central banks (Brazil, Mexico, Hungary, and Poland), entered into Fund programs or arrangements (like Hungary, Mexico, Poland, Romania, and Ukraine), and a few injected capital into banks.

**15. External (including Fund) support provided to EM Europe was instrumental in bringing down risk premia, and alleviating currency depreciation pressures.** As markets seized up in the aftermath of the Lehman shock, banks operating in Emerging Europe would have faced serious rollover difficulties, as their FX swaps (used to hedge FX loans) were typically of short maturity.

- IMF programs and EU balance of payments support greatly helped to alleviate severe FX liquidity strains.
- The Vienna Initiative (Box 3), whose origins lay in Fund support programs sought written commitments brought together the major stakeholders to prevent a disorderly pull-out of banks from the region.
- Parent banks were also able to provide swaps to their subsidiaries. The integration of EM European banks within the European banking system also played a large role in ensuring that the subsidiaries of AE banks enjoyed more stable funding from their parents through the crisis than other EM banks, and banks in other regions (see, for example, Lahnsteiner (2011), Vogel and Winkler (2010)).
- At the onset of the crisis, the ECB and SNB also provided FX repos in Hungary and Poland, where FX lending was particularly high.

Without this extent of support from the IMF, the EU, and other European institutions, it is broadly acknowledged that EM European currencies may have depreciated much more, exposing AE bank subsidiaries to a far greater level of risk.

## B. How are banks reacting?

**16. The impact of the crisis on our sample banks reveals a differentiation between the various banking systems.**

- Viewed in terms of their EM dealings, the two large international Spanish banks have emerged the strongest, as the profitability of Latin American subsidiaries have shielded them from difficulties in their home market. Both banks have been expanding their presence in Emerging Europe: Santander in Poland, and BBVA in the Turkish market.
- In Austria, the larger banks have remained profitable, but some smaller banks became insolvent. Banks largely maintained exposures as part of the European Bank Coordination Initiative (EBCI), but some face a need to deleverage. One bank (Volksbank) made plans to sell its CESEE subsidiaries ahead of the European Banking Authority (EBA) stress test, which it

### Box 3. European Bank Coordination Initiative<sup>1</sup>

The EBCI, also referred to as the Vienna Initiative, was created as a coordination platform in early 2009 to address the risk of disorderly capital flight and financial collapse in emerging Europe. Foreign bank groups controlled a large portion of the banking systems in emerging Europe. As macro-vulnerabilities in emerging Europe came to the fore in late 2008, and the global financial crisis unfolded, these banks faced severe financial instability.

Regulators in the home countries, who are primarily responsible to domestic constituencies, pressed banks to recapitalize operations in their core (home) markets. As national authorities realized that banks were facing a crisis of confidence and unable to recapitalize, bailout packages were put in place for domestic operations but there was strong resistance to bailing out foreign subsidiaries. Facing the risk of macroeconomic collapse in emerging Europe, the EBCI was created to bring together multinational banks, home and host country supervisors, fiscal authorities, the IMF, and IFIs to assure macroeconomic and banking sector stability in Eastern Europe. As a result of important work by all stakeholders, agreements were reached in March 2009:

1. Banks committed to maintain their exposures to CEE countries, recapitalizing subsidiaries where necessary,
2. Host countries committed to conduct reasonable macroeconomic policies in accordance with IFI agreements,
3. Host countries also agreed to extend liquidity and deposit insurance to subsidiaries of foreign bank groups and not ring-fence assets,
4. Home countries agreed to make bailout money available to banks without restrictions on its use for foreign subsidiaries,
5. IFIs provided funding to banking groups (EUR 33 billion were disbursed over the next two years by the EBRD, EIB, and the World Bank Group for support of various banking groups).

The commitments by banks were connected to the IMF and EU stabilization programs. In five countries — Bosnia and Herzegovina, Hungary, Latvia, Romania, and Serbia—parent banks pledged to largely maintain their exposures and to recapitalize subsidiaries as long as the IMF-EU programs remained on track.

A key win from a coordination perspective was burden sharing between home and host countries. Home countries agreed to not prevent cross-border transfers of national bailout funds, while host countries agreed to not ring fence assets and extend deposit insurance to foreign subsidiaries as well.

<sup>1</sup> Prepared by Padamja Khandelwal.

failed. Nevertheless, Raiffeisen bank has purchased a branch of Greek EFG Eurobank in Poland (subject to conversion of this branch into a full subsidiary), and Erste Bank increased its control over its Romanian subsidiary.

- Belgian and Dutch banks have been hard hit by the crisis, albeit not exclusively through their EM exposures.<sup>11</sup> Dexia wound up most of its EM municipal lending in the aftermath of the

<sup>11</sup> Dexia, in addition to an over-reliance on wholesale funding, had exposure to a U.S. bond insurer. KBC had operations in Ireland. Fortis, ING, and ABN Amro had direct exposures to U.S. subprime assets.

Lehman crisis. KBC is in talks to sell its Polish subsidiary.<sup>12</sup> Dutch authorities injected significant amounts of capital into the banking system, and took over the remainder of ABN Amro that the Belgian/Dutch bank Fortis had acquired. The *bancassurance* firm ING Group also received public capital, and had to sell businesses, including its Latin American insurance businesses and ING Direct in the U.S.

**17. In all cases, however, banks have been forced to adapt business strategies to the post-crisis environment.** There are three areas where this is evident:

- First, as external liquidity dried up, banks in Emerging Europe have had to diversify funding sources by seeking more deposits. This led to significant deposit competition in the post-Lehman shock environment, which has eased somewhat more recently as loan-to-*deposit ratios* have generally fallen. Trying to diversify the liabilities towards deposits was made all the more difficult by the fact that the panic raised deposit withdrawal pressures, as confirmed by conversations with senior bankers.<sup>13</sup>
- Second, as countries clamped down on foreign currency lending and/or implemented measures to provide credit relief to borrowers (see Box 1), banks have had to look for other areas of growth, triggering a reassessment of parent-subsidiary relationships.
- Third, indeed, bankers interviewed for this paper say that they have refined their transfer pricing strategies to their subsidiaries, both by imposing stricter curbs on liquidity provision and by relying more on market-based mechanisms to price liquidity.

**18. Current banking sector difficulties in European AEs may have knock-on effects on their EM subsidiaries.** In order to raise capital adequacy, banks will either have to issue private capital, shrink their balance sheets, or seek government (or European) assistance. Relatively stronger banks are more likely to find private sources of capital, while the weaker banks may have to divest their EM holdings, which may present acquisition opportunities for other AE banks (as highlighted earlier), or for the locally owned EM banks. Even if ownership does not change, AE-owned banks may find themselves unable or unwilling to lend in EMs out of considerations of keeping group-level balance sheet size capped. More controversial from the EM perspective, is the potential for capital and liquidity transfers from the subsidiaries back to the parents, or higher dividend payouts to the parent. AE-owned banks that are more dependent on earnings of their EM subsidiaries may leave subsidiaries significantly overcapitalized in each host jurisdiction, so as to limit the risk that profit repatriations come under scrutiny.

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<sup>12</sup>In 2007, Dutch Bank ABN Amro had already sold most of its EM businesses to RBS and Santander.

<sup>13</sup>By contrast, although Australian and New Zealand banks also faced similar pressures to raise deposits, the success of the deposit and wholesale guarantee programs allowed them to raise these deposits fairly quickly. Thanks to this, and strong supervisory pressure, the liquidity risks and sensitivity to wholesale funding shocks have fallen, though they remain potential sources of vulnerability. The loan-to-deposit ratios of both banking systems are still well in excess of 100 percent in both banking systems.



## C. Rethinking regulatory relationships

**19. Regulators interviewed for this paper cited a variety of contributing factors to explain the relative differences in risk build-up in the boom period.** In general, they acknowledged that home-host cooperation was not sufficient—not just in our sample economies, but more broadly.<sup>14</sup>

- The Spanish regulators stated that the experience of earlier crises had always necessitated closer cooperation with their Latin American counterparts. In the early stages of the bank expansion, however, they had in some cases required banks to provision against loan losses at the group level if they felt that host provisioning standards had been relatively lax.
- Among other factors, the Belgian authorities felt that the absence of a quantitative liquidity requirement combined unfavorably with Belgian banks' treating their central treasury operations as a profit center. This results in inappropriate incentives to "push liquidity out", instead of funding being driven by long-term credit policies.
- Dutch authorities noted that the experience through the crisis may drive a greater preference for locally funded subsidiaries (see Section IV), but this might be difficult to achieve for banks with a greater corporate mix in their businesses.
- The Austrian regulator cited the need to rely too much on moral suasion to curb cross-border risks in the pre-crisis period.

**20. Some regulators in EM Europe were also slow to curb the build-up of risks and vulnerabilities.** In many cases, the desire to see mortgage markets (and other financial services) grow at a rapid pace overshadowed the risk considerations that emanated from FX lending to unhedged retail customers based on a one-way currency bet. Many EMs did attempt to put in place prudential measures to curb credit growth (e.g., Bulgaria, Croatia, Romania, Serbia), but these were often ineffective.<sup>15</sup> As highlighted in the European REO (Spring 2010), EM European countries that were hit the hardest had capital flows in excess of what structural factors, size, and income convergence would have warranted, and prudential measures were a poor substitute for greater exchange rate flexibility, and tighter fiscal policies in the cases of countries with pegged exchange rates.

**21. In the aftermath of the crisis, encouraging steps have been taken at both the national and European levels.** In general, the authorities interviewed cited improved communication between micro and macro based supervisors (including through an overhaul of regulatory responsibilities in the cases of Austria and Belgium), and much more frequent

<sup>14</sup>This is also underscored in "Multilateral Aspects of Policies Affecting Capital Flows" (forthcoming).

<sup>15</sup>It should not be construed that AE-owned banks were (or are) the only sources of financial instability. Local banks (e.g., Ukraine, and Kazakhstan) also accessed external wholesale funding which led to significant difficulties. The fact that non-AE banks from these countries were among the first to get punished by markets shows that market discipline, though late in all cases, was applied relatively more swiftly to EM-owned banks.

communication with host country authorities—a fact that was confirmed by many bankers. At the multilateral level, the establishment of the ESRB was seen as a major step forward in terms of monitoring cross-border risks, along with the establishment of colleges of supervisors, cross-border stability groups, and crisis management groups where the EM regulators have an institutional mechanism through which their views can be heard. Moreover, European supervisors are in the process of conducting the first joint supervisory assessment of cross-border banks, aiming to achieve compliance with the new Capital Requirements Directive (CRD) that came into effect at the end of 2010.

**22. In this regard, it should be noted that the cooperation between the Australian and the New Zealand authorities was well advanced even before the crisis broke out.** Proposals regarding enhanced coordination, information-sharing, and harmonization were discussed in the early 2000s, culminating in significant legislation in 2006 both countries that requires each jurisdiction to consider the financial stability of the other. Capital, liquidity, and provisioning requirements were well-harmonized, and changes related to Basel III will also be carried out in mutual consultation.

**23. Cross-border crisis management, resolution, and burden-sharing arrangements remain difficult issues to solve, however.** As the Fortis and Dexia examples illustrated at the outbreak of the crisis, even when regulatory and supervisory cooperation *among AEs* was relatively strong, the absence of explicit burden-sharing arrangements causes complications<sup>16</sup>. It has led to splitting up of groups along national lines, rather than more efficient intervention along business lines. More recently, the French, Belgian, and Luxembourg governments had to resolve Dexia at a time when sovereign balance sheets are strained and sovereign ratings have generally been under pressure.<sup>17</sup> Difficulties are particularly pronounced once banks' EM exposures are large relative to the fiscal capacity of the concerned sovereign. Other significant obstacles include differences across countries in terms of bank resolution laws, as well as corporate and insolvency laws.<sup>18</sup>

**24. The Fund has proposed a framework for enhanced cooperation on resolution issues.**<sup>19</sup> The proposal strikes a middle ground between more far-reaching solutions such as the establishment of an international treaty on resolution or the alternative of “de-globalizing” financial institutions. A treaty would obligate countries to defer to the resolution decisions of the jurisdiction where the financial institution or group has its main activities. The proposal comprises four elements:

<sup>16</sup>See Box 4 of Cross-Cutting Themes in Economies with Large Banking Systems (IMF, 2010).

<sup>17</sup>Belgium has agreed to pay 4 billion euros to take over Dexia Bank (Belgium). Belgium, Luxembourg, and France are guaranteeing 90 billion euros in funding of Dexia SA and Dexia Credit Local. For Belgium, the size of the guarantee amounts to 15 percent of GDP.

<sup>18</sup>The European Commission does not expect a full assessment regarding cross-border banking group resolution until at least 2014. Global level resolution regimes were generally seen by some regulators interviewed for this paper as being out of reach for the foreseeable future.

<sup>19</sup>Resolution of Cross-Border Banks—A Proposed Framework for Enhanced Coordination (IMF, June 2010).

- Countries would amend their laws so as to require national authorities to coordinate their resolution efforts.
- The enhanced coordination framework would only be applicable to those countries that have in place core-coordination standards.
- The specification of the principles that would guide the burden sharing process among cooperating authorities.
- Countries that subscribe to the framework would also agree to coordination procedures designed to enable resolution actions in the context of a crisis

#### IV. CENTRAL ISSUES IN AE-EM BANKING TODAY

**25. The experiences of our sample countries guide us to some central issues worth thinking through in such AE-EM banking relationships today.** Three key questions relate to benefits *within* the EM banking sector attributable to the presence of AE banks, the potential funding cost advantages that AE banks can realize *across* borders and currencies, and the scope for negative macro-financial feedback loops.

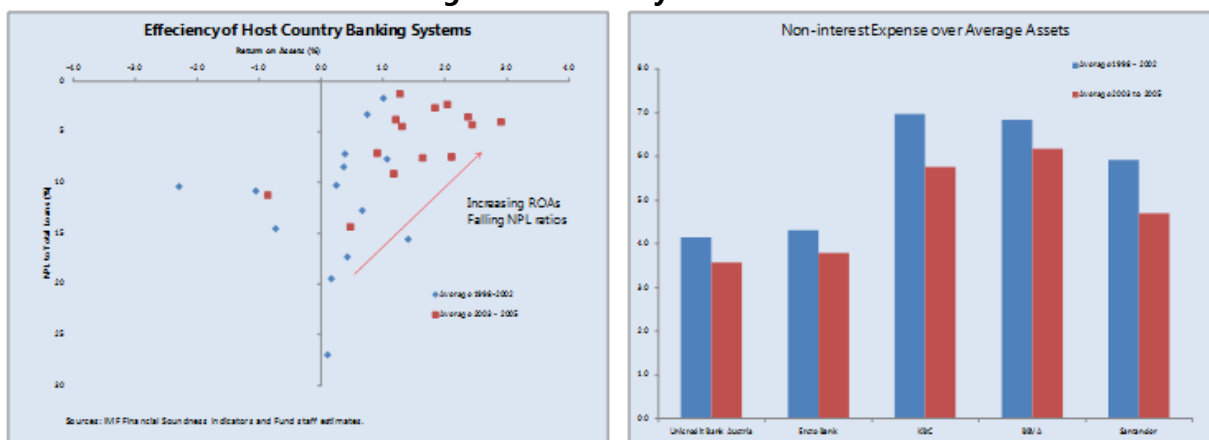
##### A. Do emerging markets benefit from the presence of foreign banks?

**26. The presence of AE-owned banks has led to operational efficiency gains in host country banking systems, but these benefits only go up to a point.** Bankers interviewed for this paper almost uniformly emphasized that an important part of their EM expansion strategy was to export their management, technology, and risk management systems to lower costs and improve the efficiency of operations of the banks they took over. In the EM European context, these entities were transformed from savings gathering institutions of the communist era into modern banks that not only attracted deposits but provided credit intermediation, and access to financial products to households and to the SME sector. In Latin America, financial systems needed to be revived after the financial crises of the 1990s with new capital. Claessens and others (2001) analyze data for 80 countries between 1988 and 1995; supporting the hypothesis that foreign bank entry improves the functioning of national banking markets.<sup>20</sup> However, Goldberg (2009) suggests that financial sector FDI, like real-side FDI, may only induce limited technology transfers and productivity gains for the host country. Also, she notes that the literature does not clearly indentify whether the productivity gains are due to increased competition or to technology transfers that close a knowledge gap between countries.

**27. Cost and performance indicators in our sample countries lead to similar conclusions for our sample countries.** An examination of overhead costs in EM subsidiaries suggests that host banking systems were able to achieve higher risk-adjusted return on assets at the same time that their ratio of nonperforming loans declined (Figure 5). Over the same period, noninterest expenses as a ratio of average assets, one indicators of cost efficiency, declined for most EM

<sup>20</sup>See also Turner (2009), as well as individual country case studies in BIS Papers No. 28 (2006). Also see Goldberg (2008) for a review of the impact of banking sector globalization.

Figure 5. Efficiency Measures



Sources: RHS panel, Bankscope.

subsidiaries of our sample of parent banks. Despite these cost efficiency gains, however, Turner (2009) highlights that average net interest margins in host countries tend to remain quite wide even years after acquisition. This suggests that exceptional profits in the host countries do not dissipate quickly, keeping AE banks profitable in EMs.<sup>21</sup> Net interest margins have tended to remain high in Latin America despite the entrance of foreign banks, while in EM Europe, net interest margins, while also still high, have compressed in Southeastern Europe, and the CIS states since foreign banks entered these economies.<sup>22</sup> In sum, there are benefits that the AE-owned banks brought to EMs, but the persistence of relatively high interest margins suggests that the welfare gains accrue sizably to the banks.

## B. Are scale economies in funding realizable across borders and currencies?

**28. The crisis has caused a re-assessment of cross-border funding models.** The issue here is the extent to which AE-owned banks, as a consequence of larger size, can centrally pool and manage funding more efficiently, and pass on a lower cost of funding to their EM-owned subsidiaries. Before the crisis, there was a widely held view among banks and market participants that these scale economies could and should be exploited to expand their business. In doing so, however, banks can become conduits for funding shocks from advanced economies to emerging markets, which can “blow back” to the parent bank and the home economy. One could argue that efficiency gains in centralized funding models could justify some risk-taking on the part the bank as well as home and host regulators. This argument weakens, however, to the extent that such scale economies in funding costs are overestimated or do not exist, in which case the preference would be from *both* the home and the host regulator’s perspective, to decentralize

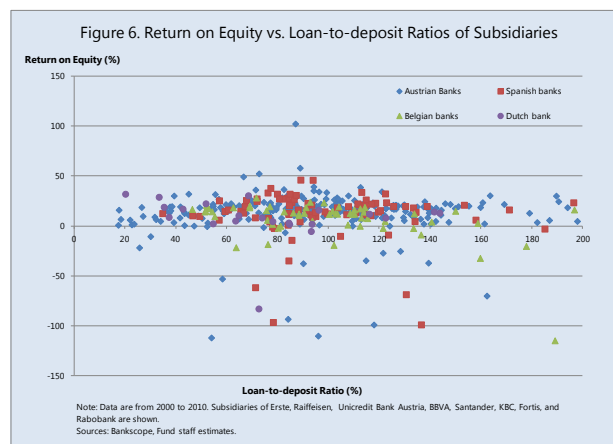
<sup>21</sup>An interesting note on the efficiency of the New Zealand banking sector is contained in the RBNZ’s Financial Stability Review (May 2011). A comparison with 22 OECD economies highlights that New Zealand ranks the highest in system-wide ROE, fourth in ROA, and 9<sup>th</sup> in net interest margins, suggesting that Australian banks have indeed run profitable ventures in New Zealand.

<sup>22</sup>See Raiffeisen CEE Banking Sector Report (2007), and Chortareas and others (2009).

liquidity management.<sup>23</sup> McCauley and others, (2010) argue that there appears to be greater stability of the decentralized multinational model, especially outside the major currency areas, as local claims in local currencies proved to be more stable in aggregate than did cross-border claims during the post-Lehman shock period. Fiechter and others, (2011) argue that the optimal choice regarding organizational structure depends on the diversity of business lines and the stages of financial development of different countries. They note that while a branch structure may be more suitable for wholesale banking activities, a decentralized subsidiary model may work better for global retail banks.

**29. A comparison of performance measures across banking subsidiaries suggests that such scale economies in funding costs may indeed have been overestimated.** Data gaps make these empirical questions challenging to address, particularly when using publicly available data to assess financial linkages (see Cerruti and others, 2011 for a detailed discussion). Below we use banking system level, and parent and subsidiary level data to examine relationships that give some *prima facie* evidence:

- Simple performance measures.** A simple scatter plot of bank subsidiaries' return on equity (ROE) against loan-to-deposit (LTD) ratios shows little evidence that externally-sourced funding improves long-run performance (Figure 6).<sup>24</sup> A caveat here is in order. Since the transfer pricing mechanisms of the parent bank to its subsidiaries cannot be known, the ROEs of the subsidiaries may not be the best gauge of its profitability. Banks may have chosen to book profits at the parent level (or elsewhere depending on tax treatment). However, it is not possible to control for the differing types of exposures the parent banks had in their home economies, therefore reducing the information content of a similar analysis at the parent level. ROEs of the subsidiaries are a useful starting point.



- Risk-adjusted performance.** A comparison of the long-term risk-adjusted returns on equity and assets of different subsidiaries in the *same* host country also fails to link centralized

<sup>23</sup>Pokkuta and Schmaltz (2011) derive an analytical solution for a bank's decision to maintain a centralized liquidity hub, and conclude that the decision is function of volatility and the characteristics of the branch network. Greater volatility translates into both large liquidity demands and higher costs, which would favor a decentralized set-up.

<sup>24</sup>Since data on parent-sourced or foreign-sourced funding of subsidiaries is not easily extracted from financial statements, LTD ratios are used as a proxy. Discussions with bankers suggested that local-currency loans were funded primarily with local-currency deposits, and for the most part matched, while foreign-currency loans were mostly funded via parent- or externally-sourced funds, like syndicated loans or foreign exchange swaps.

funding to better performance.<sup>25</sup> Since each subsidiary faces the same set of regulatory and tax rules in the host economy, the same general pool of assets, and the same (or at least similar) external and domestic funding market environments, a within-country comparison provides a greater focus on funding model. The country experience in Table 4 suggests that higher LTD ratios and greater reliance on noncustomer deposits—both signs of greater use of externally-sourced funding—were associated with a worse overall performance.

**30. Indeed, cost advantages enjoyed by bank subsidiaries may be linked to implicit sovereign support of parent banks in the home country.** Given that the mechanisms through which the internal capital markets of banks function are not well-known, it is impossible to prove

	Average Assets (\$ millions)	Risk-adjusted ROE (%) 1/	Risk-adjusted ROA 1/	Loan-to-deposit ratio	Noncustomer deposit funding/ total funding 2/	Leverage Ratio	Tangible equity/ tangible assets 3/
<b>In Chile</b>							
<u>Subsidiary of</u>							
Santander	28,637	7.4	6.5	123	34	12	9
BBVA	9,719	4.2	4.2	114	25	16	7
<b>In Mexico</b>							
<u>Subsidiary of</u>							
Santander	29,027	2.8	4.0	79	21	11	10
BBVA	58,908	2.7	2.3	88	20	11	9
ING	3,900	1.4	1.4	96	61	12	10
<b>In Croatia</b>							
<u>Subsidiary of</u>							
Unicredit Bank Austria	13,214	2.6	3.1	86	22	10	10
Raiffeisen	4,472	2.2	2.8	116	39	13	9
Erste	4,754	0.1	0.3	95	30	12	9
<b>In Hungary</b>							
<u>Subsidiary of</u>							
Unicredit Bank Austria	5,625	3.7	3.8	119	35	10	10
KBC	10,279	1.8	1.7	99	28	15	7
Raiffeisen	7,163	1.5	1.5	127	30	13	7
Erste	7,542	1.4	1.3	144	44	20	5
<b>In Poland</b>							
<u>Subsidiary of</u>							
ING	14,105	1.5	1.6	60	14	11	8
Raiffeisen	5,178	1.5	1.4	88	27	13	8
KBC	8,821	-0.2	-0.1	96	22	16	6
<b>In Romania</b>							
<u>Subsidiary of</u>							
Unicredit Bank Austria	4,597	3.5	3.7	98	27	8	10
Raiffeisen	16,247	1.0	1.0	77	19	11	11
<b>In Slovakia</b>							
<u>Subsidiary of</u>							
Raiffeisen	8,217	3.3	2.7	66	15	13	8
Erste	11,366	1.6	2.2	50	16	15	6
Unicredit Bank Austria	3,132	-0.3	0.4	85	22	32	7

Sources: Bankscope, Fund staff calculations.  
1/ Risk-adjusted return on equity (assets) = average ROE (ROA) over the period / its standard deviation.  
2/ Reliance on noncustomer deposit funding = 100 - (customer deposits / total funding) \*100.  
3/ Tangible-equity/tangible assets is used as the capital measure because risk-weighted asset-based measures are not available for the 11-year horizon sample period.

<sup>25</sup> Average 10-year returns on equity and assets are used to gauge performance, adjusted for the historical standard deviation of those returns over the period.

this with absolute certainty. However, to the extent that one can take at face value, the claim from bankers that they have moved to market-based mechanisms of transfer pricing, the following analysis is illustrative. We compare the domestic interbank lending rates and a stylized calculation of the transfer prices parent banks would charge their subsidiaries (converted to implied local currency interest rates), if they took into account market-based pricing for bank and country risk as well as the credit cost advantage of the home banks from being “too big to fail”, the TBTF premium (Figure 7).<sup>26</sup> The latter represents the potential cost of credit to banks assuming no implicit support from their home governments.<sup>27</sup>

- Figure 7 suggests that parent banks did enjoy a funding cost advantage over locally-sourced funding in several countries before the crisis, but this was driven to some extent by the fact that markets were under-pricing bank and country risks. Bank and country credit risks rose significantly during the crisis, narrowing the funding advantage in Hungary, Poland, and Mexico.<sup>28</sup> Since the crisis, when TBTF premia can be better estimated, in Hungary and Poland, the cost advantage is eliminated altogether.
- In the Czech Republic, externally-sourced funding was clearly not advantageous. This may be one of the reasons why the risks that built up in other EM European economies did not materialize. For Brazil and Turkey, the cost advantage of external funding has persisted over the last two years, but the advantage has eroded more recently in the latter.

### C. Does the presence of AE banks amplify macro-financial loops?

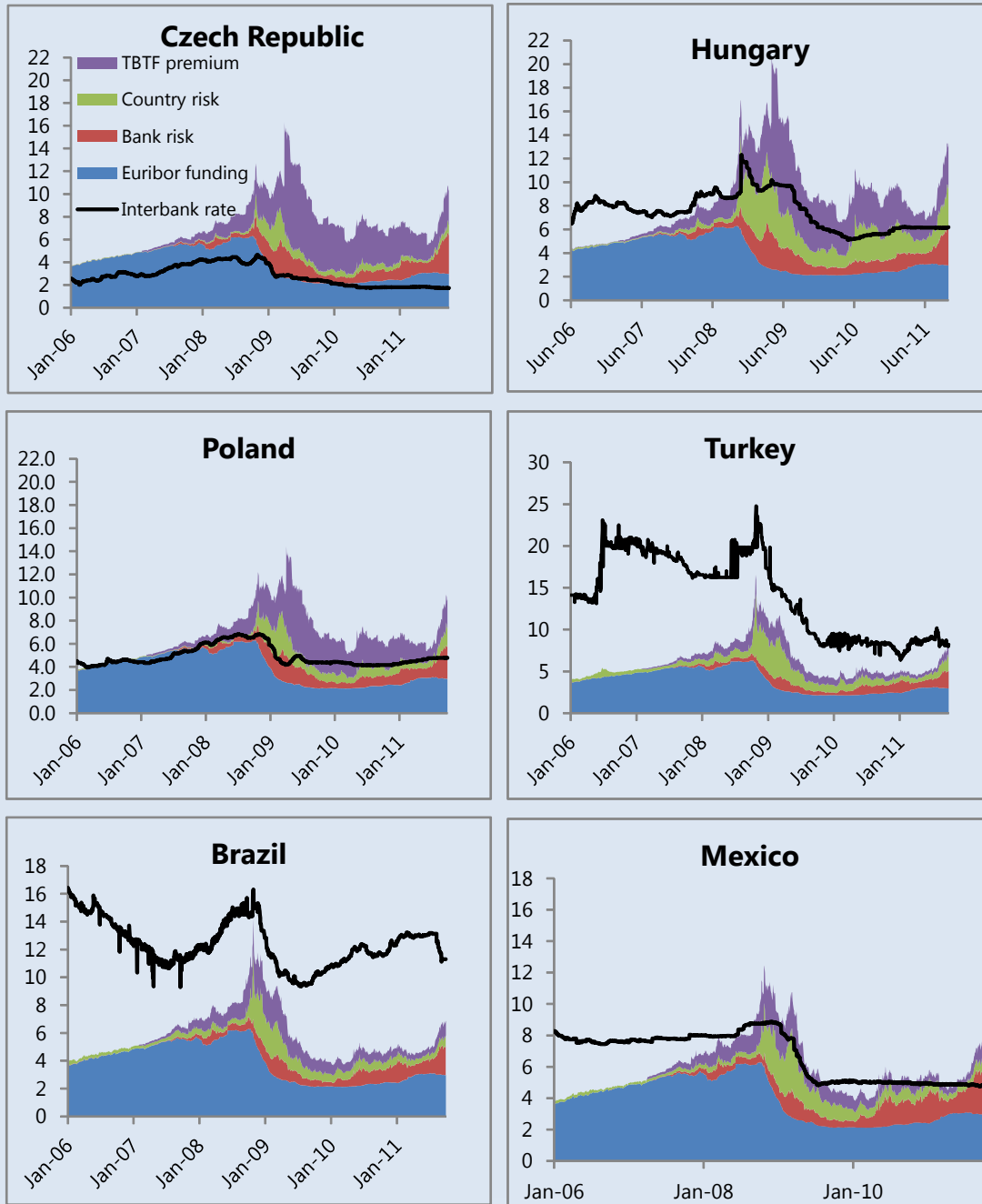
**31. Banks’ relatively easy access to home country funding allowed them to significantly expand credit in emerging market economies.** This was seen as helping EM countries catch up by developing domestic banking and capital markets, and supporting domestic demand growth. However, this also implied that banks could amplify credit cycles, serving as a funding conduit when liquidity was abundant and cheap, and necessitating rescue measures when financial markets dried up. The process picked up speed after 2003, and culminated in 2007, after which external funding markets began to dry up. This view is supported by a positive and significant correlation between peak-to-trough output declines and the rise in cross-border claims on host economies in the pre-crisis period (Figure 8).

<sup>26</sup>See Annex I for details of the calculation of the TBTF premium.

<sup>27</sup>Austrian bankers interviewed for this paper said that they had applied market based measures to transfer price funding since 2007-08. The models include sovereign CDS as a proxy for the transfer risk. However, the inclusion of other factors and smoothing techniques tends to reduce the weight of the sovereign credit risk particularly during periods when credit spreads are volatile and increase very quickly.

<sup>28</sup>However, in Mexico, banks are deposit rich, and do not need external parent funding. This is also in keeping with the stated philosophy of the Spanish banks, in terms of keeping their subsidiaries independent in terms of liquidity management.

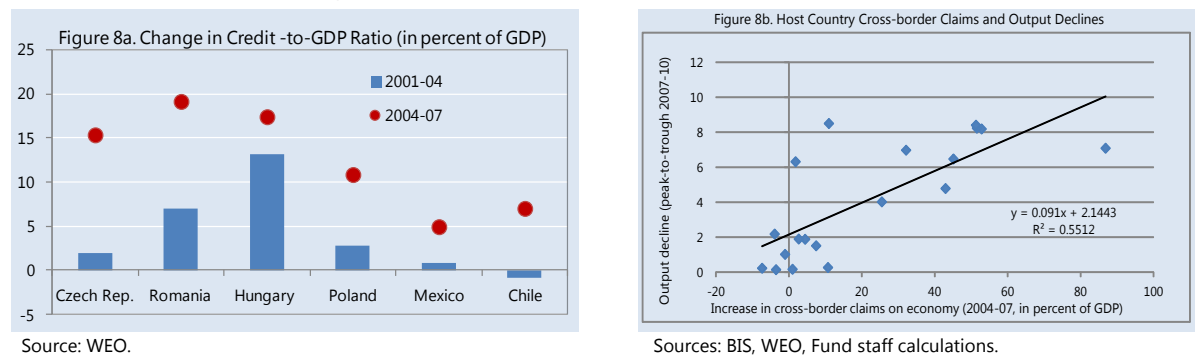
Figure 7. Estimated External Transfer Price of Funding vs. Domestic Interbank Rate



Note: The total transfer price is calculated by assuming the home bank acquires 1-year funding from the European interbank market at a cost of 1-year euribor. The home bank also pays a bank credit premium, the 1-year home bank CDS spread. It charges its subsidiary a country transfer premium, represented by 1-year sovereign CDS spread of the host country. We then include a TBTF (too big to fail) premium (see Box 4 for calculation). The transfer price is then converted to an implied local-currency rate using forward interest parity. Country and bank risks are shown in the charts as the average of select home country banks. 1-year is used in order to compare the same maturity rate between the implied transfer prices and the local-currency interbank rate.

Sources: Bloomberg, Markit, and Fund staff calculations.

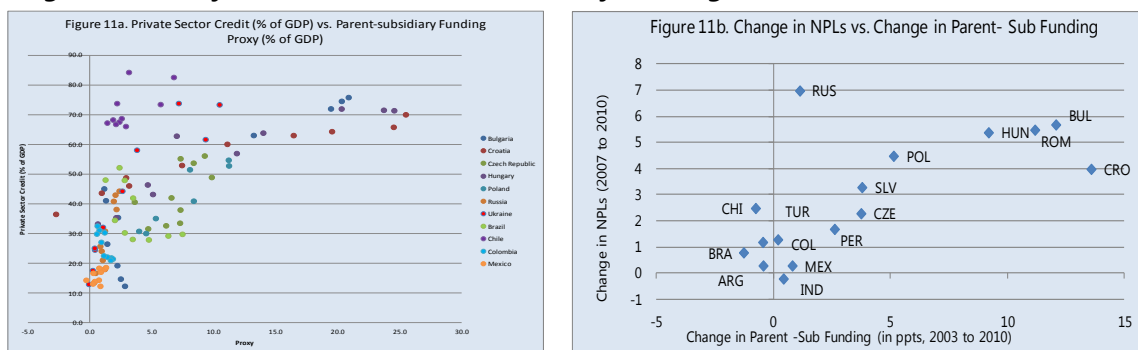


**Figure 8. Sample EM Credit-to-GDP and NPLs**

Source: WEO.

Sources: BIS, WEO, Fund staff calculations.

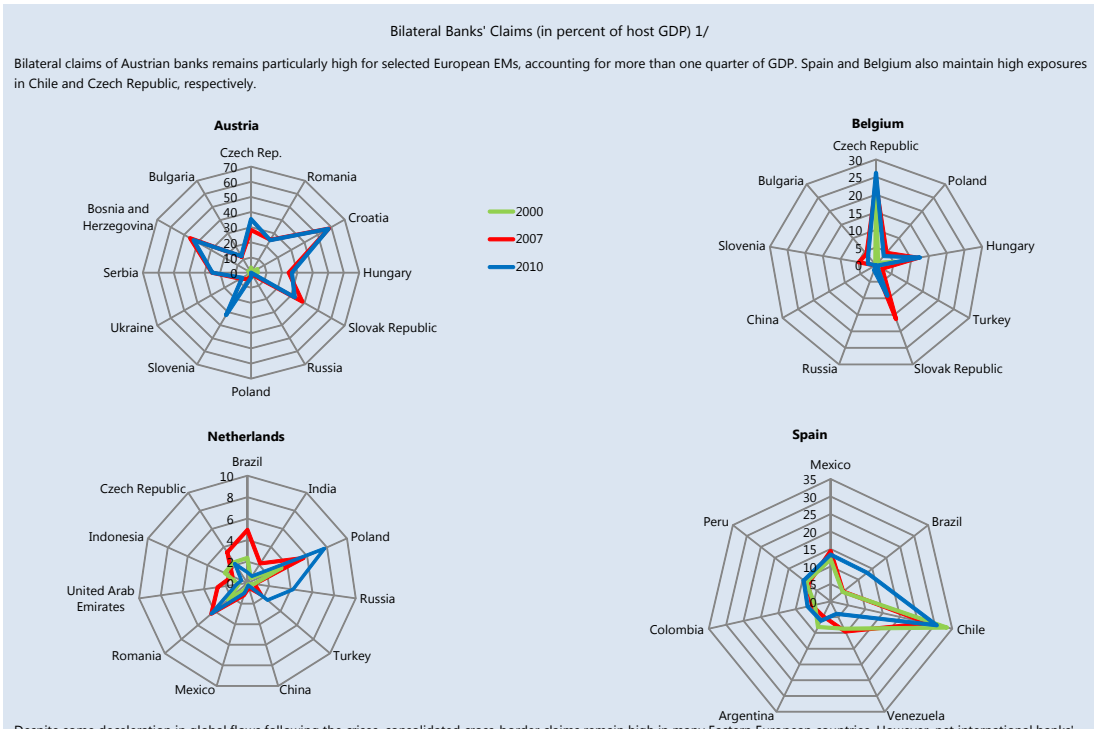
- By way of background, in 2007, consolidated foreign bank claims on many host economies equaled GDP, with bilateral consolidated claims (ownership basis) of Austrian banks accounting for a large share (Figure 9). However, there were differences in the extent of external funding. Poland, and the Czech Republic (where loan growth was domestically funded), maintained a moderate pace of output and credit growth, as well as lower fiscal and external deficits (Figure 10). Stronger growth in Romania and Slovakia was accompanied by a very rapid credit expansion which resulted in accumulation of significant external imbalances (See also tables in Appendix D).
- There is a clear link between the parent-subsidiary funding, the degree of credit growth, and the subsequent rise in post-crisis NPLs (Figure 11).<sup>29</sup> It is noteworthy that EM Europe generally received much higher parent funding, and experienced a stronger credit boom, as well as subsequent NPL rise, when compared with Latin America.

**Figure 11. Proxy Measures of Parent-subsidiary Funding, Private Sector Credit-to-GDP, and NPLs**

Sources: BIS, WEO, Fund staff calculations. Sources: BIS, WEO, Fund staff calculations.

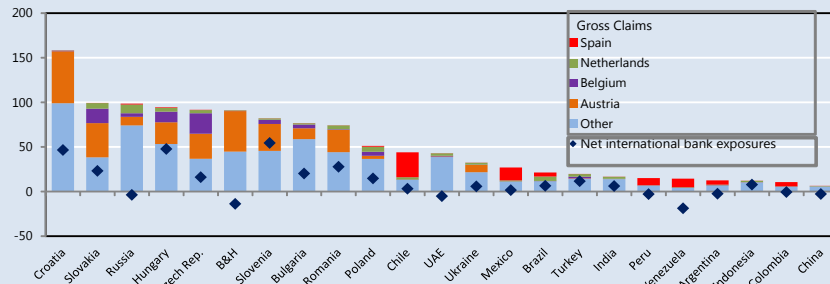
<sup>29</sup>Following Lahnsteiner (2011), a proxy for the amount of parent funding to host economies is calculated by subtracting the consolidated bank claims on host economy banks from the locational claims on BIS reporting banks. As the author notes, this measure is subject to caveats due to: (i) a difference in the number of reporting countries in the locational and consolidated statistics; (ii) foreign currency lending from subsidiaries to other banks cannot be isolated; (iii) locational statistics incorporate cross-border claims on central banks while the consolidated statistics do not; and (iv) this approach will not capture claims on host country banks that result from “round tripping” of funds from parent to subsidiary via other unrelated entities in financial centers. These caveats, on balance, tend to understate rather than overstate the extent of parental funding.

**Figure 9 Bank Claims on Sample EMs**

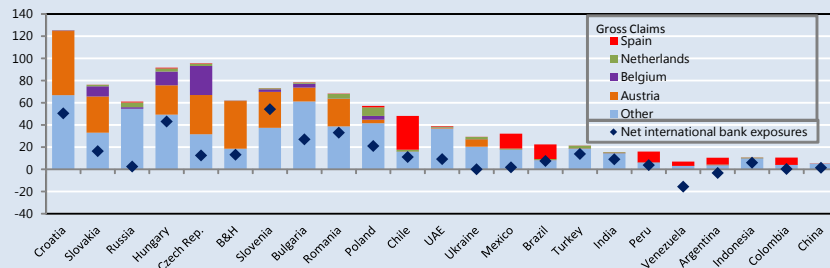


Despite some deceleration in global flows following the crises, consolidated cross-border claims remain high in many Eastern European countries. However, net international banks' claims on some host economies (e.g., Czech Republic and Poland, and several Latin American countries) are low. These countries have attracted particularly strong flows, benefiting from a global search for safer investment opportunities.

Composition of Cross-Border Claims on and Net International Bank Exposures to Selected Host Countries, 2007 (in percent of host GDP) 1/



Composition of Cross-Border Claims on and Net International Bank Exposures to Selected Host Countries, 2010 (in percent of host GDP) 1/

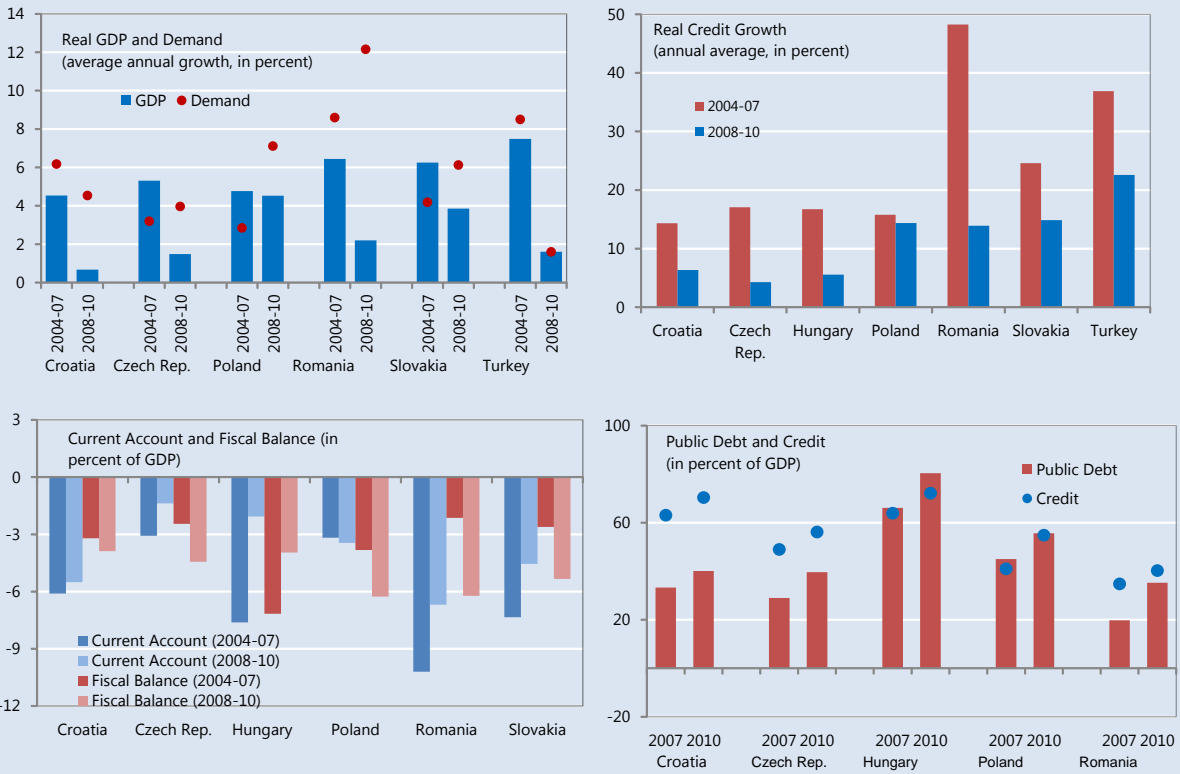


Sources: BIS consolidated and locational banking statistics; WEO; and Fund staff calculations.

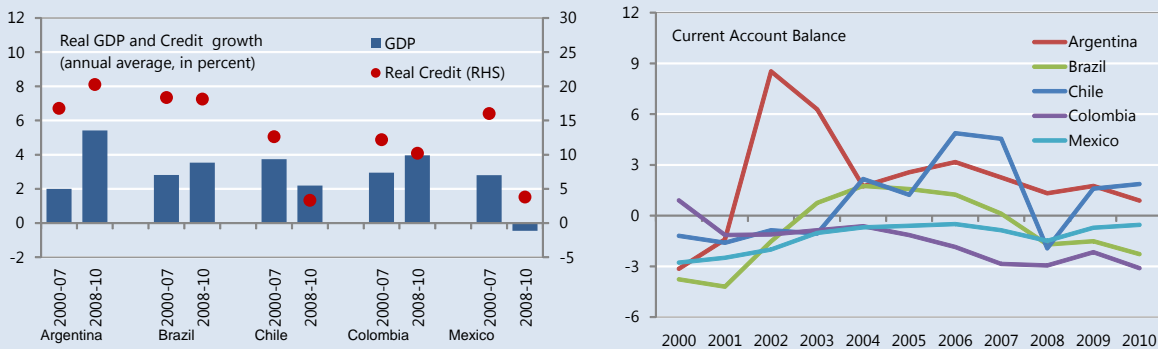
1/ Based on top 80 percent of cross-border claims on emerging economies as of 2007. BIS consolidated statistics (Table 9B) present claims of foreign subsidiaries or branches as cross-border claims regardless of whether or not these assets are financed locally e.g., Czech Republic. Furthermore, as these data include the equity claims of the international banks, they are not indicative of the net external position of the host economy's banking sector. The net international bank exposures presented are derived by netting the assets and liabilities of the BIS locational statistics (Table 6A). These are also a measure of net international bank claims on the host economy, and are not indicative of the host economy banking sector's net external position.

Figure 10. Macroeconomic Developments in Selected Host Countries

Emerging Europe: during the run-up to the global crisis, growth in many countries of the region was driven by a domestic demand boom which resulted in a surge in bank credit and persistent external deficits. Aftermath of the crisis, credit growth decelerated but remained high, and public spending pushed domestic demand up even in countries with a more balanced growth, contributing to increases in public debt ratios.



Latin America: countries in the region—except for Mexico—in general weathered the global crisis better. After 2008, real credit continued growing much faster than GDP and external positions have worsened.



Sources: WEO; IFS; and Fund staff calculations.

**32. Strong parent funding also seems to have implied greater feedback loops to home countries.**<sup>30</sup> At the outbreak of the Lehman crisis, Austrian sovereign and bank spreads climbed the most in our sample; by contrast, spreads of Spanish banks increased the least among the four countries (Table 5).

Table 5. Home and Host Country Equity Prices and CDS Spreads

	Equities (% Change)				CDS (Spreads)			
	Pre Lehman to Lehman peak (8/1/2007 to 3/2/2009)	Lehman peak to Sovereign Crisis (3/2/2009 to 6/1/2010)	Sovereign Crisis to Present (6/1/2010 to 10/3/2011)	Current level / Lehman peak (in %)	Pre Lehman to Lehman peak (8/1/2007 to 3/2/2009)	Lehman peak to Sovereign Crisis (3/2/2009 to 6/1/2010)	Sovereign Crisis to Present (6/1/2010 to 10/3/2011)	Current level / Lehman peak (in %)
<b>Home Country</b>								
Spain	(52)	24	(12)	109	139	103	131	153
Austria	(63)	63	(17)	136	253	(182)	102	237
Belgium	(71)	67	(11)	147	139	(33)	162	249
Netherlands	(59)	55	(8)	142	121	(73)	62	224
<b>Home Banks</b>								
Santander	(65)	84	(25)	139	124	47	112	154
BBVA	(71)	63	(24)	124	123	82	88	136
Erste	(87)	321	(37)	264	369	(229)	175	214
Raiffeisen	(87)	132	(40)	139	299	(268)	79	146
Dexia	(92)	118	(59)	90	346	(31)	481	243
KBC	(92)	296	(49)	201	270	(164)	232	271
<b>Host Country</b>								
Brazil	(45)	57	(10)	142	314	(295)	77	157
Argentina	(48)	116	33	288	2,915	(2,056)	(133)	89
Croatia	(62)	33	0	133	528	(314)	268	210
Ukraine	(89)	190	(24)	221	3,623	(3,226)	279	145
Czech Republic	(50)	55	(6)	147	296	(208)	64	165
Hungary	(78)	143	(33)	162	555	(338)	284	212
Poland	(65)	166	(7)	249	365	(235)	154	206
Russia	(60)	103	(2)	198	703	(601)	131	172
Turkey	(52)	131	12	258	310	(339)	113	162
Mexico	(47)	71	12	192	437	(359)	78	158
China	(45)	31	(5)	125	239	(180)	111	225
<b>Host Country Banks</b>								
Brazil (Santander)	(30)	36	(32)	93	...	...	...	...
Argentina (BBVA)	(76)	248	1	353	...	...	...	...
Croatia (Erste)	(71)	63	1	165	...	...	...	...
Ukraine (Raiffeisen)	(94)	500	(56)	267	...	...	...	...
Poland (ING)	(80)	283	1	387	...	...	...	...

Sources: Datastream, Bloomberg.

- The degree of Austrian EM exposure, its regional concentration, and the reliance of Austrian subsidiaries for funding from their parents appear to have been the principal factors contributing to investor perceptions of fiscal risks that could emanate from having to rescue the banking system. All the other sovereigns experienced much smaller (and similar) rises in their sovereign CDS spreads. Austria's spreads eventually normalized following extensive external support to EM Europe, as noted in the previous section.
- It is also interesting to observe that as of today, the bank CDS spreads in all the sample economies have either converged to, or have exceeded the average sovereign CDS spreads of the EMs to which they are exposed. So long as this holds, the attractiveness of parental funding to fuel EM loan growth will diminish.

**33. Although the relationship between Australia and New Zealand is materially different from the AE-EM relationships considered in this paper, it offers some interesting insights.** The Australian and New Zealand banking systems entered the crisis sharing some similar vulnerabilities of our sample—namely reliance on external funding, high loan-to deposit ratios, and potential downside risks from a housing boom. These remain notable vulnerabilities

<sup>30</sup>Cetorelli and Goldberg (2010) suggest that rather than openness to cross-border funding per se, loan supply to EMs was reduced more if the ties came from home countries that were more vulnerable to the global funding shock.

to date, but some other features helped contain funding difficulties from spreading. These include: (i) relatively smaller banking systems that were not exposed to the structured products that got European banks into trouble; (ii) sovereigns with very strong finances that were able to credibly guarantee the wholesale funding needs of the banking system; (iii) strong capital and provisioning regulation before the crisis, and prompt action to strengthen liquidity management since then, and *perhaps most importantly*; (iv) strong supervisory and regulatory cooperation and harmonization prior to the crisis.

## V. CONCLUSIONS: THE ROAD AHEAD

**34. This paper presented four medium-sized country cases with strong EM retail banking links, each with a different crisis experience.** The large Spanish banks, which had a locally funded EM expansion strategy, emerged stronger from their EM business through the crisis despite the difficulties they face in their home markets. The Austrian banks, which developed a more centrally funded model, faced a more severe test from their EM expansion strategy and from concentrated exposures in EM Europe. The external assistance that the region received from the Fund, the EU, and other European institutions played a significant role in alleviating the strains felt by Austrian banks. The Belgian and Dutch banks which expanded their cross-border business most rapidly were hard-hit. They not only faced difficulties similar to the Austrian banks in EMs, but also encountered difficulties with their AE exposures.

**35. Banks from advanced economies can bring benefits to EM banking systems.** AE banks tend to have international experience and expertise to offer, including technology, risk management, and potentially more efficient capital allocation. Jointly regulated and supervised foreign presence can result in greater operational and cost efficiency in the banking system, and in delivering better financial intermediation in EM countries. In turn, EM presence can provide foreign banks with increased growth, returns to equity, and diversification.

**36. However, benefits from such relationships may go only up to a point.** The literature (mirrored in the experiences of the EMs considered here) suggests that the welfare gains from the increased profitability of EM banking sectors accrue largely to the banks. Furthermore, if parentally sourced funding is inappropriately priced, the gains brought by AE banks to EMs may get eroded, leading to adverse macro-financial loops. For example, if sovereign support prevents the parent's risk from being priced properly, or if the parent does not or cannot price the risks taken on by its subsidiary properly, the economies of scale that AE banks enjoy in funding their EM subsidiaries across borders and currencies are likely to be overestimated. Banks may lack the incentives to internalize the macroeconomic risks caused by excessive lending growth, while simultaneously acting as conduits for shocks through the funding link to their subsidiaries.

**37. The comparative experiences of our economies suggest that decentralized and diversified liquidity management offers advantages in terms of lowering the build-up and transmission of vulnerabilities.** In the future, for AE-EM pairs in new or frontier markets which are not covered by a credible liquidity backstop and an effective cross-border crisis management framework, the case to go a step further and encourage subsidiaries to keep an arm's length from the parent may become more compelling. However, the integration of EM European bank subsidiaries within the EU banking framework, and the creation of pan-EU regulatory and

supervisory bodies renders the EU context different in this regard, as these could constitute stabilizing influences that other regions may not enjoy. Further, AE policymakers interviewed for this paper recognize that transitioning to such a model cannot and should not be imposed (or occur) abruptly, as that would result in a disruptive deleveraging cycle. To the extent that EM subsidiaries may need to seek more local funding, this underscores the importance for emerging markets of developing deep and liquid local markets.

**38. AE banks and regulators also need to pay more attention to the benefits of EM diversification.** In their expansions into emerging markets, banks from smaller advanced economies seemed to be motivated mostly by growth opportunities, and may not have paid as much attention to diversification. The full benefits—both at the banking and the macroeconomic levels—of such banking relationships are more likely to be realized when the economic cycles in home and host economies are less correlated with one another. The point is not that banks should go into regions where they may be unfamiliar with the risks, but that evaluating these correlations would be useful in complementing risk weights for regulators.

**39. Small AEs with large EM banking presences should internalize potentially greater sovereign risks that their banks may pose.** Our sample AE sovereigns appreciate that the model followed by their banks in EM Europe might have been far more severely tested without broader European and IFI support. Indeed, even if stringent supervision limits the build-up of vulnerabilities emanating from the parent, “reputational” considerations may still require parent banks and their sovereigns to act as backstops in the event of a crisis. Smaller home countries therefore have more of an incentive to “top-up” international regulatory standards.

**40. Retail-based expansions into EMs that are combined with financial innovation also warrant special caution.** The introduction and active promotion of foreign currency lending to retail customers in emerging market economies affords a cautionary tale. Lending at household, corporate, and government levels based on underlying currency bets—such as the euro convergence play—has been a feature in Asian and Latin American financial crises, and may re-emerge in the future.

**41. AE-EM regulatory and supervisory relationships need to strengthen, with a greater role played by EM regulators in the regulation and supervision of cross-border banks.** All authorities in our sample economies (and beyond) have made encouraging progress with respect to joint supervision. The establishment of supervisory colleges including even the smaller EM stakeholders is particularly welcome. In considering macro-prudential measures to curb future recurrences, these must be shaped by EM supervisors in close coordination with AE authorities. Furthermore, encouraging more prudent local liquidity management by banks, and other micro and macro-prudential measures to curb externally funded credit booms are likely to be inadequate, unless accompanied by appropriate tightening of macroeconomic policies.

**42. Further demonstrable progress on cross-border resolution and burden sharing remains a high priority.** The establishment of cross-border stability groups is particularly helpful in enhancing crisis-preparedness. Nevertheless, the (as yet elusive) solution is an international resolution and burden-sharing scheme which allows for smooth controlled failure of a cross-border bank in the event of a crisis. While this is true for all cross-border banking, AE-EM relationships are perhaps more fragile, and particularly riddled by uncertainties about burden

sharing. Until progress is made here, regulatory approaches will tend toward protecting perceived national interests. In the interim, a practical, and near-term solution might be to give close consideration the enhanced coordination framework recommended by Fund staff.

## APPENDIX A. THE TOO BIG TO FAIL PREMIUM<sup>31</sup>

Banks that are perceived to be systemically important and to be likely recipients of government support in time of distress are likely to enjoy a funding advantage. This funding advantage, which can be substantial especially in time of financial market stress, represents the *too big to fail* (TBTF) premium. Banks in advanced economies received significant government support during the recent financial crisis. This support, although necessary at the time to stem the financial crisis, has re-affirmed the market's view that some banks are too big to fail and may have entrenched the TBTF premium. We estimate that the TBTF premium increased sharply during the financial crisis, and, although the premium has declined since the heights of the crisis, it remains at high levels and is substantially higher than before the start of the financial crisis.

The credit rating agencies recognize that banks, unlike other entities, can benefit from significant external support, principally support from government sources. Therefore, the credit rating of a bank reflects not only the rating agency's view of the bank's underlying credit quality but also the rating agency's assessment of government support. The rating agencies determine the level of bank rating support by considering the likelihood and magnitude of external support which increase with the agency's view of the bank's systemic importance. Two of the leading rating agencies, Moody's and Fitch, publish an *all-in rating* for banks, which reflects the overall assessment of the bank's credit quality, including the agency's assessment of government support, and a *stand-alone rating* for banks, which reflects only the underlying credit quality of the bank assuming that there will be no government support. The *rating support*, which is the difference between the all-in and the stand-alone ratings, measures the rating agency's view of government support and is one metric of the extent to which a bank is perceived to be TBTF.<sup>32</sup>

Leading in to the financial crisis the ratings uplift to large banks in advanced economies was around 2 notches. As the financial crisis unfolded, and many governments extended support to their countries' major banks, the rating agencies reassessed upward their view of government support and the ratings support increased to around 3 notches by mid-2009 and has remained broadly at this level since then. Consequently, the all-in ratings of banks in advanced economies, which determine the banks' cost of wholesale funding, have remained at relatively high levels, and where little changed, during the financial crisis despite the clear deterioration in the banks'

<sup>31</sup>Prepared by Ivailo Arsov. This is an extension of a contribution by Elie Canetti, Mohamed Norat, and Ivailo Arsov to the Spring 2011 Vulnerability Exercise for Advanced Economies.

<sup>32</sup>For a recent review of bank rating methodologies see Packer, Frank and N. Tarashev, 2011, *Rating methodologies for banks*, BIS Quarterly Review, June 2011. Currently, S&P does not publish stand-alone ratings but, like Moody's and Fitch, it takes into account government support in rating banks. S&P's bank rating methodology is under review and the agency is expected to begin publishing stand-alone ratings in late 2011. This box uses ratings from Moody's. The all-in rating is constructed from Moody's Senior Unsecured Debt Rating, Issuer Rating or Foreign Currency Long-term Bank Deposit rating if the other two ratings are unavailable, and represents the senior unsecured debt rating of the bank which is the relevant rating for accessing wholesale funding. The stand-alone rating is constructed from Moody's Bank Financial Strength (BFSR) rating. The reported BFSR is mapped to the equivalent all-in rating based on Moody's, 2007, *Rating Methodology: Incorporation of Joint-Default Analysis into Moody's Bank ratings: A Refined Methodology*, Moody's Investor Services, March 2007.



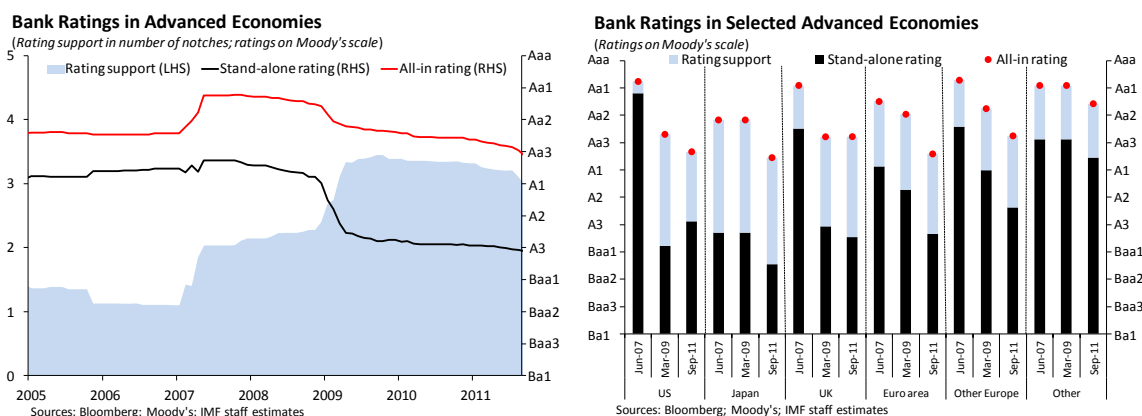
underlying credit quality as witnessed by the downgrades of the banks' stand-alone ratings then (Figure 1, left panel).

Overall, the rating agencies perceptions of TBTF have increased during the crisis but the support varies across countries (Figure 1, right panel). U.S. banks entered the crisis with the lowest levels of support but experienced the largest increase in ratings support during the crisis, and, despite recent reductions in this support, reflecting regulatory initiative to reduce the too big to fail phenomenon, their ratings support remains substantial.<sup>33</sup> Ratings support of the Japanese banks has been high for some time and was little changed during the crisis. Similarly to the U.S., the ratings support of U.K. banks increased significantly during the crisis and remains high. In contrast, the ratings support in the rest of Western Europe has changed little since mid-2007.

The ratings support translates into lower funding cost for the banks receiving the ratings uplift. The TBTF premium is reflected in the difference between the credit spread at which the bank accesses long-term wholesale funding, which is determined by the bank's all-in rating, and the credit spread at which the bank would access long-term wholesale funding if it did not benefit from government support, which would be determined by the bank's stand-alone rating.

In the years leading into the financial crisis, the TBTF premium was relatively low in absolute terms, but it was still substantial relative to the low credit spreads faced by large banks at the

Figure 1. Perceptions of Too Big To Fail



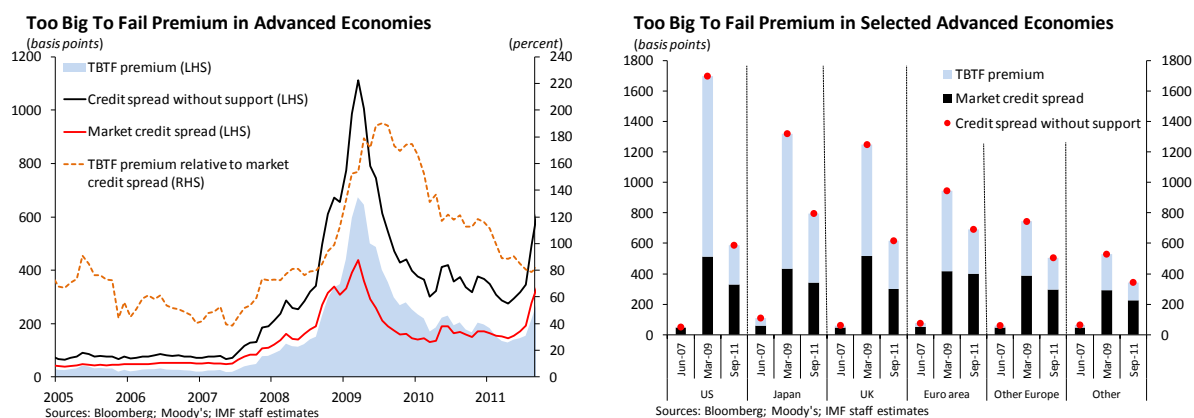
Note: All figures are bank asset-weighted averages. Data to end-September 2011. The sample of banks consists of 79 large banks in advanced economies. Bank ratings are from Moody's. The *all-in rating* reflects the rating of senior unsecured debt and incorporates Moody's assessment of external support, primarily government support, to the bank. The *stand-alone rating* is Moody's Bank Financial Strength Rating and reflects the rating agency's assessment of the underlying credit quality of the bank, i.e., excluding any external support. The stand-alone ratings are mapped to their equivalent all-in ratings.

<sup>33</sup>Ratings agencies are actively reviewing their support assumptions for banks in light of regulatory initiatives to address the TBTF (for example see Moody's, 2011, *Special Comment: Supported bank debt ratings at risk of downgrade due to new approaches to bank resolution*, Moody's Investor Service, February 14, 2011). These reviews have already led to downgrades of bank supported ratings in a number of countries. However, at the same time the rating agencies have maintained significant support assumptions for banks that they view as systemically important and in their view are likely to receive future government support if they fall in distress.

time; these banks would have had to pay credit spreads that were 60 percent higher had they not benefited from the ratings support. As financial markets came under increasing strains after mid-2007, the TBTF premium climbed steadily and peaked in early 2009 at the height of the global financial crisis. This increase reflected the increased rating support and, importantly, the steepening of the credit curves across ratings, which implies that less credit worthy borrowers experienced larger proportional increases in funding costs. Despite declining since early 2009, the TBTF premium remains very high both in absolute level and relative to the actual market credit spreads faced by large banks (Figure 2, left panel).<sup>34</sup>

The increase in the TBTF premium has been uneven (Figure 2, right panel). U.S. banks enjoyed the largest increase in the TBTF premium because the perceptions of the government support increased the most for U.S. banks. Similarly, the TBTF premium of U.K. banks increased significantly, reflecting the increasing support perceptions. The TBTF premium of banks in the euro area as a whole increased to a much lesser extent than in the other major advanced economies reflecting the relatively stable levels of perceived government support for euro area banks. However, the aggregate euro area TBTF premium masks large variations across euro area countries. The TBTF premium increasing significantly more in countries, like Austria, Belgium, Germany and Ireland, where the banking sector was viewed as befitting from stronger government support than in the rest of the euro area.

Figure 2. Estimates of Too Big To Fail Premium



Note: All figures are bank assets-weighted averages. Data to end-September 2011. The sample of banks consists of 79 large banks in advanced economies. The *market credit spread* is the average option-adjusted spread on bank bonds over the government yields for the rating corresponding to the bank's all-in rating from Moody's. The *credit spread without support* is the average of the estimated option-adjusted spread on bank bonds over the government yields for the rating corresponding to the bank's stand-alone rating from Moody's, i.e., the bank's rating excluding any external support. The *too big to fail premium* (TBTF) is the difference between the credit spread without support and the market credit spread.

<sup>34</sup>We estimate the long-term wholesale funding credit spreads for a bank at its all-in and stand-alone ratings from indices of option-adjusted bond spreads over government yields by credit rating for U.S. and Western European banks. This assumes that the bank's credit rating accurately reflects the market view of the bank's credit risk. This assumption may not hold for individual banks if the market anticipates their future rating changes and prices the banks accordingly, but the assumption is likely to hold on average.

## APPENDIX B. ESTIMATING THE GLOBAL COMMON CYCLE

This appendix describes the estimation of the global common cycle and the data used for the analysis. To account for the unevenness of data across the selected set of countries, we estimate the global common cycle for GDP, M2, and equity price using a dynamic factor model (DFM). Briefly, the estimation procedure can be separated into the following three steps. First, a DFM is estimated using the unbalanced dataset of each country's annual growth rates. Second, the Kalman filter recursion is used to help predict the missing observations to produce a balanced panel. Third, the factors are re-estimated based on the new balanced panel.<sup>35</sup> Finally, once the iteration between step 2 and 3 converges, a common component is then estimated from the balanced panel dataset.

### Data:

Real GDP, nominal M2, and equity price index for each country was taken from the Haver database. In addition, the analysis also included the data for the G7 economies.

### Methodology:

Assume that the  $n \times 1$  vector of weakly stationary time series  $X_t$  has the following factor representation:

$$X_t = \Lambda F_t + e_t, \quad e_t \sim N(0, \Sigma) \quad (0.1)$$

Where  $F_t$  is a  $k \times 1$  vector of common factors that drive the joint evolution of all variables and  $e_t$  is the idiosyncratic component associated with each observed time series, which is assumed to be normally distributed with zero mean and variance covariance  $\Sigma$ . Forni and others, (2000) and Stock and Watson (2002) show that the common factors in equation (0.1) can be consistently estimated by principal components. To complete the specification of the DFM, the common factors are assumed to follow a VAR(p) process such that:

$$F_t = A(L)F_{t-1} + Bu_t \quad \text{and} \quad u_t \sim N(0, I_q) \quad (0.2)$$

Where  $A(L)$  is a  $p^{\text{th}}$  order matrix polynomial,  $B$  is a  $k \times q$  matrix of full rank  $q$ , and  $u_t$  is a vector of uncorrelated white noise shocks.<sup>36</sup> In the model, we assume three common factors ( $k$ ), two pervasive common shocks ( $q$ ), and two lags for the VAR.

The DFM described in equations (0.1) and (0.2) is estimated using the two-step procedure described in Giannone and others, (2008). First, based on the shorter balanced data panel, estimate the common factors using the principal component method and the VAR coefficients using ordinary least square (OLS). Next, given the initial parameter estimates, apply the Kalman

<sup>35</sup>In practice, steps two and three are repeated until there is little change to the estimated factor.

<sup>36</sup>The uncorrelated white noise restriction is shown to help improve the forecasting performance of the DFM.

filter to the entire data set (including missing observations), and re-estimate the factors. For missing observations, the implicit signal extraction process of the filter will place no weight on that variable in the computation of the factors in time  $t$ . Finally, fill in the missing observations using the estimated factors (via equation (1)). These steps are repeated until there is no further change to the estimated factors.

Finally, a common component can be estimated from the new balanced panel dataset. The adjusted correlations presented figure x-y is calculated by subtracting the global common component from each individual country series.

## APPENDIX C. SYNCHRONICITY MAPPING USING MULTIDIMENSIONAL SCALING

Multidimensional Scaling (MDS) is a data analysis technique that displays the structure of distance-like data as a geometrical picture. The analysis is designed to order objects so that those that are some way similar are nearer to each other on a map.<sup>37</sup> Some previous examples of the use of multidimensional scaling include Mar-Molinero and Serrano-Cinca (2001) to model bank failure and Camacho and others, (2006) to study the existence of the European business cycle. One particular advantage of the MDS methodology is the limited number of assumptions on the underlying data that it makes, allowing the analysis to be reasonably robust.

The MDS algorithm begins by constructing an  $N$  by  $N$  distance matrix, where  $N$  is the number of countries in the analysis. This matrix contains *distance* measures, i.e., measures of how dissimilar are the stock price returns of two countries. We define the distance measure ( $\delta_{ij}$ ) as *one minus the correlation coefficient of countries  $i$  and  $j$ 's stock price return*, over the sample of annual data from 1995 to 2002 and 2003 to 2007.

The MDS algorithm finds such an arrangement of countries in two-dimensional space that the relative distances between them most accurately represent the relative synchronicity of the business cycle. The algorithm requires choosing a number of dimensions for MDS, which we set to two, since such representation is the easiest to interpret visually. An initial (possibly random) arrangement of countries will yield the matrix of distances between countries. The algorithm then regresses the actual distances on the distances in the two-dimensional map and *minimizes the sum of squared differences between distances specified initially and the distances predicted by the regression* (known as stress) such that

$$\min_{d_{ij}} \gamma = \sum \sum (d_{ij} - \delta_{ij})^2 \quad (1)$$

where  $d_{ij}$  is the Euclidean distance between countries  $i$  and  $j$  on the resultant “map” and  $\delta_{ij}$  is input data measuring business cycle dissimilarity. The ideal solution would yield a regression with a perfect fit that is a two-dimensional map, which accurately represents the distances in the original matrix. In practice, the exact representation is not obtainable, but one can characterize the goodness of the approximation using the stress number ( $\gamma$ ) or by plotting  $d_{ij}$  against  $\delta_{ij}$ .

<sup>37</sup>Other examples of ordination techniques include principal components analysis and correspondence analysis.

## APPENDIX D. DATA APPENDIX

Selected Macroeconomic Indicators for Host Countries 1/ (In percent of GDP, unless otherwise noted)																
	Share in total EM exposures (in percent, 2010)	Average Output Growth (in percent)			Real Domestic Demand (annual growth, in percent)			Public Debt			Current Account Balance			Fiscal Balance		
		2002-04	2005-07	2008-10	2002-04	2005-07	2008-10	2004	2007	2010	2002-04	2005-07	2008-10	2002-04	2005-07	2008-10
<b>Australia</b>		<b>4.5</b>	<b>2.4</b>	<b>-0.2</b>	<b>6.4</b>	<b>3.7</b>	<b>-0.4</b>	<b>23.2</b>	<b>17.4</b>	<b>31.6</b>	<b>-4.4</b>	<b>-8.1</b>	<b>-4.6</b>	<b>4.4</b>	<b>3.6</b>	<b>-2.8</b>
<b>Austria</b>		<b>4.3</b>	<b>5.9</b>	<b>0.0</b>	<b>4.6</b>	<b>7.2</b>	<b>-0.8</b>	<b>39.7</b>	<b>32.1</b>	<b>43.6</b>	<b>-4.5</b>	<b>-5.7</b>	<b>-3.8</b>	<b>-3.7</b>	<b>-1.6</b>	<b>-3.8</b>
Czech Republic	22.2	3.3	6.4	0.2	3.5	4.2	-0.4	30.1	29.0	39.6	-5.7	-2.4	-1.4	-5.4	-2.3	-4.4
Romania	15.7	6.3	6.1	-0.3	8.1	12.0	-2.3	22.5	19.8	35.2	-5.8	-10.8	-6.7	-2.7	-1.7	-6.2
Hungary	13.4	4.2	2.5	-1.6	...	...	...	59.1	66.1	80.4	-7.8	-7.4	-2.1	-7.5	-7.4	-4.0
Croatia	13.3	4.9	4.8	-1.6	6.9	4.9	-2.9	37.9	33.2	40.0	-6.0	-6.7	-5.5	-4.8	-3.0	-3.9
Slovak Republic	11.2	4.8	8.6	1.7	2.7	7.5	0.4	41.5	29.6	42.0	-7.2	-7.2	-4.6	-5.2	-2.4	-5.3
<b>Belgium</b>		<b>4.0</b>	<b>6.4</b>	<b>0.7</b>	<b>3.8</b>	<b>6.5</b>	<b>0.7</b>	<b>39.8</b>	<b>35.5</b>	<b>47.1</b>	<b>-5.1</b>	<b>-2.8</b>	<b>-1.9</b>	<b>-4.7</b>	<b>-1.7</b>	<b>-3.5</b>
Czech Republic	46.6	3.3	6.4	0.2	3.5	4.2	-0.4	30.1	29.0	39.6	-5.7	-2.4	-1.4	-5.4	-2.3	-4.4
Hungary	16.4	4.2	2.5	-1.6	...	...	...	59.1	66.1	80.4	-7.8	-7.4	-2.1	-7.5	-7.4	-4.0
Poland	16.0	3.6	5.5	3.5	2.7	6.0	3.4	45.7	45.0	55.7	-3.1	-2.9	-3.4	-5.7	-3.5	-6.3
Slovak Republic	8.2	4.8	8.6	1.7	2.7	7.5	0.4	0.0	41.5	29.6	-7.2	-7.2	-4.6	-5.2	-2.4	-5.3
Turkey	2.5	6.9	6.7	1.6	9.8	7.4	1.6	59.2	39.4	42.2	-2.1	-5.5	-4.8	-9.3	-0.6	-3.6
<b>Netherlands</b>		<b>4.5</b>	<b>6.3</b>	<b>3.5</b>	<b>4.5</b>	<b>7.2</b>	<b>3.7</b>	<b>52.1</b>	<b>45.6</b>	<b>43.5</b>	<b>0.1</b>	<b>0.5</b>	<b>-1.4</b>	<b>-4.1</b>	<b>-1.8</b>	<b>-4.5</b>
Poland	24.7	3.6	5.5	3.5	2.7	6.0	3.4	45.7	45.0	55.7	-3.1	-2.9	-3.4	-5.7	-3.5	-6.3
Turkey	12.3	6.9	6.7	1.6	9.8	7.4	1.6	59.2	39.4	42.2	-2.1	-5.5	-4.8	-9.3	-0.6	-3.6
Brazil	9.4	3.2	4.4	4.0	1.6	5.6	5.6	70.6	65.2	66.1	0.3	1.0	-1.8	-4.2	-3.3	-2.5
China	8.7	9.7	12.7	9.7	9.6	11.0	11.5	18.5	19.6	17.7	2.9	9.0	6.9	-2.0	-0.5	-1.6
Russia	8.2	6.4	7.7	0.5	7.9	11.3	1.7	22.3	8.5	9.9	8.9	8.8	5.1	2.4	6.8	-2.0
India	8.0	6.5	9.6	7.8	7.6	10.2	7.8	84.1	75.8	72.2	1.0	-1.0	-2.7	-8.6	-5.4	-9.1
Mexico	6.9	1.8	3.9	0.3	2.4	5.2	-0.1	41.4	37.8	42.7	-1.2	-0.7	-0.9	-1.5	-1.4	-2.6
Romania	4.8	6.3	6.1	-0.3	8.1	12.0	-2.3	22.5	19.8	35.2	-5.8	-10.8	-6.7	-2.7	-1.7	-6.2
<b>Spain</b>		<b>2.4</b>	<b>4.9</b>	<b>2.5</b>	<b>2.2</b>	<b>6.9</b>	<b>3.1</b>	<b>44.4</b>	<b>38.7</b>	<b>46.2</b>	<b>0.3</b>	<b>1.5</b>	<b>-0.8</b>	<b>-1.5</b>	<b>-0.4</b>	<b>-2.2</b>
Brazil	39.2	3.2	4.4	4.0	1.6	5.6	5.6	70.6	65.2	66.1	0.3	1.0	-1.8	-4.2	-3.3	-2.5
Mexico	30.2	1.8	3.9	0.3	2.4	5.2	-0.1	41.4	37.8	42.7	-1.2	-0.7	-0.9	-1.5	-1.4	-2.6
Chile	13.5	4.1	4.9	2.4	...	...	...	10.7	4.1	8.8	0.1	3.5	0.5	2.1	7.0	-0.1
Argentina	3.5	3.0	3.7	2.5	4.0	4.8	-2.6	125.8	67.7	47.8	5.5	2.7	1.3	-7.6	-1.7	-2.1
Colombia	3.3	3.9	6.1	3.1	4.2	7.7	3.6	42.9	32.7	36.5	-0.9	-2.0	-2.7	-2.1	-0.5	-2.0

Sources: BIS, GFSR, IFS, WEO, and Fund staff calculations.

1/ Based on top 80 percent exposures to emerging markets in 2007. For each column values are calculated as averages weighted by the relative bilateral exposures for each period.

Indicators of Host Countries' Relative "Risk Factors" 1/											
	Share in total EM exposures (in percent)				Real Credit (annual growth, in percent)			Housing Index (annual growth, in percent)			Decline in output (peak to trough)
	2000	2004	2007	2010	2002-04	2005-07	2008-10	2002-04	2005-07	2008-10	
<b>Austria</b>					<b>14.3</b>	<b>26.6</b>	<b>7.5</b>	<b>5.3</b>	<b>7.5</b>	<b>(2.2)</b>	<b>5.8</b>
Czech Republic	10.0	16.3	18.1	24.2	(2.0)	19.6	4.3	11.3	10.6	(1.4)	4.0
Romania	1.0	3.2	15.9	15.7	51.7	51.3	13.9	n.a.	n.a.	n.a.	8.2
Hungary	10.6	18.7	12.5	13.4	20.5	17.1	5.5	7.9	(0.9)	(8.4)	7.0
Croatia	5.2	12.7	12.6	13.3	16.1	15.2	6.3	4.1	4.3	(2.5)	7
Slovak Republic	2.8	8.2	10.7	11.2	4.5	30.5	n.a.	n.a.	13	0.4	4.8
<b>Belgium</b>					<b>11.9</b>	<b>22.4</b>	<b>9.3</b>	<b>7.2</b>	<b>10.9</b>	<b>(2.6)</b>	<b>4.6</b>
Czech Republic	54.7	43.5	30.3	46.6	(2.0)	19.6	4.3	11.3	10.6	(1.4)	4.0
Hungary	11.3	18.8	12.5	16.4	20.5	17.1	5.5	7.9	(0.9)	(8.4)	7.0
Poland	6.7	17.6	14.7	16.0	6.1	16.3	14.4	(0.6)	24.7	(0.8)	0.3
Slovak Republic	5.1	6.1	9.3	8.2	4.5	30.5	n.a.	n.a.	12.6	0.4	4.8
Turkey	2.7	2.6	10.0	2.5	36.0	34.3	22.6	n.a.	n.a.	n.a.	8.5
<b>Netherlands</b>					<b>17.5</b>	<b>24.4</b>	<b>15.6</b>	<b>5.1</b>	<b>7.4</b>	<b>0.7</b>	<b>3.3</b>
Poland	11.2	13.4	10.2	24.7	6.1	16.3	14.4	(0.6)	24.7	(0.8)	0.3
Turkey	6.5	4.2	8.0	12.3	36.0	34.3	22.6	-	-	-	8.5
Brazil	29.0	25.4	29.1	9.4	10.4	24.9	18.1	-	-	-	1.9
China	3.1	4.9	6.8	8.7	17.6	11.5	20.0	11.4	8.7	11.3	1.9
Russia	3.1	8.1	8.9	8.2	38.4	41.7	13.7	9.8	18.6	(6.2)	8.2
India	5.1	11.3	10.6	8.0	19.6	22.3	16.8	8.3	10.0	5.3	1.5
Mexico	8.1	6.0	5.3	6.9	9.4	19.6	3.8	-	-	-	6.3
Romania	1.7	3.6	3.2	4.8	51.7	51.3	13.9	n.a.	n.a.	n.a.	8.2
<b>Spain</b>					<b>7.7</b>	<b>18.9</b>	<b>7.5</b>	<b>(4.5)</b>	<b>11.2</b>	<b>4.0</b>	<b>4.1</b>
Brazil	15.7	12.5	19.3	39.2	10.4	24.9	18.1	-	-	-	1.9
Mexico	45.3	54.8	46.3	30.2	9.4	19.6	3.8	-	-	-	6.3
Chile	14.1	14.7	14.2	13.5	6.4	13.6	3.3	-	-	-	2.2
Argentina	12.9	5.6	3.8	3.5	(6.7)	32.2	20.3	(6.4)	13.8	1.8	0.2
Colombia	2.5	3.0	3.5	3.3	12.0	20.5	10.2	(2.4)	8.3	6.4	0.2

Sources: BIS, IFS, WEO, and staff calculations.

1/ For each AM country aggregated numbers are based on top 80 percent exposures to emerging markets. For each column values are calculated as averages weighted by the relative bilateral exposures. Indicators for countries with 5-highest bilateral claims are also presented separately.

Summary Table of Home Country Parent Banks

Parent Banks	Assets as of 12/31/2010 (in USD billions)	Assets (% of home banking system assets)	EBA: EM credit risk exposure 1/ (% of total)	No. of EM Subsidiaries 2/	2010 EM Net Income (% of total)	Regional EM presence	ROE (2000-2010 risk-adjusted average 7/)	Price-to-book (Current, 11/4/2011)	Loan-to-deposit (2000-2010 average)	Non-deposit Funding Ratio	Core Tier 1	Leverage Ratio (Latest reported)
<i>Austria</i>	1,511											
Erste Bank	275	18	38	12	49	CEESEE	5.0	0.5	0	0	8.8	14.0
Raiffeisen	182	12	51	3/ 26	46	CEESEE	2.1	0.4	0	0	8.3	12.5
Unicredit Bank Austria 4/	258	17		19	93	5/ CEESEE	1.4	NA	0	0	10.0	10.8
<i>Belgium</i>	1,991											
Dexia	757	38	4	4	18	6/ Turkey	0.5	0.1	0	0	10.3	59.1
KBC	429	22	30	13	34	6/ CEESEE	0.6	0.4	0	0	12.1	16.5
<i>Netherlands</i>	3,625											
ING	1,247	34	5	6	3.0	5/ Mixed	2.0	NA	0	0	9.62	26.6
Rabobank	872	24	5	8		Mixed	9.9	NA	0	0	14.2	15.6
<i>Spain</i>	5,051											
BBVA	739	15	20	10	44	Latam	4.7	0.8	0	0	9.1	14.7
Santander	1,627	32	20	9	62	Latam	6.8	0.7	147	51	9.4	16.0

1/ Exposure at default as of December 31, 2010 reported to EBA

2/ Subsidiaries where the parent has more than 25% ownership. Does not include non-bank financial entities that are not within an EM subsidiary banking group.

3/ EM credit risk exposure for Raiffeisen International

4/ Unicredit Bank Austria, which contains both Austrian and CEE subsidiaries, is a member of the Italian Unicredit Group

5/ Pre-tax profit

6/ Net revenues

7/ Risk adjusted returns = annual average ROE (ROA) / standard deviation of ROE (ROA) between 2000 - 2010)

Source: Bankscope, Bloomberg, SNL, financial stability reports, EBA, company annual reports, IMF staff calculations

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