European Commission
Directorate-General for Economic and Financial Affairs

Capital flows to converging European economies – from boom to drought and beyond

Proceedings to the workshop held on 1 October 2010

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Introduction

BACKGROUND AND THE MAIN CONCLUSIONS OF THE WORKSHOP

The aim of the workshop organized by the Directorate-General for Economic and Financial Affairs (DG ECFIN) of the European Commission on 1 October 2010 in Brussels was to improve the understanding of the determinants, characteristics and prospects for foreign capital flows into converging European economies, in particular the new EU Member States. The workshop brought together participants from the Commission, academia, central banks, ministries of finance and permanent Member States' representations to the Union.

The real convergence process in Central and Eastern Europe has been significantly driven by financial integration and a reduction of balance-of-payments constraints, resulting in large foreign capital inflows. During the boom phase, these large foreign capital inflows were, to a large extent, considered a natural part of the catching-up process with the euro area. Large capital inflows into the CEE region were in line with the neoclassical growth model - in contrast to other world regions, in Europe, capital flowed from the advanced to the catching-up economies, attracted by higher returns on capital. However, while foreign capital inflows contributed to a rapid catching-up in many countries, they also led to the build-up of imbalances and vulnerabilities. Persistent large current account deficits and negative foreign asset positions in some countries appeared increasingly to be associated with domestic consumption and investment imbalances, which made these countries extremely vulnerable to foreign capital flow reversals. Moreover, a large part of investment financed by capital inflows was directed towards the non-tradable sector, implying a lower contribution to productivity growth and prospective export potential.

The global financial crisis presented a clear turning point. Since the end of 2007 the CEE region has experienced an unwinding of capital flows, a process which was exacerbated when the financial crisis intensified in summer 2008. The impact of the crisis clearly varied across countries. Market access was significantly disrupted in some cases, leading to the need for international financial assistance, including for some new EU Member States (Hungary, Latvia and Romania). Although external financing conditions have improved in the meantime, the financial market situation still remains fragile in some parts of the region.

Given the crucial role of the banking sector in channelling foreign capital inflows into the CEE region, the workshop was split into two main sessions. The morning session was dedicated to foreign capital flows in general and to the evolution and determinants of their components. The afternoon session then focused specifically on the important role of banks and thus on the evolution and determinants of cross-border bank flows in the region.

A consensus seems to have emerged during the workshop on a set of conclusions which were shared by a number of papers. First, geographic proximity seems to have a positive impact on cross-border capital flows, both for international portfolio investment and interbank flows. Second, due to a higher degree of political, economic and financial integration, cross-border investments (again both portfolio and interbank loans) within the EU appear to be more stable compared to foreign investment in Asia and Latin America or investments from other regions in emerging Europe. Third, it appears that a stronger presence of foreign banks within the region was associated with a smaller decline in cross-border interbank flows in the post-Lehman period. Fourth, common external factors clear play a very important role in shaping capital flows to the CEE region. In particular, risk aversion (and expected financial market volatility) seems to be a very robust driver of capital flows. More specific to the CEE context, euro area macroeconomic and financial conditions have a significant impact on capital flows, especially in the case of cross-border lending. At the same time, domestic economic and financial conditions and policies, including structural reforms, also affect the ability of CEE countries to attract foreign capital. Fifth, there seems to be a broad consensus that outflows in the crisis period tend to be larger if they were preceded by rapid/large foreign capital inflows in the pre-crisis period.

Looking forward, these findings suggest that a stabilisation of global risk sentiment should result in a return to relatively favourable access of converging European economies to external funding. There are however three important restraining factors compared to the pre-crisis period. First, a key, and still open, question is to what extent there will be a lasting increase in risk premia on foreign investments after the crisis. Second, tighter financial regulation and supervision at the EU level (new supervisory architecture, higher capital requirements, etc) could reduce the willingness and capacity of EU15 banks to take risks in the CEE region. Third, a more cautious attitude of receiving countries is both likely and desirable. Domestic policies should in the future be

employed more strongly to manage the risks associated with capital inflows and to ensure that these inflows are used more prudently in order to avoid a costly misallocation of resources.

SELECTED PAPERS

DETERMINANTS OF CAPITAL FLOWS TO CEE COUNTRIES

The paper **"Determinants of capital flows to the new EU Member States before and during the financial crisis"** by Anton Jevčák, Ralph Setzer and Massimo Suardi confirms that external determinants have been important in explaining capital flows to the NMS10. In particular, it finds a strong role for euro area interest rates, business cycle, and risk sentiment. At the same time, the ability of the NMS10 to attract foreign capital has been also influenced by domestic economic and financial conditions and policies. Risk sentiment appears to be a robust driver for both the common component of aggregate capital flows to NMS10 and flows to individual countries. Overall, these results suggest a need for caution on the part of NMS in borrowing too heavily during periods of favourable external financial conditions. As the financial crisis has shown, this increases their vulnerability to a sudden reversal in the availability of financing, which can be largely driven by factors beyond their control.

Randolph Luca Bruno and Nauro Ferreira Campos show in their paper **"Capital flows to converging European economies: crises, reforms and FDI"** that within the EU15 capital tends to flow uphill, that is, richer countries within the EU15 attract relatively more FDI and portfolio inflows. As far as the NMS are concerned, market size is identified as a strong determinant of FDI inflows while institutional quality also has a positive, albeit smaller, impact. On the other hand, banking and currency crises are found to have a strong negative impact on FDI inflows into the NMS. Finally, although the NMS have received more FDI inflows than the EU15 since 1990, the volatility of FDI inflows to the NMS is also larger.

In their paper **"The dynamics of portfolio holdings in emerging Europe"** Vahagn Galstyan and Philip Lane find some evidence that shifts in the geographical composition of portfolio debt liabilities in the 2001-2007 pre-crisis period reflect shifts in bilateral trade patterns. In addition, the new Member States seem to have disproportionately attracted portfolio equity investment from other members of the European Union after 2004. During the crisis year 2008, the bilateral composition of the shift in portfolio positions period can be linked to three main factors. First, there is a systemic relation between the scale of pre-crisis holdings and the level of pull-back during 2008. Second, investors from geographically proximate countries were less likely to reduce exposures to emerging Europe than were investors from more distant countries. Third, investors from the euro area were more likely to maintain portfolio equity positions in emerging Europe than were investors from other regions.

THE ROLE OF BANKS IN CHANNELING CAPITAL FLOWS TO CEE COUNTRIES

The paper **"The determinants of cross-border bank flows to emerging markets: new empirical evidence on the spread of financial crises"** by Sabine Herrmann and Dubravko Mihaljek suggests that global as well as country-specific factors are significant determinants of cross-border bank flows. Greater global risk aversion and expected financial market volatility were the most important factors behind the decrease in cross-border bank flows during the crisis of 2007–08. The decrease in cross-border loans to Central and Eastern Europe was more limited compared to Asia and Latin America, in large measure because of the higher degree of financial and monetary integration in Europe, and relatively sound banking systems in the region.

In their paper **"Cross-border flows and foreign banks in the global financial crisis – has Eastern Europe been different?"** Ursula Vogel and Adalbert Winkler find that foreign banks in general did not stabilize cross-border bank flows during the recent global financial crisis. However, Eastern Europe has been different. Eastern European countries with a higher foreign bank asset share recorded significantly more stable cross-border flows during the crisis than their emerging market peers. This is in particular due to cross-border bank-to-bank lending. These results suggest that the special conditions of the European integration process have blurred the boundaries between home and host countries and thus led to additional efforts by parent banks to stabilize cross-border flows in the global financial crisis.

Mathias Lahnsteiner shows in his paper **"The refinancing structure of banks in selected CESEE countries"** that in the second half of 2008, most banking sectors received additional funds from abroad, while in the course of 2009, net capital flows to banks turned at least temporarily negative in all countries under review except Poland. However, the size of net outflows on the liability side of banks' balance sheets differed substantially across countries. Looking at the whole period from mid-2008 until end-2009, his findings suggest that the

outflows affected above all banking sectors that had very high net foreign liabilities at the onset of the crisis (i.e. in the Baltic countries, particularly Latvia and Estonia) and banking sectors with comparatively low levels of foreign ownership (Slovenia, Ukraine and Russia).

Determinants of capital flows to the new EU Member States before and during the financial crisis

Anton Jevčák, Ralph Setzer, Massimo Suardi[1]

ABSTRACT

This paper looks at capital flows to the new EU Member States from Central and Eastern Europe (NMS10) during the last decade. Firstly, it analyses the role of various types of foreign capital flows – direct investment, portfolio investment, financial derivatives and other types of flows (mainly bank loans) – over time and across countries. Secondly, it explores the determinants of capital flows to the NMS10, distinguishing between factors relating to the external economic and financial environment ("push factors") and factors specific to the recipient NMS ("pull factors"). The econometric analysis shows that external determinants have been important in explaining capital flows to the NMS10. In particular, we find a strong role for euro area interest rates, business cycle, and risk sentiment. At the same time, the ability of the NMS10 to attract foreign capital has been also influenced by domestic economic and financial conditions and policies. Risk sentiment appears to be a robust driver for both the common component of aggregate capital flows to NMS10 and flows to individual countries. Overall, these results suggest a need for caution on the part of NMS in borrowing too heavily during periods of favourable external financial conditions. As the financial crisis has shown, this increases their vulnerability to a sudden reversal in the availability of financing, which can be largely driven by factors beyond their control.

JEL: F32, F34, E52
Keywords: capital flows, push and pull factors, NMS10, principal components

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1. INTRODUCTION

This paper analyses the characteristics and determinants of international capital flows to the EU New Member States from central and eastern Europe (NMS10). All NMS10 recorded large private capital inflows from the late 1990s until 2007. Even during the period from 2001 to 2003, when financial and economic uncertainty was elevated due to a number of shocks such as the Argentina crisis and the burst of the tech bubble, the flows of foreign capital were not severely affected. The global financial crisis presented a clear turning point. Since the end of 2007 the NMS10 have been experiencing an unwinding of capital flows, a process which was exacerbated when the financial crisis intensified in summer 2008. Foreign capital inflows to the NMS10 even turned negative in Q4-2008 and Q1-2009.

During the boom phase, the large foreign capital inflows were, to a large extent, considered a natural part of the NMS10's catching-up process with the euro area. Large capital inflows into the EU NMS were in line with the neoclassical growth model. In contrast to other world regions, within the EU, capital flew from the advanced to the catching-up economies, attracted by higher returns on capital.[2] Private and public entities in the converging EU economies borrowed against expected future increases in their income in order to inter-temporally smooth out consumption and investment. The prospect of EU accession and, later, actual EU membership and the prospect of euro area membership fostered a rapid integration into the developed EU financial market, including by a substantial presence of foreign-owned banks in the region (Herrmann and Winkler 2008).

Nevertheless, even before the financial crisis, doubts existed regarding the sustainability of such massive foreign capital inflows (Lane and Milesi-Ferretti 2007). Persistent large current account deficits and negative foreign asset positions in some countries appeared increasingly to be associated to domestic consumption and investment imbalances, which made these countries extremely vulnerable to foreign capital flow reversals. Moreover, a large part of foreign-capital-financed investment was directed towards the non-tradable sector, implying a lower contribution to productivity growth and prospective export potential. As net external borrowing by the NMS10 reached double digit figures (in relation to GDP) in 2007, the ability to absorb foreign capital inflows turned into a major policy concern.

These developments raise important questions concerning the composition and determinants of international capital flows. The composition of capital flows is crucial as it influences the degree of reversibility of foreign capital inflows. The literature predominantly identified FDI and portfolio equity as more stable sources of foreign funding. By contrast, portfolio debt and bank lending are generally considered more prone to sudden reversals (Claessens et al. 1995, Levchenko and Mauro 2007). While portfolio debt seems to recover quickly, bank lending flows remain depressed for several years after a crisis (Chuhan et al. 1996).

The evidence of substantial co-movement in capital flows to the NMS10 over time indicates that they are not only driven by country-specific factors but also by global driving forces. Starting from the seminal paper by Calvo, Leiderman and Reinhart (1993), the determinants of capital flows have been extensively analyzed in the literature (see Kribaeva and Razin 2009 for a recent survey). While earlier studies focused on foreign direct investment, attention has shifted more recently also on cross-border international bank lending (see, e.g. Hermann and Michaljek 2010). A number of studies distinguish between push and pull factors. Push factors are external determinants of capital flows such as interest rates and economic activity in lending economies, which alter the relative attractiveness of investments in borrowing countries. Pull factors are domestic determinants of foreign capital inflows. They include both economic factors - such as domestic interest rates, productivity and the rate of economic growth - as well as institutional factors - e.g. the extent of capital account liberalization, protection of property rights and/or enforcement of law (see Agénor, 1998, for a theoretical framework to assess the role of push and pull factors for capital flows in a small open economy). Empirically, the role of push and pull factors for capital flows has been analyzed mainly with reference to the Asian or Latin American financial crises (Montiel and Reinhart 1999; Mody et al. 2001; Ying and Kim 2001).

The distinction between domestic and global factors has important policy implications. If international capital flows react mainly to global factors, the recipient countries are vulnerable to global shocks, even if domestic policymakers maintain prudent macro-policies. By contrast, if capital flows are predominantly driven by domestic factors, policymakers are better able to affect them.

This paper tries to unite these aspects with a descriptive investigation and an empirical analysis of the recent experience of the NMS10. Specifically, the paper analyzes how the role played by various types of capital flows

[2] E.g., emerging Asia countries have recorded large capital outflows and substantial current account surpluses, partly as a result of underdeveloped financial markets (see e.g., Herrmann and Winkler 2008).

– direct investment, portfolio investment, financial derivatives and other investments – has varied over time and across countries. In a further step, we separate the common component of capital flows – which, broadly speaking, reflects external conditions or "contagion" – from its country-specific component, which should be related to country's economic fundamentals. The common factor is then regressed on a euro area risk indicator and euro area macroeconomic fundamentals. The country factor is explained by country-specific variables, including domestic economic growth, interest rates, house prices and – as an innovation to the literature - country-specific risk. Throughout the paper, the focus is on net flows on the liability side of the balance of payments as the focus is on determinants of foreign capital inflows and not on domestic residents' decisions to invest abroad.

Our analysis derives five main findings: First, there seems to be no clear correlation between the balance in the aggregate international investment position (IIP) and the composition of gross foreign liabilities. Second, during the recent financial market turbulences foreign capital outflows from the NMS10 were initially driven by portfolio investment and financial derivatives, with 'other investment' outflows (including interbank lending) materialising at a later stage. However, in the two countries receiving international financial assistance - Latvia and Romania – as well as in Lithuania and Slovenia, other investment flows represented the dominant channel of net foreign capital outflows throughout the whole crisis period. Third, external factors play a large role in explaining foreign capital flows, although the responsiveness of capital flows to global factors varies across recipient countries. External factors are particularly important in case of other investment flows. Fourth, euro area macroeconomic and financial conditions have a significant impact on capital flows to the NMS10. Lower interest rates and higher economic activity in the euro area seem to stimulate capital flows to the NMS10 while higher risk sentiment depresses capital flows. Fifth, risk aversion in particular seems to be a robust driver of capital flows. Investment flows to the NMS10 react significantly not only to risk sentiment in the euro area but also to country-specific risk. At the same time, the ability of the NMS10 to attract foreign capital has been influenced also by other domestic economic and financial conditions and policies, represented in the estimation by short-term interest rates, GDP and house price growth.

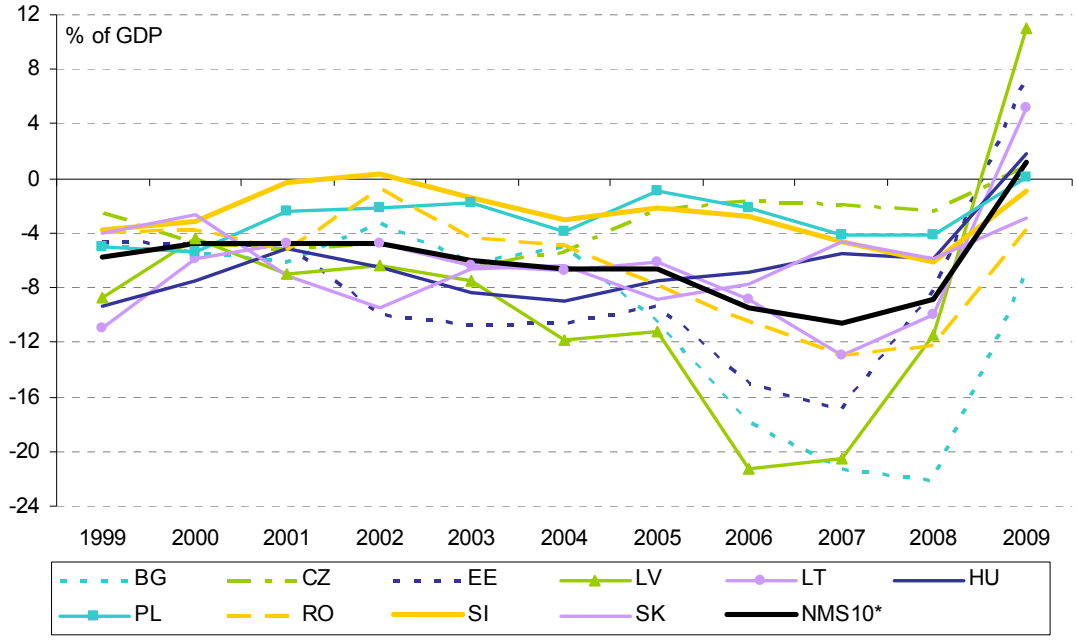
The remainder of the paper is organised as follows. Section 2 presents some stylised facts about the evolution of foreign capital inflows and net foreign liabilities since 1999. Section 3 has a closer look at capital flows during the crisis period. Section 4 provides a quantitative assessment of the role of external and internal factors for capital inflows to the NMS countries. In this section we also try to identify factors that are relevant for the different types of capital flows, i.e. foreign direct investment, portfolio investment or other investment (bank loans). Section 5 concludes.

2. HISTORICAL EVOLUTION AND COMPOSITION OF CAPITAL FLOWS TO THE NMS10

All NMS10, with the exception of Slovenia in 2002, were in a net external borrower position vis-à-vis the rest of the world throughout the whole period from 1999 until 2008 (Figure 1). The (un-weighted) average annual external borrowing of the NMS10 remained broadly stable in the pre-enlargement period marginally increasing from 5.8% of GDP in 1999 to 6.0% of GDP in 2003. Following the 2004 enlargement, average external borrowing increased sharply from 6.7% of GDP in 2005 to 10.6% of GDP in 2007 with half of the NMS10 (the three Baltic and the two Balkan countries) recording double digit external deficits.

In 2008, external borrowing started to decrease in the Baltic countries and in Romania. The intensification of the financial crisis since September 2008 resulted in an even stronger and more widespread contraction of external deficits. The average external balance for the NMS10 increased from a deficit of almost 9% of GDP in 2008 to a surplus of more than 1% of GDP in 2009, improving in all NMS10 countries. The correction was the most severe in the Baltics where the net external balance vis-à-vis the rest of the world swung from a deficit of some 10% of GDP in 2008 to a surplus of around 8% of GDP in 2009, and in Bulgaria where external borrowing dropped from above 22% of GDP to below 7% of GDP (Figure 1).

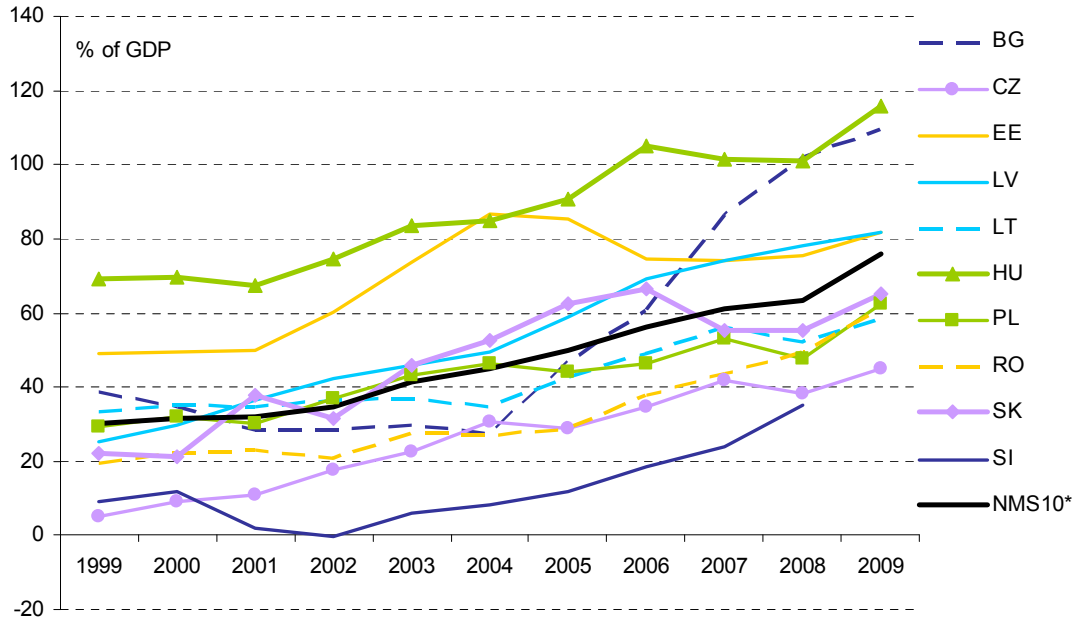
Figure 1: Net external balance vis-à-vis the rest-of-the-world, 1999-2009, annual data



Source: Ameco
*Note: *Unweighted average.*

The average net international investment position (IIP) of the NMS10 deteriorated gradually from -30% of GDP in 1999 to -42% of GDP in 2003 before dropping by more than 20 percentage points to -63% of GDP in 2008 (Figure 2). The acceleration in the built-up of net foreign liabilities since 2003 is generally attributed to the upcoming EU accession, which implied further economic and financial (especially banking) sector liberalisation, a higher attractiveness for FDI including greenfield investment, as well as an overall lower risk perception. In 2008 the stock of net foreign liabilities exceeded 70% of GDP in Hungary, Bulgaria, Latvia and Estonia, while it remained below 40% of GDP in Slovenia and the Czech Republic. The further deterioration in the IIP of the NMS10 in 2009 was induced by unfavourable valuation and GDP (denominator) effects, even though the average external balance switched into surplus (Figure 1).

Figure 2: Evolution of Net Foreign Liabilities from 1999 to 2009



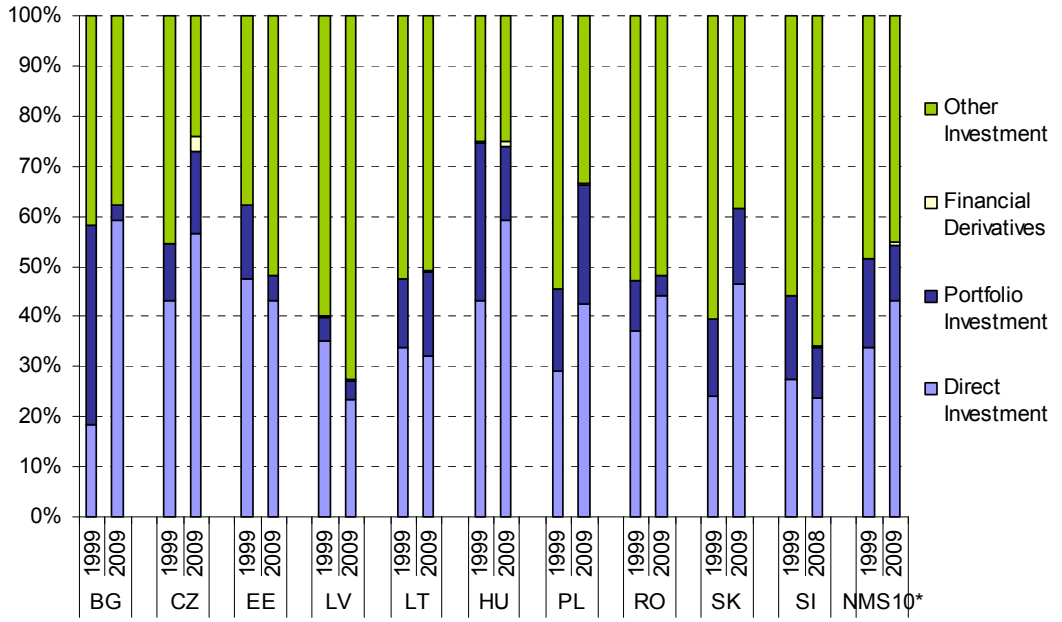
Source: IFS, IMF
*Note: * Un-weighted average; for Slovenia, the latest available data are for 2008.*

Apart from the overall level of net foreign liabilities, the composition of gross foreign liabilities also differed significantly across the NMS10. Liabilities from direct investment represented more than 50% of total liabilities in Bulgaria, Hungary and the Czech Republic in 2009, while they amounted to less than 30% in Latvia and Slovenia. On the other hand, the share of liabilities from 'other investment' (which in the NMS10 account for most of the foreign debt) exceeded 50% in the three Baltic countries, Slovenia and Romania in 2009, but it was below 30% in the Czech Republic and Hungary. Finally, liabilities from portfolio investment played a significant role in Poland, Lithuania, the Czech Republic and Hungary (likely due to more developed and liquid equity and bond markets[3]) where their share exceeded 15% and only a minor role in Bulgaria, Latvia, Romania and Estonia where their share was below 5% (Figure 3).

Overall, there seems to be no clear correlation between the balance in the IIP and the composition of gross foreign liabilities. Among the NMS10 with relatively high net foreign liabilities, direct investment was the dominant foreign funding source in Hungary and Bulgaria, while Latvia and to a lesser extent also Estonia relied primarily on other investment. At the same time, among the countries with more favourable IIP balances, direct investment was the main foreign funding channel in the Czech Republic but in Slovenia other investment accounted for the larger share of gross foreign liabilities.

For the NMS10 as a whole, the average share of direct investment in total foreign liabilities increased from around 34% in 1999 to some 43% in 2009, with the role played by direct investment increasing substantially in Bulgaria and Slovakia. As a result, the shares of other investment and portfolio investment decreased from almost 49% to around 45% and from above 17% to 11%, respectively. The role of financial derivatives remained marginal.

Figure 3: Composition of Gross Foreign Liabilities in 1999 and in 2009

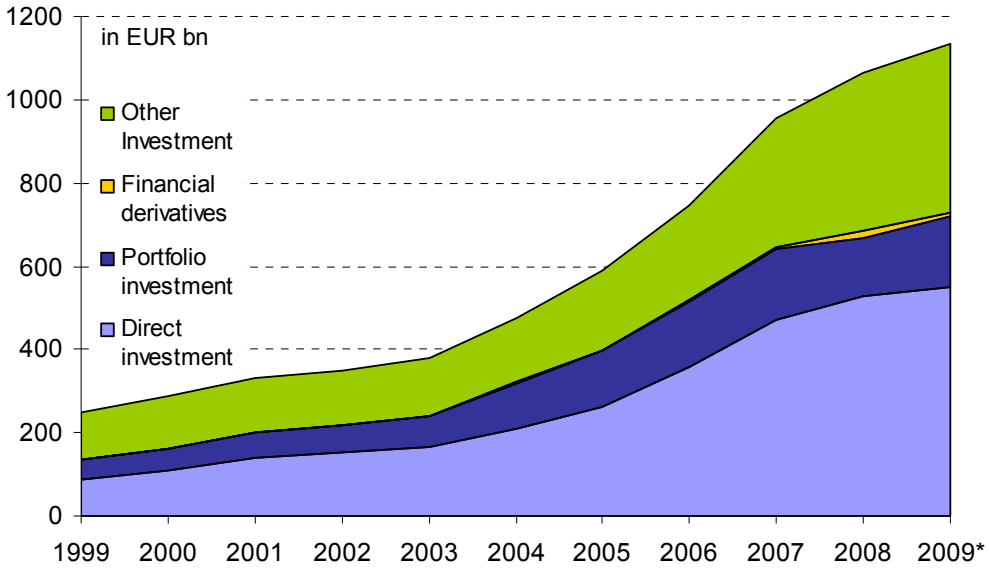


Source: IFS, IMF
*Note: *Unweighted average; for Slovenia, the latest available data are for 2008.*

In nominal terms, gross foreign liabilities of the NMS10 increased from some EUR 250bn in 1999 to above EUR 1,100bn in 2009. Direct investment rose from EUR 85bn to around EUR 550bn, portfolio investment from some EUR 50bn to around EUR 170bn and other investment liabilities from some EUR 115bn to above EUR 400bn. Liabilities from financial derivatives peaked at EUR 15bn in 2008 before falling again below EUR 10bn in 2009 (Figure 4).

[3] This would be in line with the results in Daude and Fratzscher (2006), who find that portfolio investment is substantially more sensitive to the degree of financial market development and the quality of host country institutions.

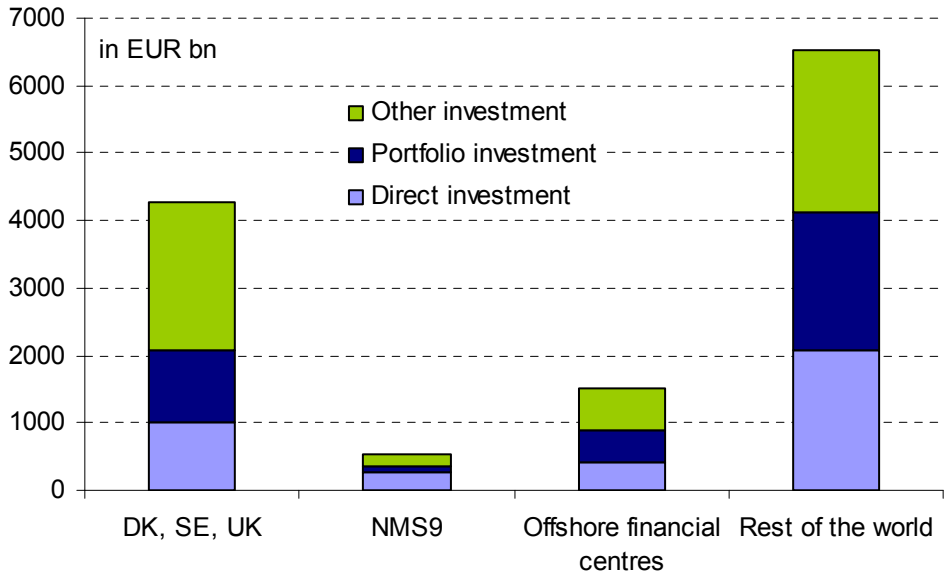
Figure 4: Nominal Gross Foreign Liabilities of NMS10



Source: IFS, IMF
*Note: *For Slovenia, the latest available data are for 2008 (a constant level of liabilities was assumed for 2009).*

A geographical breakdown of the euro area international investment position suggests that roughly half of NMS10 gross foreign liabilities is held by euro-area residents as their gross claims (excluding financial derivatives) on the NMS9[4] amounted to some EUR 540bn at the end of 2008 with direct investment accounting for EUR 260bn and 'other investment' for EUR 200bn (Figure 5).

Figure 5: Geographical breakdown of the euro area gross foreign assets at the end of 2008



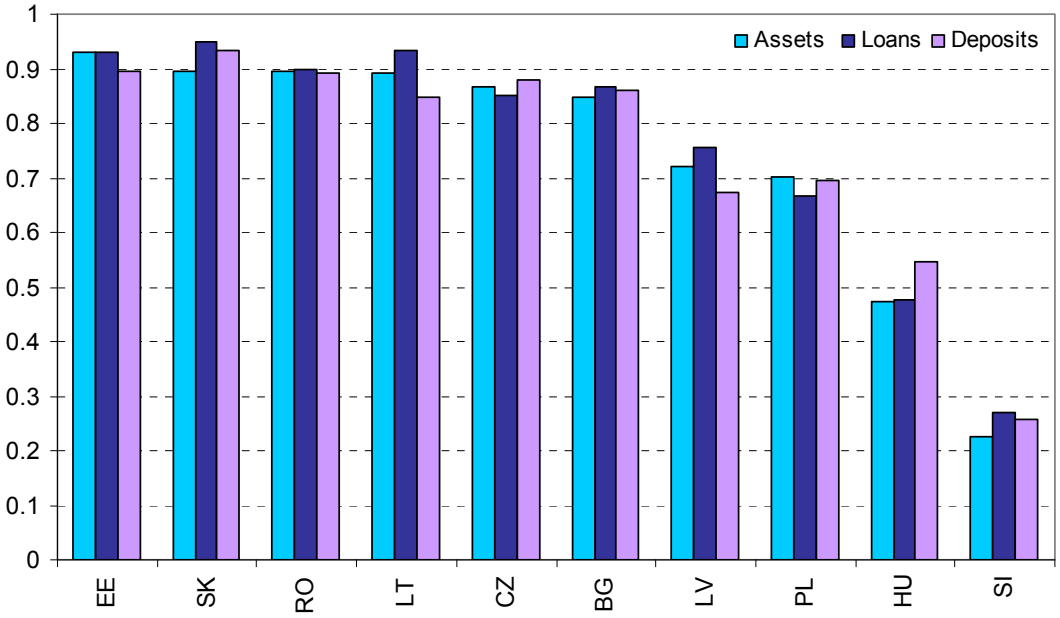
Source: ECB

A specific feature of the NMS10 is the high foreign ownership of their banking sectors. The share of foreign-owned banking assets exceeded 80% in six of the NMS10 by 2007, remaining below 50% only in Hungary and Slovenia, with parent banks predominantly located in the old EU Member States (Figure 6). The large foreign ownership of the banking sector facilitated absorption of foreign funds by providing access to more liquid

[4] NMS10 excluding Slovenia which was already part of the euro area in 2008.

international money and capital markets and by channelling foreign funds into domestic credit growth.[5] At the same time, the resulting substantial cross-border exposures in the banking sector implied large scope for contagion and also a potential channel for rapid foreign capital outflows in the case of financial market stress.

Figure 6: Foreign Ownership of Banking Assets, Loans and Deposits (as share of total)



Source: Bankscope

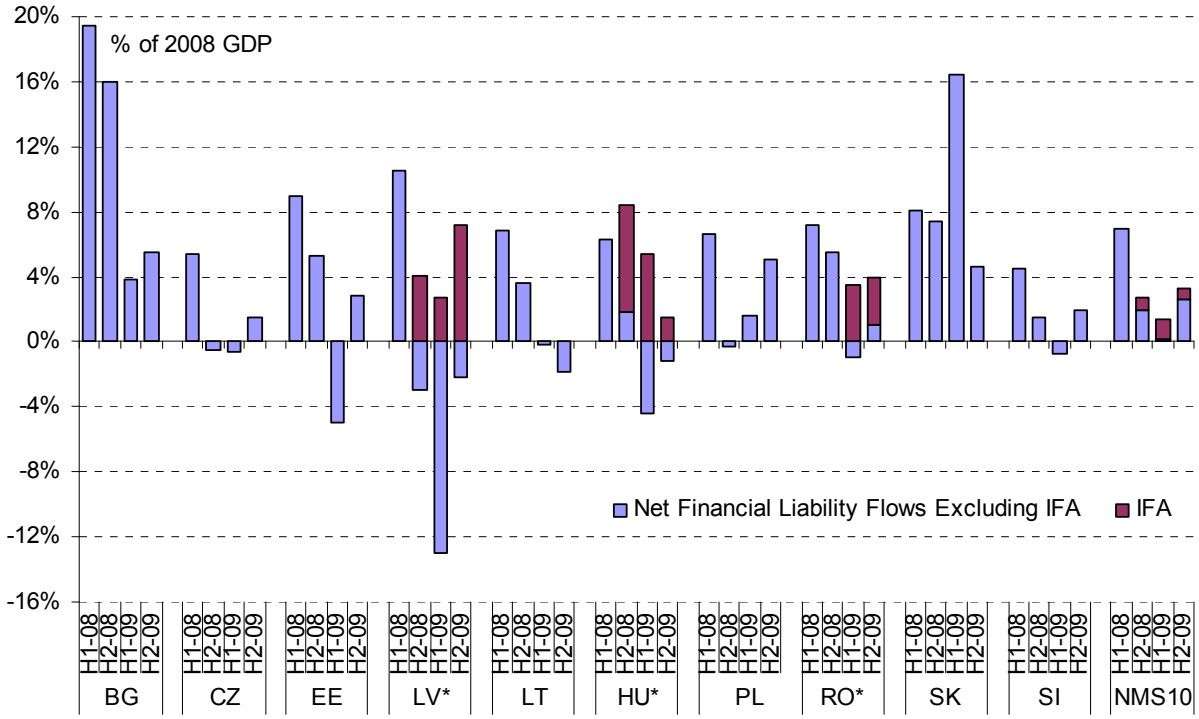
3. CAPITAL FLOWS DURING THE FINANCIAL CRISIS PERIOD

The financial crisis has had a significant impact on the balance of payments of the NMS10. The consequences were particularly severe for Hungary, Latvia and Romania, which were forced to seek official international financial assistance (IFA) following a sudden decline in foreign capital inflows. Balance of payments (BoP) data excluding IFA indicate that net foreign capital inflows (measured by net financial liability flows) into the NMS10 declined from 7% of GDP in H1-2008 to 1.9% of GDP in H2-2008 and then practically halted in H1-2009, before recovering somewhat to 2.5% of GDP in H2-2009. IFA extended to Hungary, Latvia and Romania, amounting to some 0.8%, 1.2% and 0.8% of 2008 NMS10 GDP in H2-2008, H1-2009 and H2-2009 respectively, dampened the overall decline in foreign capital inflows. Nevertheless, total foreign capital inflows still declined by some 80% between H1-2008 and H1-2009 (Figure 7).

Excluding IFA, all NMS10 apart from Bulgaria, Poland and Slovakia experienced net foreign capital outflows (negative net financial liability flows) in H1-2009, three NMS10 countries - the Czech Republic, Latvia and Poland - suffered net foreign capital outflows already in H2-2008 and three – Latvia, Lithuania and Hungary - also in H2-2009. Latvia faced the largest net foreign capital outflows, cumulatively amounting to some 18% of its 2008 GDP between H2-2008 and H2-2009, while the outflow from Hungary was around 4% of its 2008 GDP in this period. All other NMS10 countries recorded cumulative foreign capital inflows from H2-2008 to H2-2009. Moreover, IFA more than fully outweighed private foreign capital outflows from Hungary and to a large extent also compensated capital outflows from Latvia.

[5] According to BIS statistics, EU banks held 96% of BIS reporting banks' consolidated international claims on the NMS10 at the end of 2009 (EUR 460bn).

Figure 7: Net Foreign Capital Inflows (Financial Liability Flows) from H1-08 to H2-09

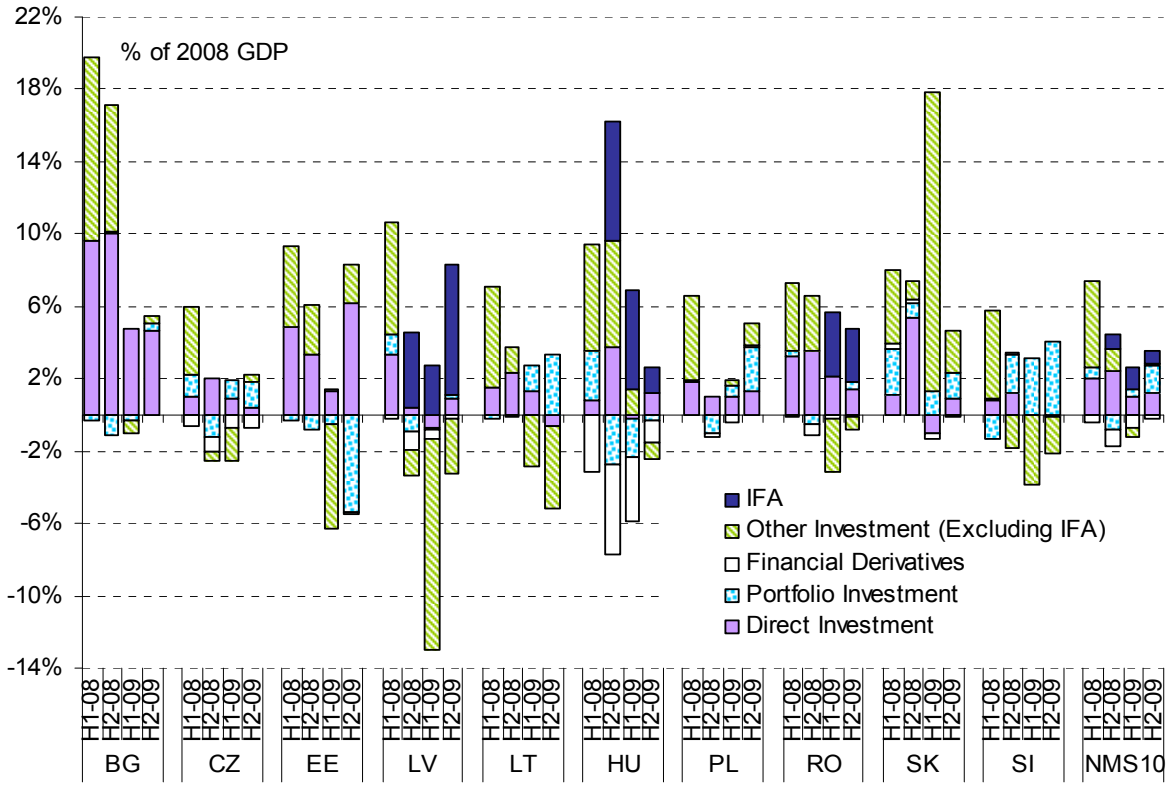


Sources: Reuters EcoWin, National Central Banks
*Notes: * IFA amounted for HU in H2-2008 to 6.6%, in H1-2009 to 5.5% and in H2-2009 to 1.5% of its 2008 GDP, for LV in H2-2008 to 4.1%, in H1-2009 to 2.8% and in H2-2009 to 7.2% of its 2008 GDP and for RO in H1-2009 to 3.5% and in H2-2009 to 2.9% of its 2008 GDP.*
*** IFA provided to LV, HU and RO amounted in H2-08 to 0.8%, in H1-2009 to 1.2% and in H2-2009 to 0.8% of the NMS10 2008 GDP.*

Capital outflows from the NMS10 in 2008 materialised through portfolio investment and financial derivatives, which are the most liquid and volatile types of investment (Figure 8). Subsequently, flows of 'other investment' (excluding IFA) also became negative in 2009. On the other hand, direct investment remained a source of capital for the region. This was, however, mainly a different type of FDI than the "fire-sale" FDI first indentified by Krugman (2000) for some Latin American countries during previous financial crises. As most large corporations in the NMS10 are already foreign owned, they are usually not forced into fire-sales by constrained access to external financing. The continued FDI inflows are thus likely to be predominantly constituted by finalisations of the projects launched before the start of the global financial crisis, as well as some new green-field investments that continue to be attracted by lower factor costs and in some cases lower exchange rates.

While other investment liability flows excluding IFA were still positive in H2-2008 and then turned positive again in H2-2009 for the NMS10 as a whole, they clearly represented the major channel for net foreign capital outflows from Latvia and Romania, two of the countries receiving IFA, as well as for Lithuania and Slovenia throughout the whole crisis period. This occurred in spite of the European Banking Group Coordination Initiative whereby foreign banks committed to maintain their exposure in the countries receiving IFA.

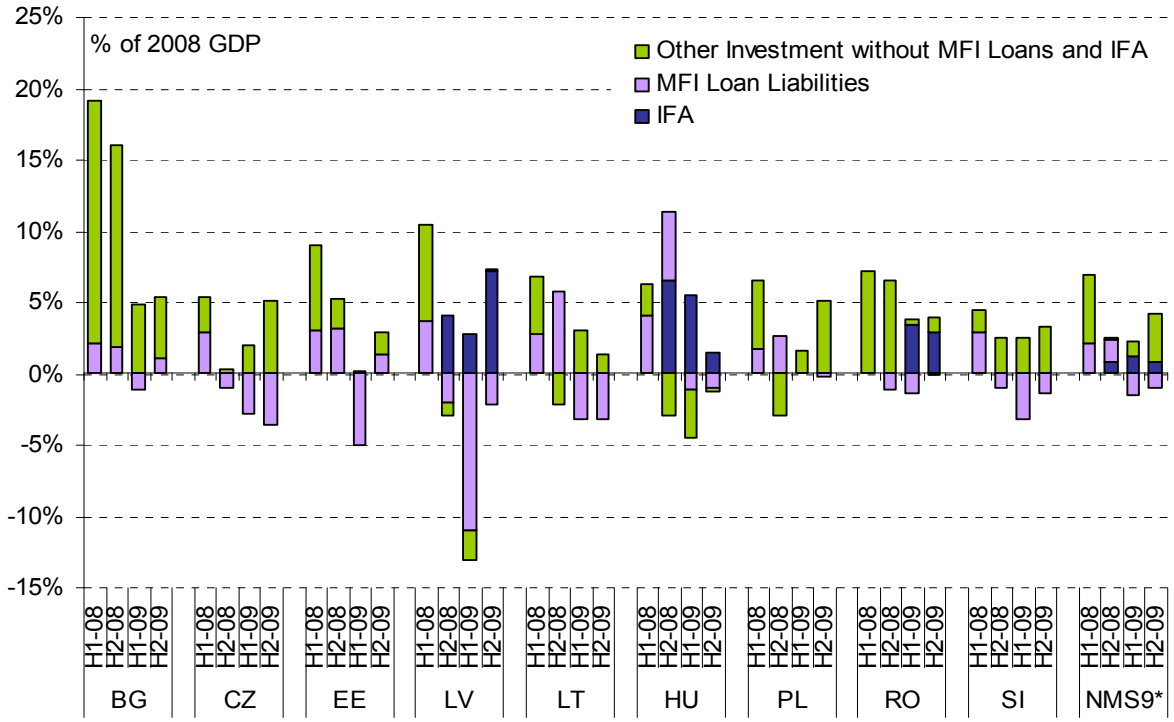
Figure 8: Composition of Net Foreign Capital Inflows from H1-2008 to H2-2009



Sources: Reuters EcoWin, National Central Banks

Furthermore, data on the sectoral composition of other investment net liability flows (Figure 9) show that net foreign loans by monetary and financial institutions (MFI) remained a source of foreign capital inflows into NMS10 (MFI data are not available for Slovakia) in H2-2008 but then turned into a channel for foreign capital outflows throughout 2009 (although in the Czech Republic, Latvia, Romania and Slovenia MFI loan liability flows were already negative in H2-2008). In spite of the difficulties experienced by the broader EU banking sector in this period, the foreign capital outflow from the banking sector in the later stage of the crisis probably to a larger extent reflects the falling demand for bank lending resulting from the decline in the economic activity rather than supply factors. This would confirm that by establishing easier access to more liquid international financial markets high foreign ownership of the banking sector can help ensuring continued inflows of indispensable foreign exchange liquidity during bouts of financial market turmoil (otherwise characterised by other investment outflows) as it seems to have been the case in Lithuania, Hungary and Poland in H2-2008 (such conclusion is also consistent with the result in Berglöf et al. (2009) that the share of foreign bank ownership had a positive impact on cross-border bank lending flows in Q4-2008). At the same time, cross-border banking groups can also more easily reallocate capital across countries towards those recovering earlier and with better investment opportunities in the aftermath of the crisis.

Figure 9: MFI Loans and IFA in Other Investment Net Liability Flows from H1-08 to H2-09



Source: National Central Banks
*Notes: *Data on MFI loan liabilities not available for Slovakia*

4. DETERMINATS OF CAPITAL FLOWS

4.1 EXTERNAL VERSUS INTERNAL DETERMINANTS

This section analyzes the role of the external and internal economic and financial environment in net capital inflows to the NMS10 in the period 1995 to 2009. The analysis is performed on quarterly data. We start by decomposing total capital flows to the NMS10 into a "common factor" and a "country-specific factor". The common factor captures "push factors". It is driven by external (global) shocks, which are the same for all NMS10. The country-specific factor reflects "pull factors", as it is driven by each country's economic fundamentals (or, more precisely, investors' perceptions about them). Overall net capital inflows to each country are the sum of the common and the country-specific factor:

$$(1) \qquad CFLOW\_TOTAL_{it} = CFLOW\_GLOBAL_t + CFLOW\_COUNTRY_{it} = \alpha_i(L)y_t + \delta_{i,t},$$

where $CFLOW\_TOTAL_{it}$ are a country's net capital inflows (in percent of GDP), $CFLOW\_GLOBAL_t$ is the common component, and $CFLOW\_COUNTRY_{it}$ is the country-specific component.

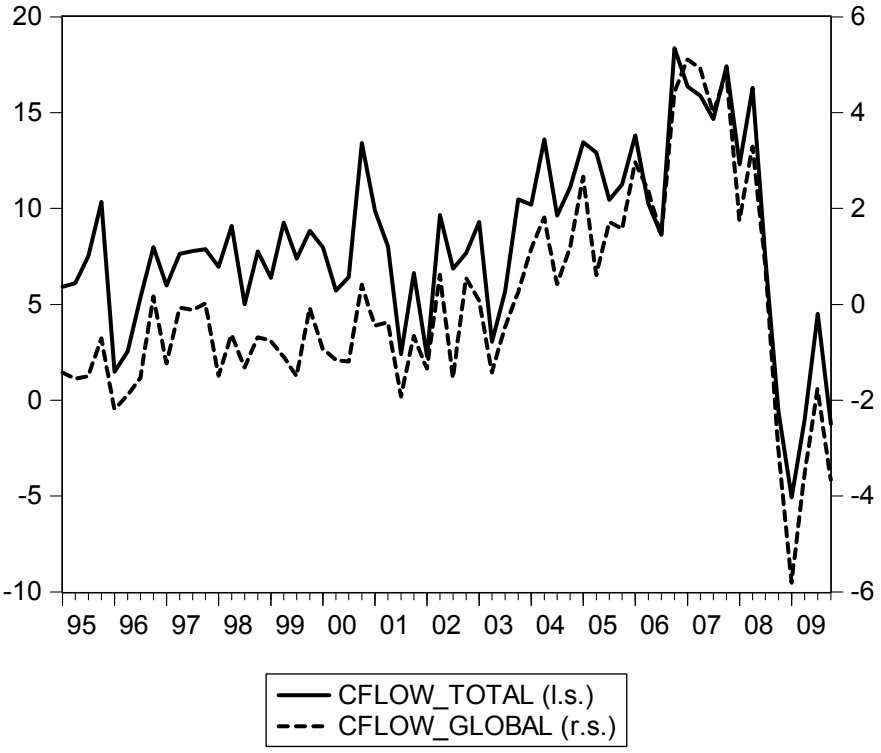
The common and country-specific components are identified via factor analysis. For example, among others, Stock and Watson (1988) find factor models useful in disentangling a common shock that is behind the covariation of macroeconomic time series. The main idea underlying factor analysis is that a large set of variables can be explained by a small number of latent variables, the 'factors', which are responsible for all the relevant dynamics. This is done by extracting one (or several) orthogonal common shock(s) that maximize(s) the explained variation in the underlying time series.

Our first common factor, $CFLOW\_GLOBAL_t$, explains 43 percent of the total variation in the correlation matrix (46 percent if the sample is restricted to the period from 1999 to 2009). It can be interpreted as a "parallel shift factor" in the capital flows to the NMS and thus reflects determinants which are common to the whole region. The factor loadings are all positive and – with the exceptions of the Czech Republic and Slovakia where they are somewhat lower – within a small range, meaning that the NMS10 react to common shocks in a similar way. Figure 9 plots the global capital flow component together with total capital flows to the NMS10 in percent of

GDP ($CFLOW\_TOTAL_{it}$). It illustrates the close co-movement of the series suggesting that capital flows to the NMS10 have followed a common trend. This becomes also visible in the latest sharp reversal in capital flows after autumn 2008.

The country-specific portions of capital flows are displayed in the Appendix. They are calculated as the residuals of regressions of each country's capital inflows $CFLOW\_TOTAL_{it}$ on $CFLOW\_GLOBAL_t$. As the residuals of these regressions are orthogonal to the global factor, this procedure eliminates any global impact on capital flows and ensures that $CFLOW\_COUNTRY_{it}$ is formed purely by the idiosyncratic part of capital inflows.

Figure 10: Capital inflows to NMS10 in percent of GDP (CFLOW_TOTAL$_t$) and common component CFLOW_GLOBAL$_t$



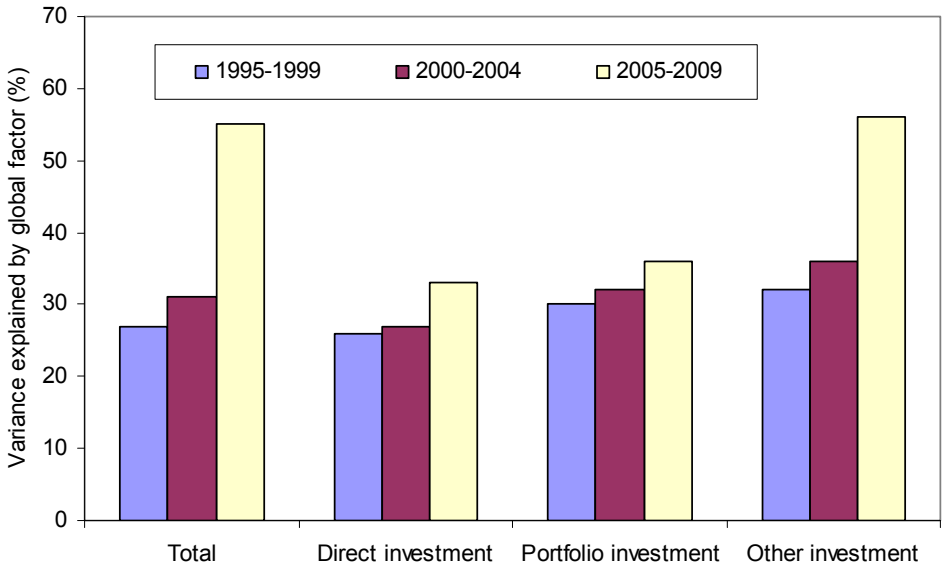
The separation into global and country-specific factors can also be pursued for the investment subcategories, i.e. direct investment (DI), portfolio investment (PI) and other investment (OI). Financial derivatives are excluded since they have played a minor role during the observation period. This results in the substitution of $CFLOW\_GLOBAL_t$ in equation (2) by the first principal components of a) direct investment flows (DI_GLOBAL_t), b) portfolio flows (PI_GLOBAL_t) and c) other investment flows (OI_GLOBAL_t) to the NMS10. It turns out that other investment flows have the highest share of common variance (Figure 11). The first principal component explains 41 percent of total variation in the correlation matrix, while the corresponding values for portfolio investment and direct investment flows are very similar, 24 percent and 25 percent, respectively.

Splitting the sample in three different time periods, shows that the global factor has become more important in recent years. For other investment flows the contribution of global factors has become more important than that of the national factors. This may reflect the deepening financial integration with other regions in the world, in particular the EU, which has become visible (among others) in a high share of foreign bank ownership.

Interestingly, the contribution of the common component for total capital flows is clearly higher than the (weighted) average of the subcategories over the whole 1995-2009 period. This suggests that a regional or global shock has a comparable impact on total capital flows in all NMS10, but that the shock exerts his impact through

different types of capital flows. In other words, there is evidence for some substitution between foreign investment subcategories.

Figure 11: Average variance of capital flows explained by common factor



4.2 EXTERNAL DETERMINANTS OF CAPITAL FLOWS

This section and the next one analyze the global and country-specific determinants of capital flows. In this section we analyse causality relationships as well as impulse responses between the external economic and financial environment and capital flows to the NMS10. External factors are those deemed to be outside the control of the NMS. Trade and financial integration of these countries has mainly taken the form of integration with the EU and in particular the euro area (see Figures 4 and 5). Euro area macroeconomic and financial conditions are thus appropriate proxies for the external (global) environment, and ultimately for the opportunity costs of foreign investment in these countries. Specifically, we examine the role of euro area interest rates, the business cycle and risk sentiment for the global component of capital flows to the NMS10.

Financing conditions in the euro area may be relevant for capital flows to the NMS10 for a number of reasons. First, lower interest rates in the euro area encourage international investors, particularly those with shorter investment horizons, to search for higher yields elsewhere. Second, as the NMS10 are net debtors, low international interest rates reduce their servicing costs and indirectly improve their creditworthiness. Third, low interest rates in the euro area encourage borrowers in NMS10 to borrow in euro rather than in their own domestic currency (BIS 2009).

The euro area business cycle is another likely relevant factor. The relationship with capital flows is, however, theoretically uncertain. On the one hand, Calvo, Leiderman and Reinhart (1996) argue that the economic downturns in most industrial countries during the early 1990s made investment opportunities in emerging markets more profitable and encouraged flows into them. This established a negative substitution effect between economic growth in creditor countries and capital flows to recipient economies. On the other hand, the more recent literature finds positive wealth effects of economic growth in creditor economies on international capital flows. This is for instance because stronger growth boosts the profitability of firms, which will in turn increase investment abroad (see, e.g., Ferrucci et al. 2004).

In addition, global risk sentiment may influence international capital flows. In an environment of perceived low global risks, as during the Great Moderation period, funds flowed towards investment in higher-returns but generally riskier catching-up economies, like the NMS10; in times of high risk aversion investors typically rebalance their portfolio toward safer and more liquid securities. Moreover, when asset price volatility becomes high, as during the recent financial crisis, uncertainty about how to value assets contributes to increasing risk aversion and discourages new investments. When financial stress in the source regions is elevated, concerns about counterparty risk may lead to funding pressures on banking groups and reduce cross-border capital flows.

We use quarterly time series from 1995Q1 to 2009Q4 of the 3-month Euribor (EA_IS_t), the euro area output gap (EA_OGAP_t) and the euro area risk sentiment (EA_RISK_t). The latter is a composite indicator of stock market volatility, exchange rate volatility and corporate bonds spreads.

We use the VSTOXX as our measure of stock market volatility (Vola-Dax before 1999), the implied volatility of currency options for the euro-USD and euro-JPY exchange rate, and the spread between corporate bonds (AAA) and government bonds as an indicator of credit default probabilities in the corporate sector. The composite indicator is calculated on a weekly basis as the first principal component of the different time series and then averaged to quarterly data. This results in the extraction of one principal component which explains 89 percent of the variance in the full data set, illustrating that our risk indicators are highly correlated. It is also interesting that all four risk indicators contribute to the common factor to a similar extent, as indicated by comparable factor loadings. The common factor can thus be taken as a good overall risk sentiment measure.

To assess the time series properties of the data, we first examine the degree of integration of the variables. Both the Augmented Dicky-Fuller and the Phillips-Perron test indicate that all our series are stationary.[6] We then pursue Granger-causality tests, which can roughly be described as a way to determine time-dependence of one variable on another. Although this concept does not account for true causality, it can give some hints with respect to the quality and potential interpretations of the relationship.

Lag length was set using the usual information and lag selection criteria, with the Schwarz criterion serving as benchmark. Table 1 shows the probability values of the Granger causality tests. Overall, a common pattern emerges from the specifications. Capital flows to the NMS are Granger-caused by the euro area interest rate, output gap and the risk environment. Not surprisingly, capital flows to the NMS have no impact on euro area macroeconomic fundamentals. Reducing the sample size or changing the lag length does not change these results.

Table 1: Granger causality tests

$Y \setminus X$	CFLOW_GLOBAL	EA_IS	EA_OGAP	EA_RISK
CFLOW_GLOBAL	-	**0.04**	**0.02**	**0.01**
EA_IS	0.58	-	**0.00**	**0.00**
EA_OGAP	0.31	0.06	-	**0.00**
EA_RISK	0.32	**0.01**	0.08	-

p-values for H_0: Y (in rows) is not Granger-caused by X (in columns).
p-values supporting Granger-causality in bold faces.
Lag length chosen by BIC.
Sample: 1995Q1-2009Q4.

To investigate causality more in-depth, we employ a vector autoregressive model (VAR), which allows modelling the impact of euro area shocks on capital flows while taking account of the feedback between the variables, as all of them are treated as endogenous. Our benchmark specification is given by the following vector of endogenous variables (along with the corresponding Cholesky ordering):

$$(2) \qquad x_t = (CFLOW\_GLOBAL_t, EA\_OGAP_t, EA\_IS_t, EA\_RISK_t)$$

The Cholesky ordering of the basic specification is based on the assumption that the risk indicator, which is comprised of financial market variables, can react contemporaneously to all other variables. Further, monetary policy can react contemporaneously to economic activity while the latter reacts on interest rates and changes in risk sentiment only with a lag. Block exogeneity for the capital flow variable is assumed. The VAR model is estimated with two lags, which proved sufficient to avoid serial correlation and non-normality of the residuals.

The impulse responses to shocks in the interest rate, output gap and risk climate are presented together with their 95% confidence bands in Figures 12a to 12c for a horizon of 20 quarters. As regards the euro area interest rate shock, the response of capital flows is negative and significant from the third to the seventh quarter (Figure 12a).

[6] Results are available upon request.

Thus, an easing of ECB monetary policy increases capital flows to the NMS. The remaining impulse responses on the interest rate shock are also in line with theoretical considerations. Higher interest rates lead to higher risk, as posited by the risk-taking channel of monetary policy (see, e.g., Gambacorta 2009).

The reaction of capital flows to the NMS to a euro area output shock is positively and statistically significant (Figure 12b). This implies that higher growth in the euro area encourages lenders to increase cross-border exposure, suggesting that the wealth effects of higher economic growth in the lending countries dominates the opposing substitution effect. The effect is significant from the second to fourth quarter. Our model specification does not allow disentangling supply from demand shocks. However, since interest rates react positively to the output shock, the impulse-response analysis provides some evidence that the output gap shock can mainly be interpreted as a demand shock.

Finally, an increase in the general level of risk exerts an immediate contracting impact on capital flows, significant for around three quarters (Figure 12c). The economic impact seems to be somewhat small, but still non-negligible. Given that the increase in the risk variable from 2007Q2 to 2008Q4 was more than five standard deviations, the increase in risk aversion during the financial crisis had a sizeable estimated impact on capital flows. In line with theoretical considerations, an increase in the risk level further reduces economic activity and leads to a decrease in interest rates.

To check for the sensitivity of our results, we estimated several alternative versions of our model. All the results are very robust to changes in the specification such as sample size, different Cholesky orderings and lag length. The most notable change occurred when reducing the sample size to the period from 1999 onwards. In this case, the role of euro area variables becomes even stronger. Moreover, our results also hold if the financial crisis period is excluded, i.e. if we estimate our model from 1995 to 2007. This suggests that the general risk sentiment was already an important driver of capital flows in the pre-crisis period.[7]

[7] We also estimated our model replacing euro area variables by US macro factors using the US output gap, the 3-month US money market rate and a US risk aversion measure constructed in a corresponding way as the euro areas risk indicator. Again, all variables have the theoretically expected sign. The impact of US macro-variables on capital flows to the NMS10 was, however, not statistically significant. By contrast, we found strong evidence for an impact of US risk sentiment on capital flows. This corroborates the view that the global risk environment plays an important role for capital flows to the NMS10. (The euro area and the US risk indicator have a correlation of 0.90.)

Figure 12a: Impulse responses to a one-standard deviation euro area interest rate shock

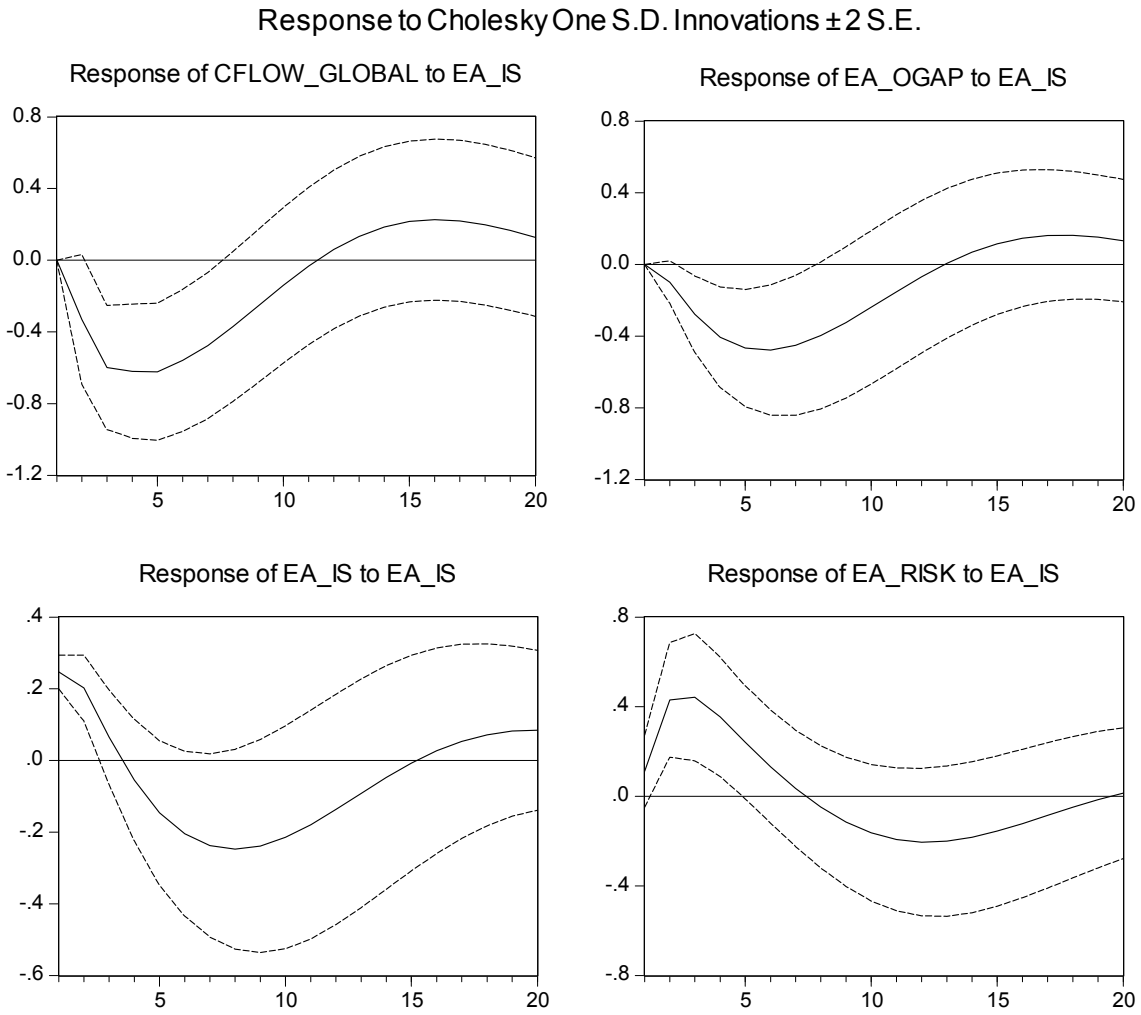


Figure 12b: Impulse responses to a one-standard deviation euro area output gap shock

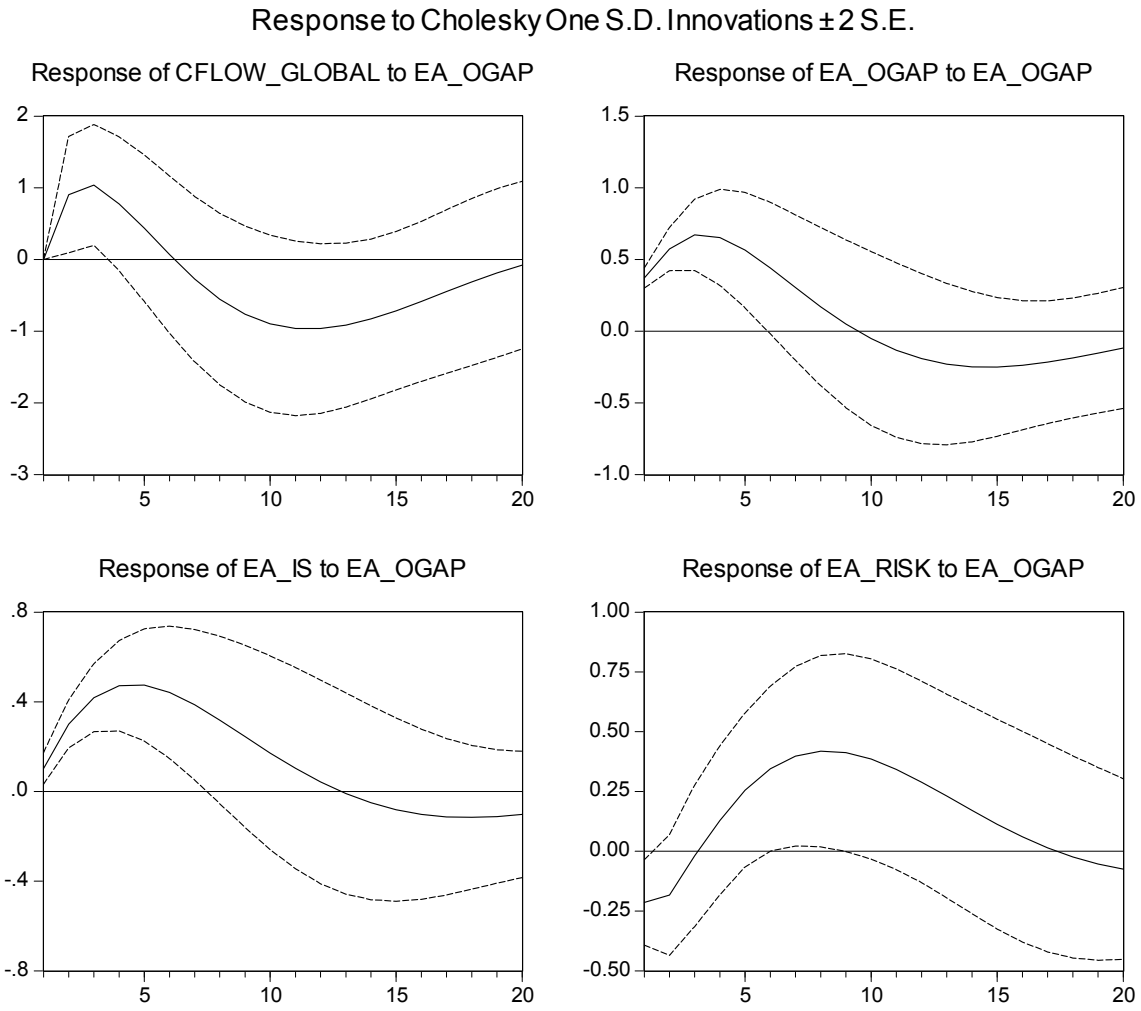
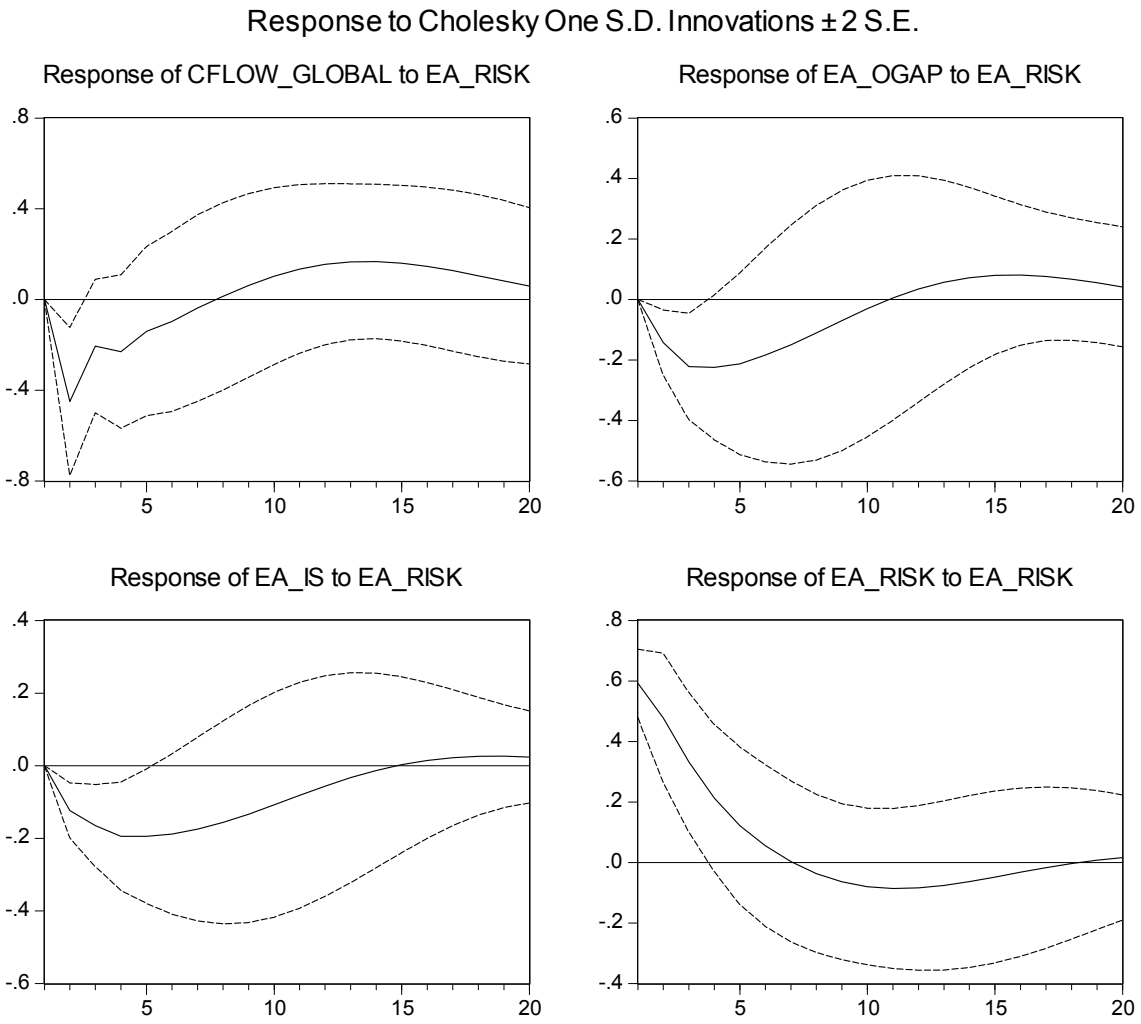


Figure 12c: Impulse responses to a one-standard deviation euro area risk shock



To assess the relative importance of different shocks, Table 2 shows the percentage of the forecast error variance due to each variable in the VAR model over a 12 quarter horizon. It is based on the Cholesky decomposition of the covariance matrix in equation (2). The impact of the two euro area macro variables on the global factor of capital flows to NMS is substantial and increases over time. After two years, more than one third of the forecast errors in capital flows are determined by euro area interest rates. The euro area business cycle explains up to a fifth of the forecast errors of capital flows in the long run. The general risk sentiment entails the highest contribution in the short-term but does not seem to have considerable explanatory power over longer horizons.

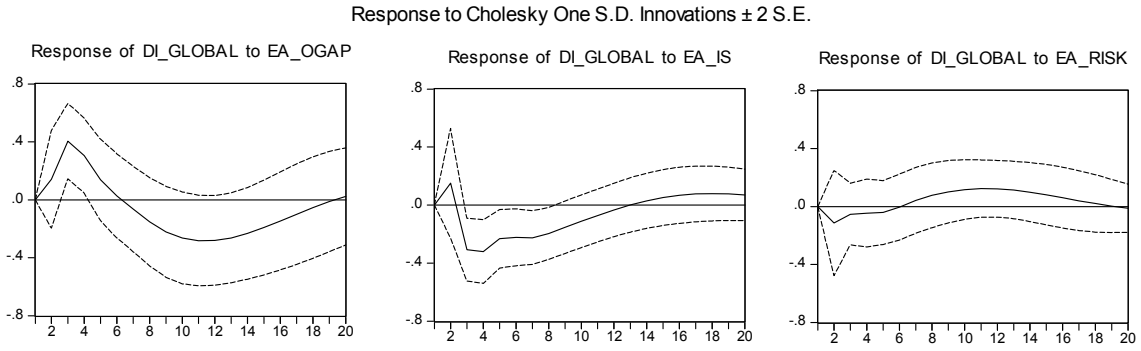
Table 2: Variance decomposition

Period	CFLOW_GLOBAL	EA_OGAP	EA_IS	EA_RISK
1	100.00	0.00	0.00	0.00
2	82.90	6.27	3.76	7.06
3	65.44	10.33	13.76	10.44
4	55.39	11.74	21.88	10.97
5	49.925	11.32	27.81	10.93
6	47.049	10.53	31.76	10.64
7	45.37	10.37	33.90	10.345
8	44.06	11.31	34.53	10.09
9	42.71	13.31	34.04	9.92
10	41.20	16.00	32.93	9.85
11	39.61	18.88	31.66	9.83
12	38.07	20.53	30.54	9.844

Cholesky Ordering: $CFLOW\_GLOBAL_t$, EA_OGAP_t, EA_IS_t, EA_RISK_t

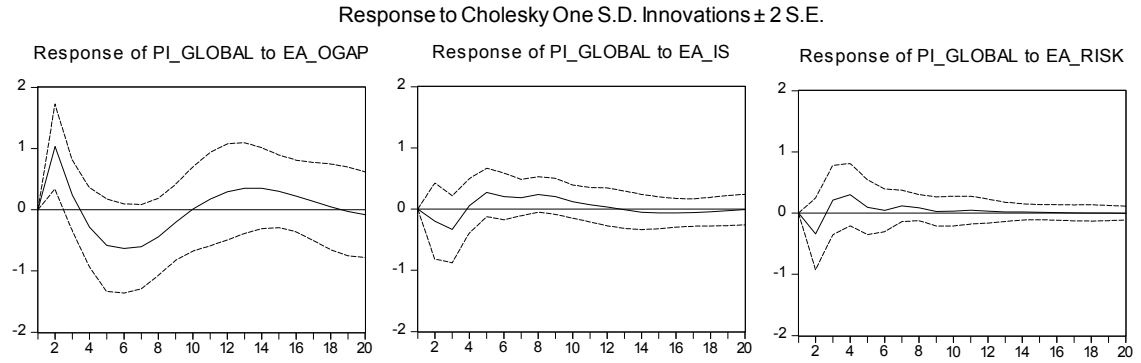
These results are confirmed when relating the common component of the capital flow subcategories (DI_GLOBAL_t, PI_GLOBAL_t, OI_GLOBAL_t) to the set of euro area variables (Figures 13a to 13c). Specifically, direct investments appear to react to the euro area business cycle and to interest rates, but not to changes in risk sentiment. This is consistent with the resilience of direct investment during the crisis shown in the descriptive analysis. Portfolio investment, somewhat surprisingly, shows a statistically significant response to the euro area output gap but not to the two financial variables. Other investment displays a particularly strong reaction to euro area interest rates and risk environment, in line with a priori and the recent experience, whereas the impact of shocks to the euro area output gap is not statistically significant.

Figure 13a: Responses of common factor "Direct investment flows" (DI_GLOBAL)



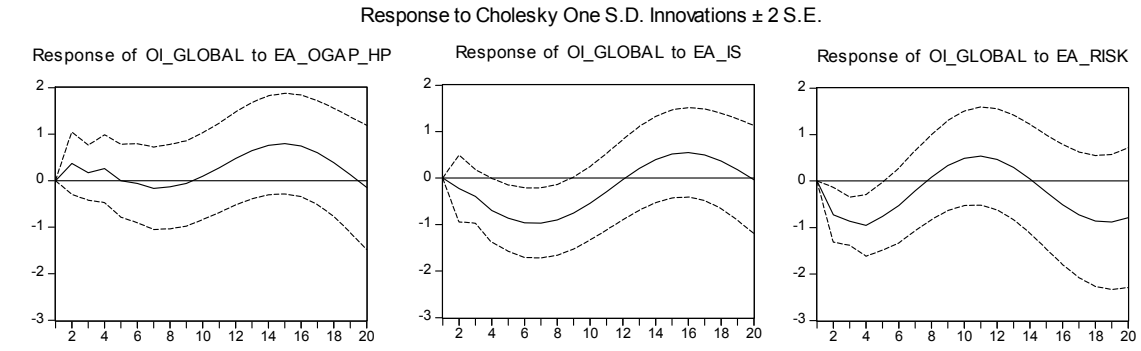
Note: Impulse responses based on VAR analysis for the period 1995Q1-2009Q4 with two lags and Cholesky ordering $x_t = (DI\_GLOBAL_t, EA\_OGAP_t, EA\_IS_t, EA\_RISK_t)$.

Figure 13b: Responses of common factor "Portfolio investment flows" (PI_GLOBAL)



Note: Impulse responses based on VAR analysis for the period 1995Q1-2009Q4 with two lags and Cholesky ordering $x_t = (PI\_GLOBAL_t, EA\_OGAP_t, EA\_IS_t, EA\_RISK_t)$.

Figure 13c: Responses of common factor "Other investment flows" (OI_GLOBAL)



Note: Impulse responses based on VAR analysis for the period 1995Q1-2009Q4 with two lags and Cholesky ordering $x_t = (OI\_GLOBAL_t, EA\_OGAP_t, EA\_IS_t, EA\_RISK_t)$.

4.3 COUNTRY-SPECIFIC DETERMINANTS

Looking at the country level, two main questions are of interest. First, what is the importance of global determinants for the individual countries in our sample? Second, which role do country-specific determinants play in attracting capital inflows?

We try to shed some light on the first question by estimating VAR models for all countries in our sample. The model includes the previously-defined euro area macroeconomic and financial variables $(EA\_OGAP_t, EA\_IS_t, EA\_RISK_t)$ and, separately, the country's net capital inflows (in percent of GDP). (In other words, we replace the global component in equation (2) by a country's net capital inflows.) It appears that capital flows to the Baltic countries, Slovenia and Romania tend to react more strongly to changes in the euro area economic and financial situation (Table 3). This may be explained by the stronger reliance of these countries on international bank loans - the borrowing category with the strongest dependence on euro area economic and financial conditions. As displayed in Figure 3 above, it is precisely this group of countries that has the highest shares of other investment in gross external liabilities. With the exception of Slovakia and Poland, capital flows to all countries are affected by the euro area economic and financial situation. In line with previous findings, monetary conditions seem to have a stronger impact on capital flows than euro area economic activity. The results do not suggest a strong role for the exchange rate regime. Capital flows to countries with both floating and fixed exchange rate regimes are affected by external factors—a finding in line with previous research (Alfaro et al. 2005) and the view that more structural factors determine the size of international capital flows.

Table 3: Capital flows to NMS, reaction to euro area interest, output and risk shocks

	Euro area interest rate shock	Euro area output shock	Euro area risk shock
Bulgaria	yes	no	(yes)
Czech Republic	no	no	yes
Estonia	yes	no	yes
Hungary	yes	no	yes
Latvia	yes	yes	(yes)
Lithuania	yes	yes	yes
Poland	no	no	no
Romania	(yes)	(yes)	no
Slovakia	no	no	no
Slovenia	(yes)	(yes)	(yes)

Note: Table indicates whether capital flows to country X react significantly (at the 5% significance level) to euro area interest rate, output gap and risk shocks. Brackets mean that the result is significant for only one quarter.

To examine the role of country-specific determinants, we model the idiosyncratic component of capital flows separately for each NMS by regressing the country-specific component from the first stage ($CFLOW\_COUNTRY_t$) on variables intended to capture shocks specific to each country:

$$(3)\quad CFLOW\_COUNTRY_t = \gamma_1 \Delta Y_{t-1} + \gamma_2 \Delta IS_{t-1} + \gamma_3 \Delta HP_{t-1} + \beta_3 CRISK_{t-1} + \nu_t$$

where $CFLOW\_COUNTRY_t$ is the country-specific component of capital flows, ΔY_{t-1} is real GDP growth (in logs), IS_{t-1} is the three month interest rate, $\Delta HP_{i,t-1}$ is house price growth (in logs) and $CRISK_{t-1}$ is country-specific risk (explained below).[8] To avoid problems of reverse causality, we use lagged values of the explanatory variables.[9] For the domestic growth and the interest rate variable we expect positive coefficients as stronger growth and higher interest rate increase the expected return of investment (Agénor 1998). Given the important role of the housing sector in several NMS in recent years, we include house prices as one of the possible pull factors for foreign capital. Higher house prices, and the fact that the number of transactions on the housing market is generally higher during housing boom episodes (Stein 1995), increase the demand for credit, which in turn feeds into the demand for financing capital. Moreover, growing housing wealth loosens the borrowing constraints faced by economic agents by increasing collateral value. Thus there is a direct positive link between housing and capital flows.

A problem with constructing an appropriate measure of country risk is that usual proxies of risk like bond spreads, exchange rate or stock market volatility are also influenced by global movements in asset markets. In this exercise, we are however only concerned with the "pure" country risk, i.e. the idiosyncratic portion of country risk which is independent of global movements in risk sentiment. Following Fiess (2003), we apply a two-step procedure to extract the country-specific component of country risk. In the first step, we construct a "broad country risk indicator". This is done by calculating on a weekly basis for each country the first principal component of 10-year government bond yield spreads to Germany and stock market volatility. Next, we regress this country risk indicator on our euro area risk indicator (EA_RISK_t), which is taken as accounting for global risk. The residual of this estimation is purely orthogonal to the euro area risk indicator and thus captures only the portion of the overall country risk that is attributable to the individual country. It is then converted from weekly to quarterly frequency and used as an indicator of "pure" country risk.

In principle, the idiosyncratic component of capital flows to the NMS may also be driven by institutional factors such as political stability, financial development, EU/euro area membership or the physical infrastructure. However, institutional characteristics change little over time, if available in the form of time series at all, so that time series analysis with such data is precluded. Therefore, in the above specification, these effects are not explicitly modelled.[10]

Table 4 displays the result of the country estimation. Due to lack of long house price series, the sample had to be shortened for most countries. In view of the low number of degrees of freedoms, the results in Table 4 should be interpreted with caution. With the exception of Poland, for all countries meaningful econometric models could be established that illustrate the importance of national developments for capital inflows. As expected, capital flows to NMS10 react procyclically as they increase in times of buoyant economic development and rising interest rates. International investors seem to react relatively more strongly to country-specific changes in risk assessment in the Czech Republic, Hungary, Romania and Slovenia. The results point to an important role for house prices in Bulgaria, Estonia and Lithuania. For the remaining countries no strong link between house price developments and capital inflows can be established. There are no signs of serial correlation in the errors and the model fit is satisfactory, in particular when considering that the model is expressed in flows and not in levels. Nevertheless, in view of the relatively short sample period, the results should be interpreted with caution.

The low explanatory power of housing may partly be related to the low quality of official house price statistics. However, it can also be expected that house prices influence only certain subcategories of capital flows, in particular intra-bank flows that are included in "other investment flow". Indeed, the importance of house prices seems to be somewhat stronger when using the idiosyncratic component of "other investment flows" (including bank loans) as a dependent variable. In addition to Bulgaria, Estonia and Lithuania, house price developments then turn out to be significant for Hungary and Latvia at the 10 percent level.

[8] We did not calculate output gap measures as these are subject to large uncertainty for the NMS10.

[9] We refrained from using panel techniques like pooled or random effects regressions, since we were mainly interested in the cross-country variation of the coefficients. A seemingly unrelated regression (SUR) estimation was not feasible since - due to the unavailability of house price data for Romania and Slovakia - we didn't have the same set of explanatory variables for all countries.

[10] Another reason to relinquish institutional variables are problems with multicollinearity. These arise because institutional variables affect capital flows via economic variables. For instances, if higher economic freedom spurs economic growth which in turn causes capital flows to grow, estimation results could possibly attribute an increase in capital flows partly to the high economic freedom and partly to the higher economic growth rate with the results that none of the two effects turns out to be statistically significant. Accordingly, an empirical specification that combines institutional and economic variables might wash out some of the effects.

Table 4: Determinants of country-specific component

	ΔY_{t-1}	IS_{t-1}	$\Delta HP_{i,t-1}$	$CRISK_{t-1}$	Sample start	R^2 adjusted	LM(1)	LM(4)
Bulgaria	n.s.	0.05*** (0.02)	1.04** (0.42)	n.s.	2003Q1	0.27	0.60	0.46
Czech Republic	n.s.	n.s.	n.s.	-0.015* (0.007)	2000Q1	0.11	0.92	0.46
Estonia	n.s.	n.s.	0.43** (0.20	n.s.	1998Q1	0.12	0.41	0.76
Hungary	0.46** (0.19)	n.s.	n.s.	-0.06* (0.03)	2003Q1	0.25	0.46	0.37
Latvia	0.96* (0.56)	0.011** (0.004)	n.s.	n.s.	2001Q1	0.12	0.70	0.68
Lithuania	1.67*** (0.60)	n.s.	0.74*** (0.18)	n.s.	2001Q1	0.40	0.93	0.83
Poland	n.s.	n.s.	n.s.	n.s.				
Romania	0.39* (0.22)	0.01** (0.004)	n.a.	-0.02** (0.01)	2003Q1	0.43	0.57	0.48
Slovakia	1.50*** (0.49)	0.005*** (0.001)	n.a.	n.s.	1995Q1	0.21	0.78	0.59
Slovenia	2.04** (0.44)	0.06*** (0.01)	n.s.	-0.05* (0.03)	2003Q1	0.39	0.63	0.16

Note: Dependent variable: Idiosyncratic component of capital flows. Statistically significant variables reported; n.s. = not statistically significant at 1 percent, 5 percent, or 10 percent; n.a.- data series not available. LM(j) - test for no autocorrelation up to order j (p-value).

5. CONCLUSION

Using both descriptive and econometric techniques, this paper sheds some light on the determinants of capital flows to the new EU Member States from central and eastern Europe.

Following the 2004 EU enlargement, external borrowing by the NMS10 increased sharply, resulting in a rapid deterioration in the international investment position. However, there appears to be no clear correlation between the balance in the international investment position and the composition of gross foreign liabilities. The boom in foreign capital inflows was then sharply interrupted by the global financial crisis when capital sought a safe haven in more advanced countries. Net foreign capital inflows into the NMS10 excluding official international financial assistance declined substantially in H2-2008 and practically ceased in H1-2009, before recovering somewhat in H2-2009. Capital outflows initially mainly materialised through portfolio investment and financial derivatives, but later also through other investment outflows. Conversely, direct investment remained a source of net foreign capital inflows into the region throughout the whole crisis period.

The surge in foreign capital flows to the NMS10 in the pre-crisis years was the result of two basic forces. First, international developments, in particular the relatively low interest rate environment in the euro area and low risk perception, encouraged investors to seek higher return in the NMS10 in the pre-crisis period. This result is consistent with the view that ample "global liquidity" and increasing financial integration have been an important external push factor for capital flows into emerging markets, including the NMS10. The important role played by external factors has been confirmed during the recent financial crisis, when NMS10 experienced large capital flow reversals. This turnaround was not initiated by any major domestic policy reversal but was rather mainly the result of a sharp turn in investors' risk sentiment (suddenly making foreign investors more attentive to the imbalances which had emerged in some NMS) and the deterioration of macroeconomic conditions in the euro area.

Second, the ability of the NMS10 to finance current account deficits is also influenced by domestic economic conditions and policies. National GDP growth, interest rates, house prices and country-specific risk tend to exert a pro-cyclical influence on capital inflows. In particular, stronger growth and higher short-term interest rates in the NMS10 tend to be associated with larger foreign capital inflows. Some caveats apply however with respect to these empirical findings due to the short time span available.

Overall, the analysis in this paper suggests a need for caution by the NMS10 in borrowing too heavily during good economic times, especially if the capital flows are largely driven by external liquidity and economic conditions rather than by domestic 'pull' factors and are not directed at productivity-enhancing investment. As a reversal in credit availability can be triggered by developments unrelated to the domestic policy framework, the accumulation of large external liabilities and a high dependence on large foreign capital inflows are a source of high vulnerability to changes in the external and domestic environment and risk perception.

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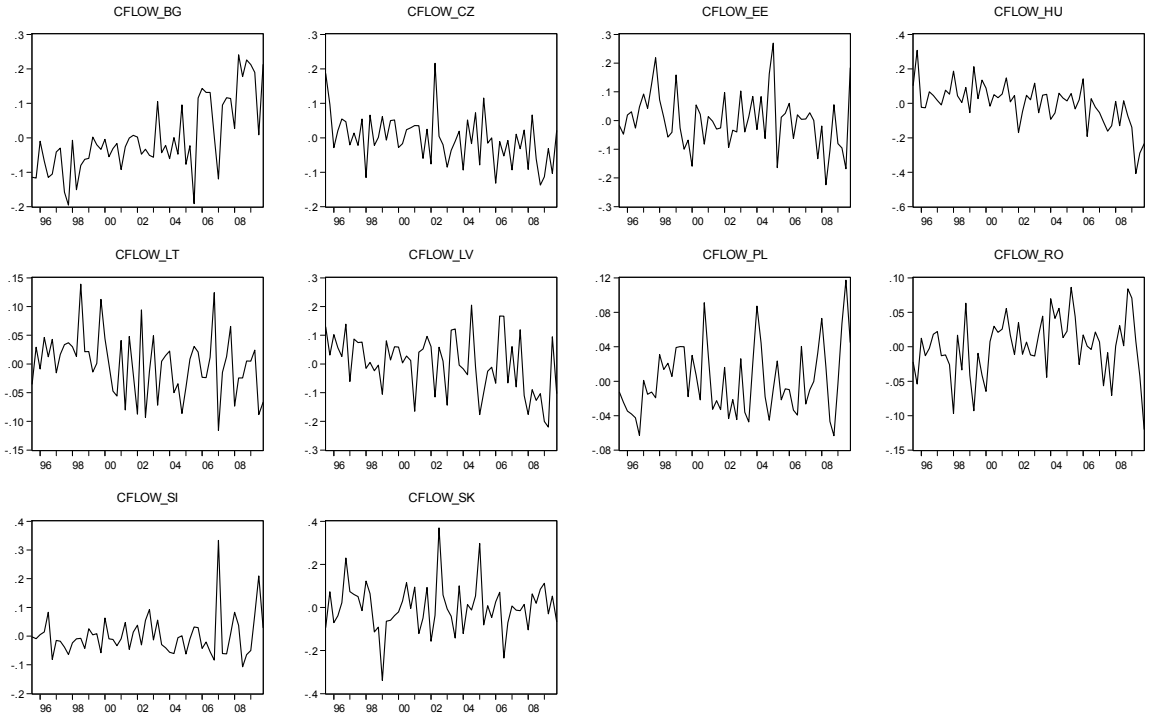
APPENDIX: COUNTRY-SPECIFIC COMPONENTS AND DATA SOURCES

A1. COUNTRY-SPECIFIC COMPONENTS OF CAPITAL FLOWS TO NMS10



A2. DATA SOURCES

Data on **capital flows** and subcategories are from Ecowin and cross-checked and extended with data from the IMF International Financial Statistics.

Data on **GDP growth** and three month **interest rates** in the NMS10 are from Ecowin. We use three month interbank rates for Bulgaria (SOFIBOR), the Czech Republic (PRIBOR), Estonia (TALIBOR), Hungary (BUBOR), Latvia (RIGIBOR), Lithuania (VILIBOR), Poland (WIBOR), Romania (BUBOR), Slovakia (BRIBOR/EURIBOR), and Slovenia (STIBOR/EURIBOR).

On **stock markets** we use the following indices: SOFIX (Bulgaria), PX Index (Czech Republic), OMX Talinn Index (Estonia), BUX (Hungary), OMX Riga Index (Latvia), OMX Vilnius Index (Lithuania), VIG (Poland), BET (Romania), SAX (Slovakia), SBI20 (Slovenia). For Bulgaria, Lithuania and Latvia data were only available from 2000. For Romania time series starts in 1997.

House price data are collected from national statistical offices for the following countries (with the number in brackets indicating the first observation): Bulgaria (1997Q1), Czech Republic (1999Q1), Estonia (1997Q1), Hungary (2001Q1), Latvia (2000Q1), Poland (1999Q1) and Slovenia (2003Q1). For Lithuania (2000Q1), data was taken from the land registry office, for Slovakia (2005Q3) we use the house price indicator of the National Association of Real Estate Offices of Slovakia. For Romania, no reliable house price data are available, for Poland data should be interpreted with particular caution as they are based on a small (and not necessarily representative) sample of housing transactions.

Data on euro area variables are from the ECB (EURIBOR), the OECD (output gap), Bloomberg (exchange rate and stock market volatility) and Ecowin (corporate bond spreads).

Capital flows to converging European economies: crises, reforms and FDI[11]

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Abstract

This paper examines the determinants of foreign private capital inflows in Europe. Using the Hausman-Taylor panel estimator and data for the 27 European Union members, yearly since 1990, it compares determinants of capital flows into old (EU15) vis-à-vis new Member States (NMS). In addition to standard factors (infrastructure, institutions, etc), it focuses on the relative roles of economic crises and structural reforms. Three main conclusions emerge: (1) since 1990, NMS have received more inflows than the EU15, of which mostly is FDI, but the variance of these inflows is larger (until 2007) in NMS than in the EU15, (2) infrastructure, market size and institutions affect inflows to both EU15 and NMS, and (3) the negative effects of crises on FDI inflows are significantly stronger in the NMS than in the EU15.

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1. INTRODUCTION

The aim of this paper is to contribute to our understanding of the determinants (or drivers) of foreign capital inflows to European economies, with emphasis on a comparison between the old (that is, EU15) and the new Member States of the European Union (hereafter NMS.)

The convergence process in the new Members States has been shored up in large part by deep financial integration and large capital inflows.[12] Although the propitious external financing conditions of the last two decades helped the catching-up and convergence of many countries, the 2007 financial crisis questions the sustainability of the prevailing model of financially-driven economic convergence and raises a number of important questions (Berglof et al 2009; IMF 2010). Among these new pressing questions, we highlight: which are the main factors explaining the success in attracting capital flows across European economies, what is the effect of crises and structural reforms in this process, and which policies can contribute to the management of capital flows in a post-2007 crisis world.

This paper uses macroeconomic country level data on unilateral net inflows and hence tries to complement the other large strand of literature, namely that based on firm or industry data and bilateral flows. We put together a unique panel data set covering all EU27 members, yearly since 1990, and encompassing an extensive set of determinants of international capital flows suggested by economic theory (per capita GDP levels, infrastructure quality, institutions, etc). We pay special attention to the relative roles of economic crises, on the one hand, and structural reforms, on the other. The emphasis is also on trying to differentiate these effects for main types of international capital inflows (foreign direct investment, portfolio and equity.)

The related literature is very rich and can be divided in two major strands, one focusing on the drivers of capital inflows and the other on their main economic consequences (benefits and costs). At the risk of a gross over generalization, one can say that the "drivers literature" tend to focus on identifying the set of FDI determinants in the so-called transition economies using macro country-level data, while on the other hand the "outcomes literature" focuses on the benefits and costs from international capital inflows using mostly industry and firm-level data.

Focusing exclusively on Europe,[13] Guiso et al. (2004) study the economic growth payoffs from financial development using industry level data for 61 countries (1981-1995) and firm-level data for 26 countries (1996-2001). Using the Rajan-Zingales methodology their results indicate that the payoffs of financial integration are higher in Europe than elsewhere. Brezigar-Masten, Coricelli and Masten (2008) study whether financial integration has non-linear effects on economic growth using macroeconomic and industry-level data for Europe. They offer strong evidence for threshold effects: the benefits from international capital flows are significant only above a certain level of financial development. Prasad et al. (2007) present cross-country and firm-level evidence suggesting that countries that rely mostly on foreign financing grow more slowly than countries that rely on domestic savings. This constitutes a challenge to standard economic theory and a powerful illustration of the Lucas paradox (Lucas 1990), on why capital does not flow from rich to poor countries. Yet, Prasad et al. stress that Europe is unique because capital actually flows "downhill" (that is, in accord with neoclassical predictions.) Abiad et al. (2009) use cross-country regressions to show that financial integration has a positive effect on economic growth in Europe, but not anywhere else: "the mystery remains since even after allowing for conventionally measured institutional thresholds, the European difference is significant" (2009, p. 245). Finally, Friedrich et al. (2010) ask whether emerging Europe is different and conclude that this is indeed the case (the growth dividend from international capital inflows are significantly larger than elsewhere) and, after examining several plausible competing explanations, attribute this finding to political integration. In short, a rich literature investigates whether the growth payoffs of international capital flows are significantly higher in the Europe but attention so far has concentrated on comparisons with respect to developing countries (while in this paper we focus on the contrast between NMS and EU15).

Although the second strand of related literature addresses the same central question as we do in this paper ("what drives capital inflows?"), it has so far not been overly concerned with the issue of whether or not (emerging) Europe is actually different, which is indeed the focus of our paper. The literature on the determinants of capital inflows in the so-called called transition economies is arguably more voluminous than that on their growth dividend.[14] Bevan and Estrin (2004) and Resmini (2000) examine the drivers for FDI into 11 transition countries in a panel setting. These authors put forward the notion that the prospect of European

[12] On capital flows and convergence see Henry (2007). Villegas-Sanchez (2009) presents evidence showing that FDI and equity inflows foster economic convergence, while debt flows tend to slow it down.
[13] See Kose et al. (2009) for an extensive review of the literature on financial integration and economic growth across the globe.
[14] See Blonigen (2005) for a detailed review of the econometric literature on FDI determinants, across the world.

Union membership played an important role in attracting export-platform FDI. Garibaldi et al. (2001) examine the overall level as well as the composition of private capital flows. One of their main findings is that although the allocation of FDI across transition countries is well explained by macroeconomic and initial condition variables, a similar degree of explanatory success cannot be replicated for portfolio investment.[15] Campos and Kinoshita (2003) examine FDI inflows determinants across 25 transition countries stressing the importance of institutions in this process. The present paper builds upon recent cross-country and quantitative work from Campos and Kinoshita (2010) but differ in that instead of contrasting the transition economies to Latin America up to 2004, here we compare the drivers of international capital flows in the EU15 vis-à-vis the new Members States since 1990. The main finding from Campos and Kinoshita (2010) refers to the role of structural reforms, in general, and financial liberalization, in particular. They also find that "foreign investors are attracted to countries with more stable macroeconomic environment, higher levels of economic development, and better infrastructure" (2010, p. 329). As it can be seen by this cursory look at the literature on FDI inflows drivers to the transition countries (which includes the vast majority of NMS), the relative importance of economic crises has received relatively scant attention thus far.

Our main finding is the identification of important differences within the European Union countries: since 1990 NMS have received more capital inflows than the EU15 and these are mostly FDI with a much smaller share of portfolio (which is not the case for EU15). The volatility of FDI to NMS is significantly higher than that of portfolio inflows and, further, it is also significantly higher than the variances of the EU15's FDI or portfolio inflows. Finally, the effects of crises and reforms on FDI inflows (negative and positive, respectively) are substantially and significantly stronger in the NMS than in the EU15 countries.

The paper is organized as follows: Section 2 provides a brief conceptual discussion of the main factors highlighted by economic theory as relevant in driving capital inflows. Section 3 provides details of the construction of the data set and identifies various stylised facts regarding capital inflows, reforms and crises with emphasis on comparing EU15 with the NMS. It also explains the main features of the econometric methodology we use. Section 4 presents the main econometric results. Section 5 concludes.

2. CONCEPTUAL FRAMEWORK

What are the main factors that help one country attract capital inflows rather than another? Such questions are of greater interest with regards to foreign direct investment than to portfolio flows, as the later should be more responsive to straightforward differentials in rates of return. Hence in what follows we centre the discussion on potential drivers of FDI. The vast theoretical work on the determinants of FDI focuses on ownership advantages, location advantages, and benefits of internalization (Dunning, 1993). Past studies can be classified largely into two groups. One focuses on an analysis of the determinants endogenous to the multinational investing firm such as the size of the firm and R&D intensity, and asks why a firm becomes a foreign investor. The other group examines factors exogenous to the foreign investors, namely, location advantages of the host country such as market size and level of economic development. In the rest of the section, we focus on the latter group as this paper examines the determinants of FDI that are exogenous to the investor but endogenous to the host country.

The literature indicates that the key FDI location determinants are the classical sources of comparative advantages of the host country. Firms choose the investment site that minimizes the cost of production.[16] Notably, host country's market size and relative factor prices (i.e., natural resources, labour cost, and human capital) all affect the expected profitability of foreign investment.

The emerging consensus is that it depends on the motives of foreign investors and, thus, which of three types of FDI they are undertaking.[17] One first type of FDI is called market-seeking FDI, whose purpose is to serve local and regional markets. It is also called horizontal FDI, as it involves replication of production facilities in the host country.[18] Tariff-jumping or export-substituting FDI is a variant of this type of FDI. Because the reason for horizontal FDI is to better serve a local market by local production, market size and market growth of the host economy play important roles. Impediments to accessing local markets, such as tariffs and transport costs, also encourage this type of FDI.

A second type of FDI is called resource-seeking: when firms invest abroad to acquire resources not available in

[15] The distinction between pull and push factors is useful in this context. FDI is mainly driven by country-specific determinants, while portfolio investment is mainly driven by external determinants (such as interest rates differentials). See Jevčák, Setzer and Suardi (2010) for an application to the EU New Member States.
[16] Wheeler and Mody (1992) provide a comprehensive summary of these classical sources of comparative advantages.
[17] See Dunning (1993).
[18] The mode of horizontal FDI is typically "greenfield investment."

the home country, such as natural resources, raw materials, or low-cost labour. Especially in the manufacturing sector, when multinationals directly invest in order to export, factor-cost considerations become important. In contrast to horizontal FDI, vertical or export-oriented FDI involves relocating parts of the production chain to the host country. Availability of low-cost labour is a prime driver for export-oriented FDI. Naturally, FDI in the resource sector, such as oil and natural gas, is attracted to countries with abundant natural endowments.

The third type of FDI, called efficiency-seeking, occurs when the firm can gain from the common governance of geographically dispersed activities in the presence of economies of scale and scope. Bevan and Estrin (2000) found that prospective membership in the EU, because it is conductive to the establishment of regional corporate networks, seems to have attracted more efficiency-seeking FDI to those countries after the initial announcement of the progress of EU accession.

Together, the factors attracting each type of FDI suggest that the countries with a large market, abundant natural resources, and close proximity to the major Western markets would attract larger amounts of FDI inflows. FDI would thus go to countries with favourable initial conditions. However, research suggests that other factors also matter.

Based on a survey of Western manufacturing companies, Lankes and Venables (1996) find that the main purpose of FDI in transition economies before 1995 varied substantially across countries. They observed a noticeable shift from projects to serve local markets to those serving export markets. Export-oriented FDI was then expected to increase as the market integration with the EU progressed.

Another important variable for explaining the geographical distribution of FDI is a pattern of persistence over time. Compared to other forms of capital flows such as portfolio investment, the time series of FDI are generally more stable due to the high sunk cost nature of FDI. FDI is often accompanied by physical investment that is irreversible in the short run. Thus, a large amount of FDI in the country today implies a large amount of FDI tomorrow. Also, FDI is persistent over time due to agglomeration economies. If agglomeration economies are substantial, new investors mimic past investment decisions by other investors in choosing where to invest. By locating "next" to other firms, they benefit from positive spillovers from investors already producing in the host country. Common sources for these positive externalities are knowledge spillovers, highly specialized labour, and intermediate inputs.[19] There is much evidence on the value of agglomeration economies, although existing studies tend to focus on FDI in the United States or U.S. FDI abroad. A seminal work by Wheeler and Mody (1992) makes a strong case for agglomeration (and market size) in U.S. investors' location decisions.

Factor-endowment theory suggests that differences in endowments among countries are central in explaining the geographical pattern of inward FDI. On the other hand, the theory of agglomeration economies suggests that once countries attract the first mass of investors, the process will be self-reinforcing.

A growing body of literature in economic growth argues that good economic institutions raise economic growth by promoting higher investment, higher educational attainment, and lower mortality. In the context of private capital inflows, institutions underpin local business operating conditions, but they differ from "physical" supporting factors such as transport and communication infrastructures. One possibility is that a fair, predictable, and expedient judiciary, an efficient bureaucracy and less corruption may help attract FDI.

The risk of investment in terms of economic and political environment also affects the expected returns to the investment. In this respect, greater macroeconomic and political stability of the host country could attract more foreign investment (Bevan and Estrin, 2004).

How these various dimensions are usually dealt with in the empirical work? In order to test for these different hypotheses, we include various classical determinants of FDI as the first set of explanatory variables. Namely, we measure country or market size by log of population. If investment decisions are of market-seeking nature (i.e., sell in the local market), then we would expect this effect to be positive. Natural resources endowment may also be an important factor, particularly for resource-driven FDI. We use (log of) the percentage of fuel and natural gas in total exports as a proxy for natural resource dependence. Log GDP per capita captures the level of development across countries, which reflects among other things differences in initial conditions. Inflation is the proxy we use for macroeconomic stability. We expect a negative sign on the coefficient of (log) inflation as low inflation is perceived by foreign investors as a favourable signal and it should thus lead to more capital inflows. High-quality infrastructure is another factor that allures foreign investors to a country. We use (log of) the number of mobile phone subscribers as our main infrastructure variable. Availability of a modern communications network is important to help integrate the domestic market and, given that other important

[19] Industrial conglomerations arise because of technological spillovers, the advantages of thick markets for specialized skills, and backward and forward linkages. The new economic geography emphasizes the linkages effects: users and suppliers of intermediate inputs cluster near each other because larger market provides greater demand for goods and supply of inputs.

elements of the national infrastructure (for instance, ports, roads and internet services) are often complementary to telephones lines, this variable provides a useful proxy for the overall quality of infrastructure in the host country. We have also paid special attention to incorporating various aspects of financial reform (the contrast between de jure and de facto measures) as well as of economic crises (encompassing both the occurrence of a crises episode and its severity in terms of output loss). In the next section, we provide a fuller discussion of these important measurement issues.

3. DATA AND METHODOLOGY

The objective of this section is to present the data set and the econometric methodology used in this paper. The panel data set covers the period 1990-2010 for all current 27 EU members. Table A.1 lists the countries and provides their EU accession dates and income level classification. It also highlights the distinction between the so-called "Old" and "New" member states (i.e. EU15 and NMS). The former is defined as countries that were EU members by April 2004, and the latter as countries which became members of the European Union after 1st May 2004.

Let us start by highlighting some facts our data suggests about emerging Europe and the nature and speed of its convergence process. First of all, the economies of the two groups (EU15 and NMS) still differ quite substantially. It is worth noting that although the GDP in New Member States experienced a steady growth after entering the EU, the differences in the living standards between Old and New members are still quite visible. Comparing per capita GDP growth or labour productivity since 1990 (Figure 2), one concludes there is weak evidence of convergence (although admittedly this ignores that some NMS have grown much faster than others and have, as a sub-group, converge to the EU15.)

3.1 DATA

The data collection effort centred on different forms of international capital flows, which correspond to our "left hand side variables", and on their determinants, our "right hand side variables". With respect to the latter, we consider standard capital flows' determinants, financial reforms and crises indicators together with selected institutional variables.

The three main forms of international capital flows we consider are: foreign direct investment (FDI), portfolio equity flows and portfolio debt. Data on FDI were taken from UNCTAD World Investment Report (2010) and from The World Bank Global Development Finance (2010). These represent the most used sources of FDI data.[20] Portfolio equity and debt flows are from the latest International Monetary Fund, Coordinated Portfolio Investment Survey (IMF; CPIS 2010). This is a rich dataset. The majority of data are available from 2001 to 2008 and they include e.g. currency breakdown of portfolio investment to bilateral investment series. It is important to note that, in the econometric exercise, all international capital flows data were normalized as a share of GDP.

In our sample, FDI represent the major part of capital inflows in both Old and New EU, amounting on average to the 3% and 5% of GDP in the period considered. Among the Old EU countries, the greatest attractor of capital inflows unsurprisingly was Luxembourg (15%), followed by Ireland, Netherlands and Sweden (all around 5%); while Malta (8.5%), Bulgaria (8%), Estonia (7.6%) and Cyprus (6.8%) were the best performers among New Members. Luxembourg received also the greatest amount of equity and debt flows, respectively 231% and 60% of GDP, while the Old EU averages (excluding Luxembourg) were of 1.15% and 0.88% of GDP. Clearly, Luxembourg is an important outlier and the analysis in the next section is accordingly carried out excluding Luxembourg (from the EU15 and all-countries samples). In the New EU, equity inflows were 0.04% of GDP while debt represented 0.12%. In short, FDI in NMS is a much larger component of capital flows than in EU15 where portfolio debt and equity flows have important shares. Moreover, FDI in NMS is more volatile than in EU15, while debt and equity is much less volatile than in EU15.[21] Regarding the time path of the series, Figure 1 highlights that FDI inflows peak in 2000 in Old EU and in 2005 in New Members.

We now turn to the standard determinants of international capital flows. In particular, from the World Bank World Development Indicators (WB, WDI 2010) and from the latest available Penn World Tables (PWT 6.3),

[20] Another well known source for FDI data is represented by International Monetary Fund, International Financial Statistics (IMF IFS). These data was not used here because of poorer coverage in the early years (until 1996) and because Belgium and Luxembourg are treated as a single country for the period 1990-2005.

[21] The hypothesis of unequal variances of capital inflows to the EU15 versus to the NMS can not be rejected at the conventional 95% confidence level until year 2007. As Figure 1 strongly suggests, the average shares of capital on GDP are significantly larger in NMS than in the EU15, again at the conventional 95% confidence level.

we obtain information about structural features, such as the size of the market (i.e. log GDP), development stage (i.e. log GDP per capita),[22] and percentage of fuel exports over total exports (as a proxy for natural resources dependence). Data on macroeconomic stability (i.e. inflation) and physical infrastructures (i.e. telephone lines, internet users and cellular phones) originate respectively from the International Monetary Fund, World Economic Outlook (IMF, WEO 2010) database, and from the World Telecommunication ICT Dataset (2010). Note that all infrastructure data were normalized to population, in order to ensure comparability.

In terms of a general assessment of capital inflows, although the EU15 economies represent a better environment in terms of market size, macroeconomic stability and physical infrastructure, the NMS are rapidly catching-up in all these fronts. Also note that the NMS may be better in attracting resource seeking investments, as the average share of fuel exports on total exports was 5.5%, compared to 3.5% for the EU15.

To construct our indexes of financial reforms, we employed two major data sources: Beck and Demirgüç-Kunt (2009) and Abiad et al. (2008). We follow Campos and Kinoshita (2010) and use the data reported in Beck and Demirgüç-Kunt (2009) to construct various indexes of financial development. The first index, an Overall Financial Development Index (fd1), is the arithmetic average of the normalized values of three variables for overall financial development, which are: the ratio of liquid liabilities to GDP (llgdp), the ratio to GDP of credit issued to the private sector (pcrdbofgdp) and the ratio of commercial bank assets to the sum of commercial bank assets and central bank assets (dbacba). The second index (fd2) is reflects the efficiency of the banking sector (be) and corresponds to the arithmetic average of the normalized value of the ratio of overhead costs to total bank assets (overhead) and net interest margin (netintmargin), the latter calculated as the difference between bank interest income and interest expenses divided by total assets.[23]

Figures 3 and 4 show the catching-up of NMS countries with respect to financial development indicators. In particular, the first graph highlights the development of the credit market and its increased liquidity, while the second show that the banking sector has quickly become more efficient, especially until 2006.

Regarding Abiad et al.(2008), it covers 91 economies over 1973–2005 and it collects information on de jure financial development along seven different dimensions, providing also two synthetic indexes of financial reform and five dummy variables for financial sector's policy changes. The dimensions considered are credit controls and reserve requirements (i.e. dc, cc, cco); interest rate controls (i.e. ico); entry barriers (i.e. eb); state ownership (i.e. pr); policies on securities markets (i.e. sm); banking regulations (i.e. bs) and restrictions on the capital account (i.e. intlc). The first financial reform index (i.e. fr) is constructed as the summing these up and it ranges from 0 to 21. The second index (i.e. ffn) is the normalized version of fr. As the previous financial development indexes, also this one is obtained following the Lora (1998) procedure and it ranges from 0 to 1.

As for economic crises, the data we use is from Laeven and Valencia (2008, 2010). Together, the two datasets cover more than 250 countries from 1976 to 2008 and have information about the initial and end years of systemic banking crises, the initial year of currency and debt crises.[24] This shows that the vast majority of the EU15 countries experienced a systemic banking crisis between 2007 and 2008, while Finland and Sweden did it in 1991. All NMS, with exception made for Cyprus and Malta, suffered from banking crisis during the 1990s and Slovenia, Hungary and Latvia were involved in the 2008 crisis.

The Laeven and Valencia datasets also provide information on output loss, fiscal costs, financial markets and economic performance during systemic banking crises. On average, output loss in the EU15 was higher than in NMS (1.75% of GDP versus 1.25%) while the opposite is true for fiscal costs (i.e. 8.2% of GDP versus 8.85% of GDP).

Figure 5 shows output loss (oloss) expressed as percentage of GDP and computed by extrapolating trend real

[22] With reference to PWT 6.3, following the recommendations of Summers and Heston (1991, p.344), we the real GDP data obtained from the chained series of relative prices, in order to mitigate the so-called 'Laspeyres fixed-based problem'.

[23] The normalization procedure we use is the one suggested by Lora (1998) and it involves the following steps. First, calculate the absolute maximum and the absolute minimum of each series. This means finding the maximum (minimum) value across all countries and years. Second, calculate the range of each variable, subtracting the absolute minimum from the absolute maximum. Third, if the underlying variable is a "goody" (i.e. the higher its value reflect more financial development), subtract the absolute minimum from the actual values of the series and divide it by the range of the variable; if the indicator is a "baddie" (i.e. the higher values indicate lower financial development), subtract the actual values of the series from the absolute maximum and divide it by the range. In this case, the "goodies" are: llgdp, pcrdbofgdp, dbacba and the "baddies" are overhead and netintmargin. See Campos and Kinoshita (2010) for more details. It should be clear that this normalization provides an easy way to make comparisons which are free of scale problems. Consequently, in either a goody or a baddie, the best country performer (i.e. the one having the relative higher financial development level) has a normalized value of 1, so that the closer the value to 1 the better.

[24] According to Laeven and Valencia (2008), a "systemic banking crisis" occurs when a country's corporate and financial sectors experience a large number of defaults and financial institutions and corporations face great difficulties repaying contracts on time. As a result, non-performing loans increase sharply and all or most of the aggregate banking system capital is exhausted. A "currency crisis" is identified by a nominal depreciation of the currency of at least 30 percent that is also at least a 10 percent increase in the rate of depreciation compared to the year before. A "debt crisis" is associated to sovereign defaults to private lending and to debt rescheduling.

GDP growth, up to the year preceding the crisis, and taking the sum of the differences between actual real GDP and trend real GDP expressed as a percentage of trend real GDP for the first four years of the crisis (including the crisis year).[25]

Regarding the measures of institutions, we employed different sources. From the Polity IV Project, which collects 30 political related variables for all states with a population above 500,000 people over the period 1800-2009, we selected three measures: the duration of the political regime measured in years (durable), the index of polity fragmentation (fragment) and the level of democracy in the country (democ). The first indicator reflects the absence of political crisis, the second is a measure of potential political instability and the latter indicates the strength of democracy. In particular, fragment is coded on a 0-3 scale, where 0 represents "no overt fragmentation" and 3 "serious fragmentation", while democ ranges from 1 to 10, with 10 indicating a high level of democracy. From Transparency International we use Corruption Perception Index (ticpi), which is a measure of perceived corruption among public officials and politicians. It is available for more than 150 countries, from 1995 to 2009, and it coded on a 0-10 scale, with 10 indicating the lowest perceived level of corruption.

The institutional evolution in the EU countries is fascinating. Figure 6 illustrates the democratization process of the New EU members and how quickly political convergence has been achieved.

3.2 ECONOMETRIC METHODOLOGY

Our study draws on the existing literature on the determinants of cross-country private capital flows, discussed above. Specifically, we investigate three main categories of determinants. First, we look into traditional or classical factors such as market size, infrastructure, and macroeconomic environment. Second, we assess whether structural reforms play a significant role in attracting foreign investors. Third, we look at the role of economic crises.

In our baseline model, we specify capital inflows (FDI or portfolio) as a function of three main groups of variables: a set of classical determinants, financial reforms, and economic crises. The baseline econometric model is as follows:

$$\begin{aligned} Y_{it} &= \lambda X_{it} + \varepsilon_{it} \\ \varepsilon_{it} &= \eta_i + \gamma_t + u_{it}, \end{aligned} \qquad (1)$$

where Y_{it} is the dependent variable which is measured as FDI and portfolio inflows as a percentage share of GDP in country i at year t. X_{it} includes (1) classical factors (market size, natural resource abundance, infrastructure, inflation, institutional differences), (2) structural reform variables (depth of the financial market and banking sector efficiency) and (3) indicators for the occurrence and severity of economic crises. In addition, η_i represents unobservable country-specific attributes and γ_t is a vector of time-specific effects (e.g., time dummies).

It is a well-known concern in the literature that some of the regressors may be potentially endogenous or predetermined. For example, FDI might be attracted to a country that has a more liberalized financial market but at the same time financial liberalization may be enhanced by the presence of FDI. If we were to run the ordinary least squares (OLS) regression on (1), the estimate would be biased as the error term is correlated with the regressors.

The main strategy to address this problem is to rely on fixed effects model estimation. By so doing, we control for unobserved country-specific fixed characteristics that might affect private capital inflows. In this case, one estimates whether within country the progress in financial sector reforms is associated with greater FDI inflows. However, the fixed effects model yields biased OLS coefficients when endogeneity is severe. In order to address

[25] Gross fiscal costs (fc) as percentage of GDP is computed over the first five years following the crisis using data from Hoelscher and Quintyn (2003), Honohan and Laeven (2005), IMF Staff reports, and publications from national authorities and institutions. Financial market performance is indicated by the peak nonperforming loans (i.e. npl) that is the highest level of nonperforming loans as percentage of total loans during the first five years of the crisis. Economic performance during the crisis (i.e. mingdp) is the lowest real GDP growth rate during the first three years of the crisis. As all these variables (oloss, fc, npl and mingdp) are calculated over more than one year but the available information corresponds to one single entry, we decided to impute the costs of the crisis to the median year of the original time-window chosen by Laeven and Valencia. This solution, although somewhat arbitrary, has the advantage of exploiting all the available information (i.e. initial and final crisis' year and its costs) in the simplest way. Finally, it must be clarified that for the losses of output related to the 2007-2008 crisis, we were forced to impute all the costs to 2008. The reason is threefold. First, if the crisis started in 2007 (this is the case only for United Kingdom) and we take the standard 4-years window, 2008 is the year that should be selected according to our rule. Second, in the majority of the cases, the crises began in 2008 and they have not ended yet or, at least, no information about their ending year is available. Finally, GDP data from international sources are available at most until 2008. Putting these things together, it is easy to see that 2008 is the only employable year.

concerns about the potential endogeneity of the regressors, we adopt a Hausman-Taylor type estimator.

The Hausman Taylor estimator fits panel data random-effects models in which some of the covariates are correlated with the unobserved individual-level random effect and therefore conduce to bias estimates:

$$\begin{aligned} &Y_{it} = \lambda X_{it} + \varepsilon_{it} \\ &\varepsilon_{it} = \eta_i + \gamma_t + u_{it} \\ &\text{cov}(X_{it}, \eta_i) \neq 0 \Rightarrow \text{cov}(X_{it}, \varepsilon_{it}) \neq 0 \end{aligned} \qquad (2)$$

We consider that the institutional variables in our model (e.g. Democracy and corruption from Transparency International) might be potentially endogenous and we use HT in order to instruments them. In fact, the estimator, originally proposed by Hausman and Taylor (1981) and Amemiya and MaCurdy (1986), is based on instrumental variables: to comply with HT estimator we assume that some of the explanatory variables are correlated with the individual-level random effects, η[i], but that none of the explanatory variables are correlated with the idiosyncratic error u[i,t][26].

$$\begin{aligned} &Y_{it} = \lambda X_{it} + \varepsilon_{it} \\ &\varepsilon_{it} = \eta_i + \gamma_t + u_{it} \\ &\text{cov}(X_{it}, \eta_i) \neq 0 \Rightarrow \text{cov}(X_{it}, \varepsilon_{it}) \neq 0 \\ &\text{cov}(X_{it}, u_{it}) \neq 0 \end{aligned} \qquad (3)$$

These baseline results are reported in tables 2 and 4 in the following section.

4. ECONOMETRIC RESULTS

The objective of this section is to present and discuss our main econometric results. First we introduce our baseline results (in that they focus on a set of standard capital inflows determinants) and then we investigate the relative of economic crises and financial reforms vis-à-vis these standard determinants.

4.1 BASELINE RESULTS

Our baseline results refer to a set of standard drivers or determinants of capital inflows. This set includes (a) market size and the level of economic development (measured by the log of the country's population and per capita GDP, respectively), (b) the level of macroeconomic instability (measured by the log of annual inflation rates), (c) the quality of infrastructure and the level of human capital, (d) institutional differences and (e) and the relative importance of natural resources in each economy. The explanatory power of these factors should differ whether we are focusing on differences over time, EU15 versus NMS and within each one of these two groups. For the baseline estimates we also report both fixed-effects and Hausman-Taylor estimates as well as results for both FDI and portfolio inflows so as to provide a clear view of how the results change (or do not change) along such lines.

Tables 1 and 2 present our results for the standard set of determinants of FDI inflows for both the NMS (upper-panel of these tables), the EU15 (middle panel), and the EU27 (shown in the bottom-half of the tables). Table 1 reports fixed-effects, while Table 2 has Hausman-Taylor estimates.

The results reported in Table 1, show that the quality of the infrastructure, market size and institutional differences (democracy and EU accession) are important driver of FDI inflows to the EU15 and to the NMS. The log-log functional form generates estimates that can be read as elasticities; accordingly, a 10 percent increase in mobile phone users would, once all other factors are treated as constant, increase the inflows of FDI into the NMS by about 2 percent and into the EU15 by 1.5 percent. For the NMS sample we find that the more institutionally developed countries seem to attract more FDI, while an opposite result obtains for the EU15.[27] Indeed, when we measured institutions by the Corruption Transparency International index, the opposite result emerges for the EU15 (Column 3): countries with better institutions tend to attract significantly more FDI inflows. As noted, this is because our institutional proxies tend to correlated highly with a range of other institutional factors that also encourage capital inflows, such as regulatory transparency, low contract

[26] Even if this hypothesis might appear to be too strong we mainly address our endogeneity concern on the institutional variable, that being rather time invariant they well be correlated with the country level random effects. We thank Ansgar Belke for this suggestion.
[27] As noted above, the EU15 countries receive the maximum score in the democracy measure throughout with one exception, namely the Belgium elections in 2007. This small relative decline is the main reason for this result.

enforcement costs, respect to property rights, and respect to the rule of law. Interestingly, EU membership plays a more important role for the case of FDI inflows within the EU15 than among NMS.[28] Pooling all countries (i.e., focusing on the EU27), one finds that infrastructure differences seem to play the role of main determinant of FDI inflows.

If asked what the fundamental determinants of capital inflows in Europe are, our results would suggest that institutional and infrastructure differences are large elements in such answer (we also find that population size is positively correlated with FDI in NMS and it is insignificant or negative in the EU15[29]). Tables 3 and 4 confirm the importance of these factors also for portfolio inflows. Note that there is more divergence between the FE and Hausman-Taylor results suggest that these are less robust than the results for FDI. Also of interest, institutions still matters but in a different way: better institutions attract more portfolio inflows in the EU15, while worse institutions seem to attract more portfolio inflows in the NMS (although the Hausman-Taylor preserves the signs of these effects, they loose statistical significance).

There is one additional determinant of FDI inflows to the NMS worth discussing, namely that while FDI inflows are attracted in the NMS to those economies that have a relatively high share of their exports in primary goods (agriculture and energy), this factor has the stronger and opposite (repelling) effect on portfolio inflows. It should also be said that, as many researchers before us, we found trying to explain portfolio inflows to be more difficult than, for example, trying to explain FDI inflows (when using country-level variables).

Finally, there is also one additional determinant of capital inflows to the EU15 worth discussing, which is the role of per capita GDP. We do find some evidence that richer countries in the EU15 tend to receive more portfolio inflows than poorer countries within the EU15, and that the same can be said regarding FDI inflows. This is a quite interesting result because it adds a novel element on the discussion of the "European difference" in section 2 above. In this debate it is argued that the reason that emerging Europe differs is because capital moves downhill, that is, it moves from richer to poorer countries (or from low to high return on capital's economies). In this light, our result provides some food for thought.

A final issue to be raised before concluding the discussion of our baseline results regards the role of human capital. The latest literature on the determinants of capital inflows often highlights the role of various threshold factors reflecting different degrees of absorptive capacity. Two that have received the most attention are financial development (only once the financial sector has reached a certain level can the benefits of financial integration materialize) and human capital (the lack of domestic skills able to utilise the new techniques brought in by foreign investors can be blamed for the lack of benefits from financial integration). We deal extensively with financial development below, so here we try to check human capital differences would be important across the EU countries in our sample. Although we do not find that this factor plays an important role (one can say that this is not surprising giving that the levels of formal education are very high in the sample), we do find that it is rather closely correlated to mobile phones. For this reason, when we argue that mobile phone subscriptions are an important explanatory factor for capital inflows in Europe and that they proxy for infrastructure, we have in mind a broader definition of the latter.

4.2 WHAT ROLE FOR CRISES AND REFORMS?

Taking into account (or controlling for) a standard set of reasons to attract capital inflows in different countries, what roles can structural reforms and economic crises play? Tables 5 to 7 present our main results addressing this question.

Table 5 presents Hausman-Taylor results for the role of financial reforms on attracting FDI inflows in both the NMS and the EU15 countries, as well as for the EU27. One main distinction we try to respond to is one that has received a lot of attention in the financial liberalization literature, namely that of de jure versus de facto measures. Kose et al (2010) argue that this difference account for much of the current debate on the benefits of financial liberalisation. De jure measures are those that reflect the changes in the laws and regulations that govern capital flows, while de facto measures try to capture not only the letter of these laws, but also how countries differ in terms of how they understand, interpret, absorb, implement and enforce such laws. Hence, we report results for both types of measures.

As it can be seen in Table 5, our results suggest that financial reform has played a very limited role in attracting or repelling FDI in the EU15 since 1990. One of the few noteworthy results is that shallower financial systems

[28] We also tested whether for the effect of NATO membership but found broader support for EU membership instead (Belke et al., 2009).
[29] It is rather surprising in that we find that FDI is attracted to larger markets across the NMS. Studies focusing solely on the transition economies do not tend to find such strong results, but in our case the inclusion of Cyprus and Malta may help understand this effect. Moreover, it is quite difficult too to fully disentangle market size from level of development effects, given that there are no lower middle income countries in our sample.

tend to be associated with smaller inflows of FDI in the NMS. This may be driven of course by foreign investors searching for higher profit rates which may be more easily found in other environments. The similar results we obtain for portfolio inflows in Table 6 (and for fd1 which is a composite measure of the quantity of financial services or of the size of the financial sector) may be used to back up such line of interpretation. In order to test the differential impact on NMS and EU15 of the financial system measures (namely international capital flows, financial reform de jure (ffn), financial reform de facto (fd1 or be) and Beck & Demirgüç-Kunt (2009) measure of deposit ratio) we report their interaction with the level of development (see "[X] Log Per Capita GDP PPP" in Tables 5 and 6 for the EU27 sample only[30]). On the one hand the results in Table 5 document a positive effect of openness to international capital flows on FDI only for countries with real GDP per capital above the 7400$[31] (PPP 2005) threshold, i.e. we exclude some of the NMS. On the other hand, Table 6 reports a positive impact of international capital flows, financial development (fd1) and Beck & Demirgüç-Kunt ratio on portfolio investment only for countries with real GDP per capita (PPP 2005) above the 4675$[32], 28000$[33] and 13800$[34] thresholds, respectively. To summarize, there is a differential impact of financial systems variables on FDI and NMS, due to their different level of development -in our example measured by GDP per capita (PPP 2005).

Table 7 present the Hausman-Taylor results for the role of economic crises on FDI (the results can not be obtained for portfolio inflows as the crises variables are all dropped because of collinearity.) For the New Member States the results are very clear: banking and currency crises play major roles in stopping capital inflows. As the results indicate, although crisis occurrence seems to be the major factor, crisis severity also plays an important role. We do not find an equally important role for crises in the EU15.

[30] The computation of the overall effect of the financial system variables on the FDI or portfolio flows can be obtained by composing the coefficients via the following factorisation: Financial Reform{Beta(FR)+[Beta(Interaction)] X [Level of Development]}. Details available upon request.
[31] E.g. Latvia after 1999 and Romania after 2004.
[32] This is for all EU 27 countries in the analysed time span.
[33] E.g. Spain after 2005 and UK after 2002.
[34] E.g. Slovak Republic after 2004 and Poland after 2007.

5. CONCLUSIONS

There is now a large literature examining the drivers of private capital inflows into the countries of emerging Europe. The bulk of this literature either studies exclusively NMS, restrict their samples to the transition economies, and/or compare them with other groups of developing countries. Our paper is one of the first to provide a comparison of capital inflows drivers between old (EU15) and new EU members (NMS). In order to examine the determinants of foreign private capital inflows (FDI and portfolio) to European economies, we assembled a panel data set encompassing all 27 EU countries, yearly since 1990. It covers standard set of drivers of international capital flows as well as measures of economic crises and structural reforms, both de jure and de facto.

In our view, the reader should take four main conclusions out of our analysis. The first is that on average the NMS have received substantially more capital inflows than the EU15 since 1990. Yet the composition of these stocks is predominantly made up of FDI (in stark contrast to the EU15 and also to other developing countries) with a smaller share of portfolio (which is surely not the case for EU15).

Secondly, we stress that the volatility of FDI to NMS is large and, it seems to us, has not received much attention from academicians and policy-makers. One reason governments prefer to try to attract FDI inflows, rather than portfolio, is precisely because the former is widely perceived to be more resilient. We find the variance of FDI to NMS is significantly higher than that of portfolio inflows and, further, it is also significantly higher than the variances of the EU15's FDI or portfolio inflows (up to 2007).

Thirdly, financial structural reforms have a differential impact on NMS and EU15, the reason being that we identified important non-linear effects. When controlling for the interaction of our financial reform variables with the level of development -in our example measured by the GDP per capita (PPP 2005)- we document the existence of a threshold effect, i.e. countries with a relatively low level of development might not fully benefit from rapid financial reforms or international capital flows (as documented in tables 5 and 6).

Finally we find that the effects of crises –namely systemic banking and currency crises- on FDI inflows are substantially negative and significantly stronger in the NMS than in the EU15 countries (where they are insignificant). Currency crises, however, seem to have played a negative impact on the EU27 as whole, as documented in table 7. Our results suggest that economic crises have played an important role in determining the intensity and direction of capital inflows and that their impact was different for NMS and EU15.

There are a number of important possibilities for further research that our results open up, which we here highlight three. One is to assess how comparable are the results emanating from the "gravity literature." Using bilateral data we can surely do a better job at least in explaining portfolio inflows (if indeed these are more responsive to straightforward differentials in rates of return on capital). The second is to push for improvements in the available measures of both capital flows and some of its main drivers (reforms and crises in particular). One principal way in which FDI is distinguished from portfolio inflows is the 10% ownership rule (inflows that generate ownership shares above this figure are counted as FDI, while those that do not reach this percentage are counted as portfolio inflows.) With foreign inflows shifting from manufacturing to the financial and construction sectors in the 2000s and (with the lift of restrictions to FDI in the banking sector, mostly among the transition economies) the attendant rise of cross-border loans from parent banks in the EU15 directly to their affiliates in the NMS, a finer delineation among these different types of flows than that currently available would be of substantial assistance. The third and last implication is to encourage further investigation of the volatility of these capital flows, as opposed to the so far almost exclusive focus on their mean values. Explicitly modelling their variance should also assist, because of similarities in the underlying methodologies, in disentangling the short- from the long-run effects of some key factors chiefly reforms, but also to a more limited extent, economic crises.

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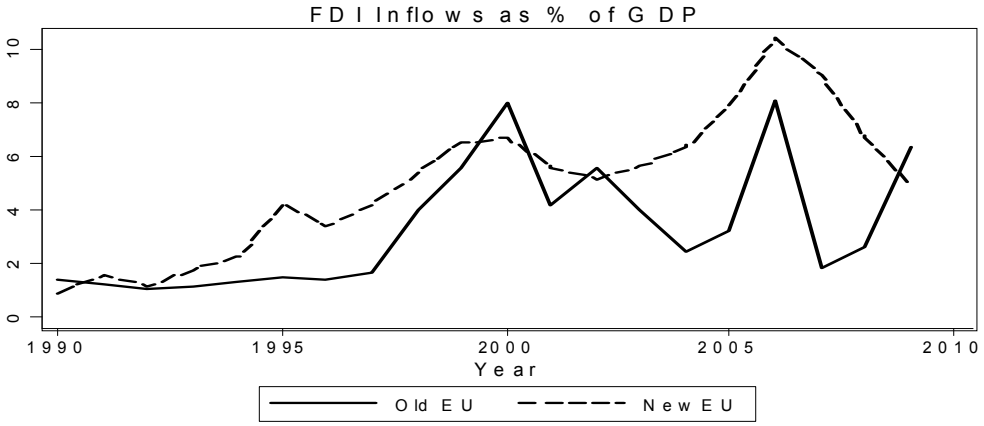
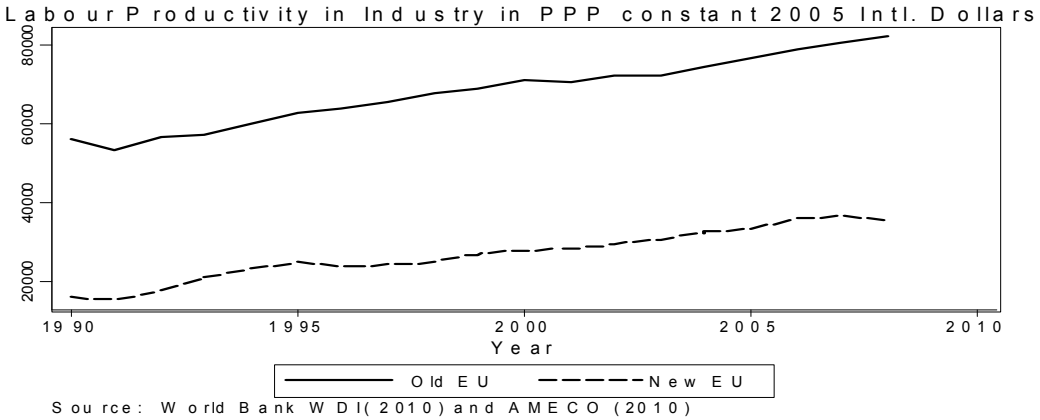
Figure 1: FDI Inflows to NMS and EU15, 1990-2010



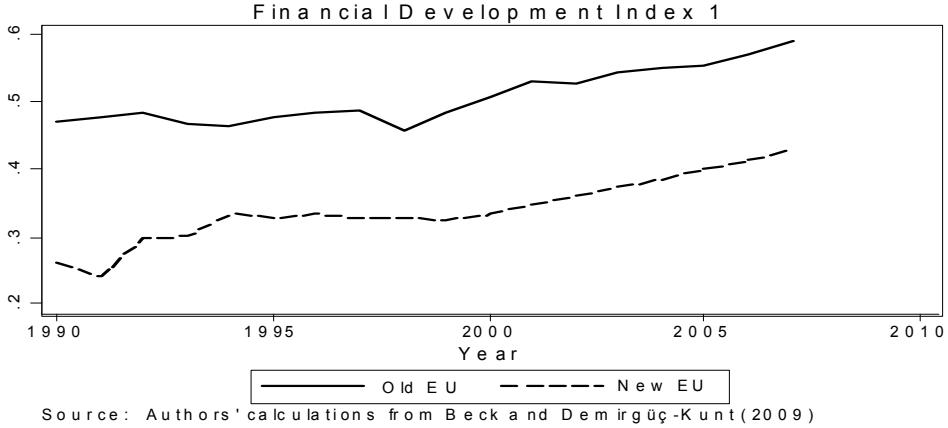
Source: UNCTAD, World Investment Report (2010)

Figure 2: Labour Productivity, NMS and EU15, 1990-2008



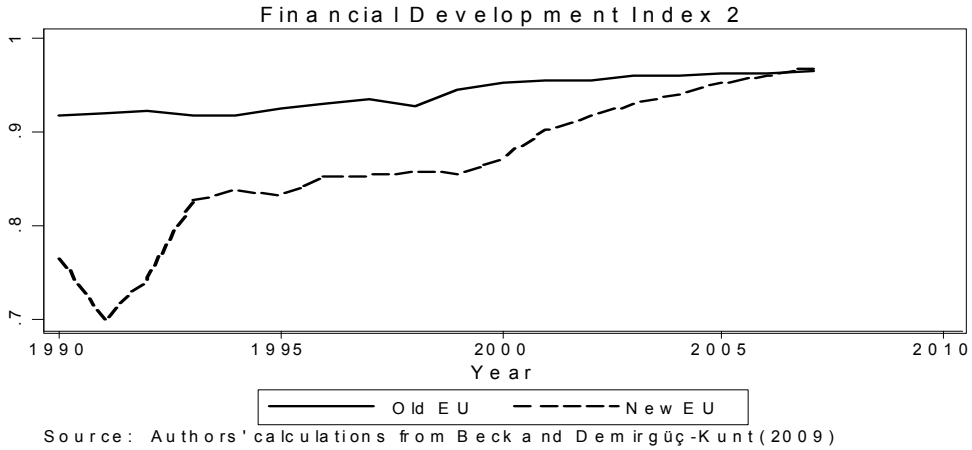
Source: World Bank WDI (2010) and AMECO (2010)

Figure 3: Financial Sector Depth (size), NMS and EU15, 1990-2008



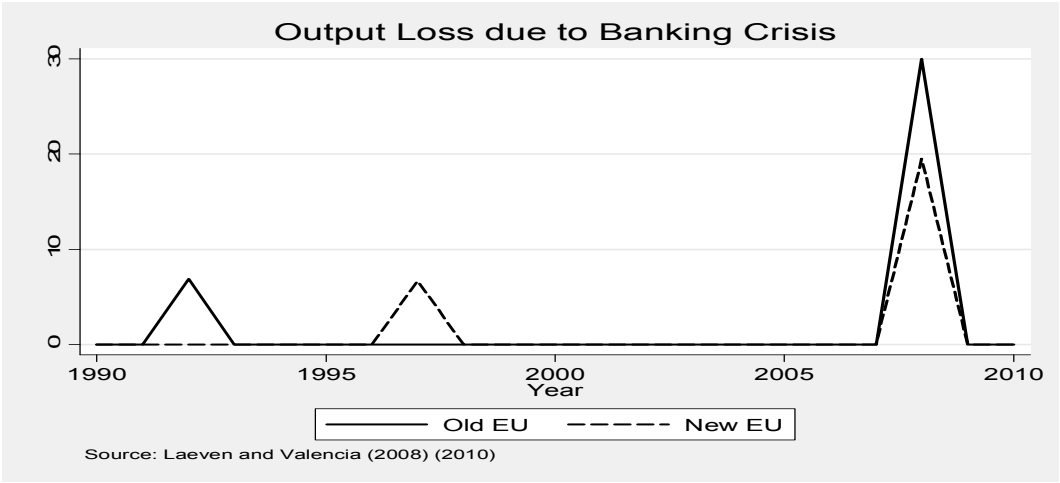
Source: Authors' calculations from Beck and Demirgüç-Kunt (2009)

Figure 4: Financial Sector Efficiency, NMS and EU15, 1990-2008



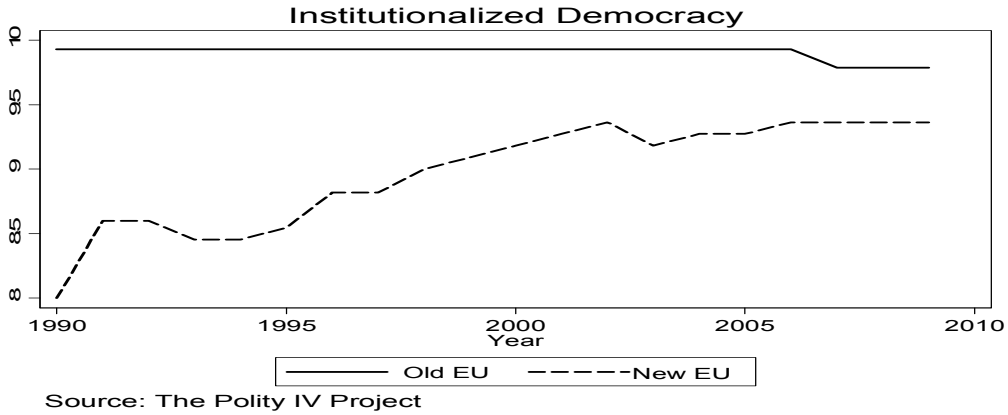
Source: Authors' calculations from Beck and Demirgüç-Kunt (2009)

Figure 5: Severity of Banking Crises, NMS and EU15, 1990-2010



Source: Laeven and Valencia (2008) (2010)

Figure 6: Institutional Development (Democracy), NMS and EU15, 1990-2009



Source: The Polity IV Project

Table A.1: Sample of Countries

Country	EU Membership, Old Member accession before 1st May 2004, EU15	Date of EU Accession	Income Group
Austria	Old Member (EU15)	1 January 1995	High income: OECD
Belgium	Old Member (EU15)	23 July 1952	High income: OECD
Bulgaria	New Member	1 January 2007	Upper middle income
Cyprus	New Member	1 May 2004	High income: nonOECD
Czech Republic	New Member	1 May 2004	High income: OECD
Denmark	Old Member (EU15)	1 January 1973	High income: OECD
Estonia	New Member	1 May 2004	High income: nonOECD
Finland	Old Member (EU15)	1 January 1995	High income: OECD
France	Old Member (EU15)	23 July 1952	High income: OECD
Germany	Old Member (EU15)	23 July 1952	High income: OECD
Greece	Old Member (EU15)	1 January 1981	High income: OECD
Hungary	New Member	1 May 2004	High income: OECD
Ireland	Old Member (EU15)	1 January 1973	High income: OECD
Italy	Old Member (EU15)	23 July 1952	High income: OECD
Latvia	New Member	1 May 2004	Upper middle income
Lithuania	New Member	1 May 2004	Upper middle income
Luxembourg	Old Member (EU15)	23 July 1952	High income: OECD
Malta	New Member	1 May 2004	High income: nonOECD
Netherlands	Old Member (EU15)	23 July 1952	High income: OECD
Poland	New Member	1 May 2004	Upper middle income
Portugal	Old Member (EU15)	1 January 1986	High income: OECD
Romania	New Member	1 January 2007	Upper middle income
Slovak Republic	New Member	1 May 2004	High income: OECD
Slovenia	New Member	1 May 2004	High income: nonOECD
Spain	Old Member (EU15)	1 January 1986	High income: OECD
Sweden	Old Member (EU15)	1 January 1995	High income: OECD
United Kingdom	Old Member (EU15)	1 January 1973	High income: OECD

Table 1. Dependent Variable: Log of FDI inflows (% GDP)	Estimation Method: Fixed-Effects with Heretoskedasticity - Robust and Country-Clustered Standard Errors				
Sample: NMS					
Log Per Capita GDP PPP	-0.111		0.792	0.039	0.094
	[0.17]		[0.99]	[0.03]	[0.19]
Log inflation rate	0.074	0.022	0.152	-0.202	0.033
	[0.99]	[0.33]	[1.79]	[2.11]	[0.47]
Log Nat Resources Exports	0.029	0.124	0.116	-0.080	0.137
	[0.38]	[2.44]*	[0.95]	[0.36]	[2.21]
Log Per Capita Mobile Phones	0.202	0.191	0.200		0.190
	[12.22]**	[8.60]**	[1.47]		[7.00]**
Democracy (Polity IV)	0.112	0.138		0.586	0.140
	[1.61]	[2.02]		[2.64]*	[2.25]*
EU member	0.030	-0.002	-0.143	0.259	-0.006
	[0.17]	[0.02]	[0.86]	[0.64]	[0.05]
Log population		5.626	9.210	1.878	5.541
		[3.23]**	[0.94]	[0.26]	[3.58]**
Corruption Transparency Intl			0.052		
			[0.79]		
Constant	1.679	-86.558	-149.277	-33.057	-86.260
	[0.29]	[3.17]**	[0.96]	[0.28]	[3.86]**
Observations	160	170	114	165	160
Number of Country	11	11	12	11	11
Adjusted R-squared	0.4	0.43	0.12	0.29	0.43
Sample: EU 15					
Log Per Capita GDP PPP	1.226		2.886	4.041	2.537
	[1.67]		[2.34]*	[3.74]**	[2.54]*
Log inflation rate	0.173	0.216	0.239	0.080	0.190
	[1.26]	[1.34]	[1.79]	[0.43]	[1.30]
Log Nat Resources Exports	0.039	0.048	-0.180	0.076	0.105
	[0.22]	[0.22]	[0.66]	[0.40]	[0.53]
Log Per Capita Mobile Phones	0.157	0.247	0.262		0.183
	[2.04]	[3.55]**	[2.40]*		[2.28]*
Democracy (Polity IV)	-0.372	-0.188		-0.343	-0.400
	[20.48]**				[15.08]**
EU member	0.711				0.656
	[3.41]**				[3.15]**
Log population		-0.795	-10.126	-9.654	-9.290
		[0.18]	[2.62]*	[1.59]	[2.03]
Corruption Transparency Intl			0.231		
			[1.95]		
Constant	-8.656	15.194	138.677	100.541	132.985
	[1.11]	[0.21]	[2.40]*	[1.30]	[1.87]
Observations	229	239	170	232	229

Number of Country	14	14	14	14	14
Adjusted R-squared	0.27	0.26	0.2	0.24	0.28
Sample: EU 27					
Log Per Capita GDP PPP	0.345		0.553	1.227	0.170
	[0.55]		[0.84]	[2.20]*	[0.30]
Log inflation rate	0.120	0.057	0.183	-0.092	0.077
	[1.61]	[0.82]	[2.76]*	[1.05]	[1.05]
Log Nat Resources Exports	0.071	0.092	-0.005	0.000	0.105
	[0.93]	[2.50]*	[0.05]	[0.00]	[1.81]
Log Per Capita Mobile Phones	0.204	0.183	0.229		0.184
	[4.45]**	[5.10]**	[2.93]**		[4.17]**
Democracy (Polity IV)	0.054	0.113		0.541	0.109
	[0.64]	[1.38]		[2.37]*	[1.34]
EU member	0.116	0.174	-0.233	0.146	0.172
	[0.67]	[1.33]	[1.45]	[0.73]	[1.12]
Log population		3.788	0.008	4.135	3.401
		[2.10]*	[0.00]	[1.85]	[1.64]
Corruption Transparency Intl			0.126		
			[1.36]		
Constant	-2.858	-61.243	-4.953	-83.119	-56.693
	[0.47]	[2.09]*	[0.14]	[2.38]*	[1.79]
Observations	389	409	284	397	389
Number of Country	25	25	26	25	25
Adjusted R-squared	0.29	0.3	0.15	0.23	0.3

Robust t statistics in brackets * significant at 5%; ** significant at 1%.

Table 2. Dependent Variable: Log of FDI inflows (% GDP)	Estimation Method: Hausman-Taylor Estimator (institutional variables as endogenous)				
Sample: NMS					
Log Per Capita GDP PPP	-0.111		0.792	0.039	0.094
	[0.20]		[1.03]	[0.05]	[0.18]
Log inflation rate	0.074	0.022	0.152	-0.202	0.033
	[1.13]	[0.36]	[2.01]*	[1.95]	[0.51]
Log Nat Resources Exports	0.029	0.124	0.116	-0.080	0.137
	[0.45]	[2.00]*	[1.25]	[0.60]	[1.91]
Log Per Capita Mobile Phones	0.202	0.191	0.200		0.190
	[4.77]**	[6.06]**	[1.94]		[4.64]**
Democracy (Polity IV)	0.112	0.138		0.586	0.140
	[1.55]	[2.09]*		[5.42]**	[2.00]*
EU member	0.030	-0.002	-0.143	0.259	-0.006
	[0.17]	[0.01]	[0.73]	[0.83]	[0.04]
Log population		5.626	9.210	1.878	5.541
		[3.45]**	[1.26]	[0.60]	[3.23]**
Corruption Transparency Intl			0.052		
			[0.65]		
Constant	1.292	-98.084	-167.174	-36.994	-97.546
	[0.26]	[3.43]**	[1.28]	[0.66]	[3.14]**
Observations	160	170	114	165	160
Number of Country	11	11	12	11	11
Sample: EU 15					
Log Per Capita GDP PPP	1.226		2.886	4.423	2.537
	[1.79]		[2.28]*	[5.42]**	[2.79]**
Log inflation rate	0.173	0.216	0.239	0.005	0.190
	[1.52]	[1.98]*	[1.92]	[0.05]	[1.68]
Log Nat Resources Exports	0.039	0.048	-0.180	0.146	0.105
	[0.24]	[0.31]	[0.86]	[0.88]	[0.65]
Log Per Capita Mobile Phones	0.157	0.247	0.262		0.183
	[2.68]**	[4.73]**	[2.52]*		[3.08]**
Democracy (Polity IV)	-0.372	-0.188		-0.333	-0.400
	[0.90]	[0.60]		[0.79]	[0.97]
EU member	0.711	0.805			0.656
	[2.64]**	[3.06]**			[2.44]*
Log population		-0.795	-10.126	-9.654	-9.290
		[0.25]	[2.14]*	[2.28]*	[2.16]*
Corruption Transparency Intl			0.231		
			[2.33]*		
Constant	-9.015	14.476	130.297	111.403	125.464
	[1.07]	[0.29]	[1.93]	[1.84]	[2.00]*
Observations	229	239	170	232	229
Number of Country	14	14	14	14	14
Sample: EU 27					

Log Per Capita GDP PPP	0.345		0.553	1.227	0.170
	[0.80]		[0.85]	[2.92]**	[0.39]
Log inflation rate	0.120	0.057	0.183	-0.092	0.077
	[2.00]*	[0.98]	[2.63]**	[1.34]	[1.24]
Log Nat Resources Exports	0.071	0.092	-0.005	0.000	0.105
	[1.02]	[1.54]	[0.05]	[0.00]	[1.48]
Log Per Capita Mobile Phones	0.204	0.183	0.229		0.184
	[5.59]**	[6.94]**	[3.19]**		[4.92]**
Democracy (Polity IV)	0.054	0.113		0.541	0.109
	[0.67]	[1.44]		[5.87]**	[1.31]
EU member	0.116	0.174	-0.233	0.146	0.172
	[0.81]	[1.49]	[1.18]	[0.78]	[1.19]
Log population		3.788	0.008	4.135	3.401
		[2.79]**	[0.00]	[2.26]*	[2.31]*
Corruption Transparency Intl			0.126		
			[1.90]		
Constant	-3.677	-60.961	-5.832	-83.574	-56.563
	[0.81]	[2.79]**	[0.17]	[3.03]**	[2.43]*
Observations	389	409	284	397	389
Number of Country	25	25	26	25	25

Absolute value of z statistics in brackets* significant at 5%; ** significant at 1%.

Table 3. Dependent Variable: Log of Portfolio inflows (% GDP)	Estimation Method: Estimation Method: Fixed-Effects with Heretoskedasticity-Robust and Country-Clustered Standard Errors				
Sample: NMS					
Log Per Capita GDP PPP	0.783		0.739	2.408	0.995
	[1.17]		[1.78]	[3.41]**	[1.53]
Log inflation rate	-0.009	-0.047	-0.009	-0.106	-0.012
	[0.20]	[0.89]	[0.15]	[1.91]	[0.27]
Log Nat Resources Exports	-0.206	-0.130	-0.067	-0.177	-0.151
	[7.01]**	[2.87]*	[0.90]	[3.13]*	[4.27]**
Log Per Capita Mobile Phones	0.256	0.331	0.214		0.268
	[2.22]	[3.51]**	[1.89]		[2.41]*
Democracy (Polity IV)	-0.084	-0.060		-0.055	-0.082
	[1.47]	[0.90]		[0.87]	[1.28]
EU member	0.252	0.249	0.295	0.162	0.207
	[2.20]	[1.86]	[2.03]	[0.96]	[1.70]
Log population		5.195	18.088	3.752	4.944
		[1.02]	[1.89]	[0.59]	[1.06]
Corruption Transparency Intl			-0.008		
			[0.16]		
Constant	-8.749	-81.736	-288.653	-82.441	-87.198
	[1.40]	[1.03]	[1.98]	[0.82]	[1.19]
Observations	86	96	82	86	86
Number of Country	11	11	12	11	11
Adjusted R-squared	0.65	0.55	0.55	0.61	0.66
Sample: EU 15					
Log Per Capita GDP PPP	1.801		1.040	3.588	1.065
	[3.85]**		[1.75]	[5.73]**	[1.78]
Log inflation rate	0.066	-0.051	0.057	0.112	0.057
	[2.36]*	[1.72]	[2.00]	[2.01]	[1.95]
Log Nat Resources Exports	0.086	-0.155	0.029	0.131	0.031
	[0.77]	[1.35]	[0.25]	[0.73]	[0.26]
Log Per Capita Mobile Phones	0.431	0.531	0.444		0.440
	[7.04]**	[9.64]**	[6.68]**		[7.38]**
Democracy (Polity IV)	0.062	0.101		0.133	0.065
	[4.44]**	[7.40]**		[7.38]**	[6.57]**
Log population		5.852	3.797	2.711	3.804
		[4.16]**	[2.72]*	[0.92]	[2.69]*
Corruption Transparency Intl			0.003		
			[0.07]		
Constant	-19.403	-98.180	-74.050	-83.725	-75.051
	[4.00]**	[4.22]**	[3.70]**	[1.87]	[3.65]**
Observations	111	124	111	111	111
Number of Country	14	14	14	14	14
Adjusted R-squared	0.89	0.82	0.9	0.76	0.9
Sample: EU 27					

Log Per Capita GDP PPP	1.508		0.240	2.949	0.847
	[2.47]*		[0.45]	[6.01]**	[1.71]
Log inflation rate	0.063	-0.023	0.037	-0.054	0.030
	[1.46]	[0.63]	[1.25]	[1.24]	[0.95]
Log Nat Resources Exports	-0.164	-0.109	-0.095	-0.129	-0.110
	[2.82]**	[4.64]**	[3.57]**	[4.00]**	[3.69]**
Log Per Capita Mobile Phones	0.348	0.402	0.319		0.357
	[4.06]**	[5.95]**	[4.69]**		[4.71]**
Democracy (Polity IV)	-0.141	-0.038		-0.038	-0.077
	[3.53]**	[0.65]		[0.60]	[1.32]
EU member	-0.031	0.167	0.270	0.046	0.151
	[0.35]	[1.54]	[2.40]*	[0.37]	[1.75]
Log population		7.262	10.811	6.960	7.235
		[4.21]**	[5.14]**	[3.09]**	[3.91]**
Corruption Transparency Intl			-0.004		
			[0.11]		
Constant	-14.509	-117.595	-177.891	-142.089	-125.302
	[2.42]*	[4.19]**	[5.60]**	[4.22]**	[4.46]**
Observations	197	220	193	197	197
Number of Country	25	25	26	25	25
Adjusted R-squared	0.69	0.66	0.72	0.66	0.75

Robust t statistics in brackets * significant at 5%; ** significant at 1%.

Table 4. Dependent Variable: Log of Portfolio inflows (% GDP)	Estimation Method: Hausman-Taylor Estimator (institutional variables as endogenous)				
Sample: NMS					
Log Per Capita GDP PPP	0.783		0.739	2.408	0.995
	[1.22]		[1.35]	[4.62]**	[1.51]
Log inflation rate	-0.009	-0.047	-0.009	-0.106	-0.012
	[0.14]	[0.77]	[0.18]	[1.80]	[0.20]
Log Nat Resources Exports	-0.206	-0.130	-0.067	-0.177	-0.151
	[3.93]**	[2.00]*	[0.98]	[2.56]*	[2.32]*
Log Per Capita Mobile Phones	0.256	0.331	0.214		0.268
	[3.06]**	[4.97]**	[2.20]*		[3.20]**
Democracy (Polity IV)	-0.084	-0.060		-0.055	-0.082
	[0.96]	[0.65]		[0.60]	[0.95]
EU member	0.252	0.249	0.295	0.162	0.207
	[1.78]	[2.13]*	[2.37]*	[1.06]	[1.44]
Log population		5.195	18.088	3.752	4.944
		[1.42]	[2.60]**	[0.98]	[1.37]
Corruption Transparency Intl			-0.008		
			[0.15]		
Constant	-8.686	-91.293	-324.156	-88.890	-96.066
	[1.47]	[1.42]	[2.65]**	[1.29]	[1.48]
Observations	86	96	82	86	86
Number of Country	11	11	12	11	11
Sample: EU 15					
Log Per Capita GDP PPP	1.801		1.040	3.588	1.065
	[5.88]**		[2.76]**	[7.51]**	[2.83]**
Log inflation rate	0.066	-0.051	0.057	0.112	0.057
	[1.70]	[1.24]	[1.53]	[1.94]	[1.52]
Log Nat Resources Exports	0.086	-0.155	0.029	0.131	0.031
	[1.36]	[2.16]*	[0.45]	[1.34]	[0.49]
Log Per Capita Mobile Phones	0.431	0.531	0.444		0.440
	[10.82]**	[13.92]**	[11.31]**		[11.52]**
Democracy (Polity IV)	0.062	0.101		0.133	0.065
	[0.76]	[1.34]		[1.10]	[0.84]
EU member	0.000	0.000			0.000
	[.]	[.]			[.]
Log population		5.852	3.797	2.711	3.804
		[5.28]**	[3.08]**	[1.42]	[3.11]**
Corruption Transparency Intl			0.003		
			[0.10]		
Constant	-19.730	-94.205	-71.580	-82.336	-72.583
	[5.88]**	[5.33]**	[4.12]**	[3.05]**	[4.19]**
Observations	111	124	111	111	111
Number of Country	14	14	14	14	14

Sample: EU 27					
Log Per Capita GDP PPP	1.508		0.240	2.949	0.847
	[3.91]**		[0.71]	[10.21]**	[2.36]*
Log inflation rate	0.063	-0.023	0.037	-0.054	0.030
	[1.59]	[0.63]	[1.21]	[1.36]	[0.85]
Log Nat Resources Exports	-0.164	-0.109	-0.095	-0.129	-0.110
	[4.13]**	[3.20]**	[2.51]*	[3.02]**	[3.03]**
Log Per Capita Mobile Phones	0.348	0.402	0.319		0.357
	[6.99]**	[12.05]**	[7.40]**		[8.02]**
Democracy (Polity IV)	-0.141	-0.038		-0.038	-0.077
	[2.23]*	[0.63]		[0.56]	[1.35]
EU member	-0.031	0.167	0.270	0.046	0.151
	[0.32]	[2.13]*	[3.19]**	[0.45]	[1.69]
Log population		7.262	10.811	6.960	7.235
		[6.69]**	[9.54]**	[5.36]**	[6.54]**
Corruption Transparency Intl			-0.004		
			[0.12]		
Constant	-14.405	-115.521	-175.013	-141.303	-123.513
	[3.62]**	[6.64]**	[10.25]**	[7.11]**	[7.24]**
Observations	197	220	193	197	197
Number of Country	25	25	26	25	25

Absolute value of z statistics in brackets * significant at 5%; ** significant at 1%.

Table 5.FDI and Financial Reform. Dependent Variable: Log of FDI inflows (% GDP)	Estimation Method: Hausman-Taylor Estimator (institutional variables as endogenous)				
Sample: NMS					
Log population	0.604	2.846	-3.472	5.450	7.086
	[0.10]	[0.48]	[0.68]	[3.12]**	[3.40]**
Log Per Capita GDP PPP	-1.550	-1.631	-0.540	0.217	0.165
	[1.79]	[1.88]	[0.61]	[0.38]	[0.24]
Log inflation rate	-0.026	-0.009	0.081	0.037	0.037
	[0.33]	[0.12]	[1.05]	[0.54]	[0.55]
Log Nat Resources Exports	0.320	0.362	0.187	0.116	0.161
	[1.51]	[1.69]	[1.08]	[1.61]	[2.15]*
Log Per Capita Mobile Phones	0.193	0.192	0.207	0.198	0.174
	[2.81]**	[3.01]**	[3.95]**	[4.56]**	[3.45]**
Democracy (Polity IV)	0.167	0.178	0.178	0.124	0.132
	[1.99]*	[2.10]*	[2.02]*	[1.67]	[1.61]
EU member	0.191	0.173	0.112	0.016	-0.027
	[0.73]	[0.68]	[0.49]	[0.09]	[0.15]
International capital flows	0.104				
	[0.97]				
Financial reform (de jure ffn)		1.013			
		[1.16]			
Financial reform (de facto fd1)			-1.830		
			[1.84]		
Deposit Ratio (Beck)				-0.834	
				[2.35]*	
Financial reform (de facto be)					0.709
					[1.11]
Constant	5.198	-27.784	65.866	-96.193	-125.731
	[0.06]	[0.30]	[0.70]	[3.06]**	[3.31]**
Observations	98	98	121	152	153
Number of Country	8	8	10	11	11
Sample: EU 15					
Log population	-12.210	-10.555	-8.813	-13.254	-9.799
	[2.03]*	[1.70]	[1.96]*	[3.05]**	[2.23]*
Log Per Capita GDP PPP	2.531	2.340	3.620	3.670	2.752
	[2.42]*	[2.06]*	[3.61]**	[3.81]**	[2.87]**
Log inflation rate	0.138	0.171	0.179	0.096	0.207
	[1.20]	[1.44]	[1.42]	[0.80]	[1.79]
Log Nat Resources Exports	-0.147	0.007	0.265	0.219	0.099
	[0.77]	[0.03]	[1.47]	[1.34]	[0.57]
Log Per Capita Mobile Phones	0.269	0.241	0.156	0.200	0.171
	[3.66]**	[2.67]**	[2.47]*	[3.34]**	[2.77]**
EU member	0.523	0.755	0.574	0.658	0.528
	[1.90]	[2.63]**	[1.81]	[2.42]*	[1.85]
Democracy (Polity IV)	-	-	-0.379	-0.370	-0.397

			[0.92]	[0.92]	[0.97]
International capital flows	-0.868				
	[3.69]**				
Financial reform (de jure ffn)		-1.474			
		[1.29]			
Financial reform (de facto fd1)			-2.283		
			[1.63]		
Deposit Ratio (Beck)				-4.064	
				[2.94]**	
Financial reform (de facto be)					-2.446
					[1.60]
Constant	170.849	144.761	107.889	180.389	133.476
	[1.91]	[1.57]	[1.63]	[2.85]**	[2.08]*
Observations	202	202	210	218	222
Number of Country	14	14	14	14	14
Sample: EU 27					
Log population	3.663	3.88	-0.907	3.384	3.249
	[1.45]	[1.23]	[0.31]	[2.05]*	[1.75]
Log Per Capita GDP PPP	1.432	0.446	0.027	1.562	0.939
	[1.72]	[0.45]	[0.03]	[1.27]	[0.93]
Log inflation rate	0.086	0.075	0.121	0.071	0.078
	[1.18]	[1.02]	[1.70]	[1.08]	[1.17]
Log Nat Resources Exports	-0.067	0.046	0.193	0.103	0.088
	[0.45]	[0.32]	[1.52]	[1.43]	[1.20]
Log Per Capita Mobile Phones	0.233	0.219	0.189	0.197	0.156
	[4.38]**	[3.68]**	[4.28]**	[5.05]**	[3.68]**
Democracy (Polity IV)	0.011	0.123	0.107	0.075	0.084
	[0.09]	[1.07]	[1.03]	[0.85]	[0.84]
EU member	0.275	0.324	0.099	0.244	0.143
	[1.47]	[1.66]	[0.57]	[1.64]	[0.93]
International capital flows	4.697				
	[2.37]*				
International capital flows [X]	-0.528				
Log Per Capita GDP PPP	[2.45]*				
Financial reform (de jure ffn)		4.743			
		[0.49]			
Financial reform (de jure ffn) [X]		-0.579			
Log Per Capita GDP PPP		[0.57]			
Financial reform (de facto fd1)			-26.828		
			[2.08]*		
Financial reform (de facto fd1) [X]			2.472		
Log Per Capita GDP PPP			[1.85]		
Deposit Ratio (Beck)				10.534	
				[0.93]	
Deposit Ratio (Beck) [X]				-1.28	
Log Per Capita GDP PPP				[1.04]	

Financial reform (de facto be)					4.512
					[0.44]
Financial reform (de facto be) [X]					-0.536
Log Per Capita GDP PPP					[0.49]
Constant	-70.513	-66.299	14.244	-67.791	-60.964
	[1.68]	[1.20]	[0.28]	[2.20]*	[1.81]
Observations	300	300	331	370	375
Number of Country	22	22	24	25	25

Absolute value of z statistics in brackets * significant at 5%; ** significant at 1%.

Table 6. Portfolio Flows and Financial reform Dependent Variable: Log of portfolio inflows (% GDP)	Estimation Method: Hausman-Taylor Estimator (institutional variables as endogenous)				
Sample: NMS					
Log population	-45.549	-44.796	-21.347	4.846	3.096
	[3.44]**	[3.10]**	[2.62]**	[1.32]	[0.86]
Log Per Capita GDP PPP	-2.689	-2.083	1.098	0.972	1.413
	[1.94]	[1.46]	[1.29]	[1.43]	[2.03]*
Log inflation rate	-0.160	-0.145	-0.058	-0.006	-0.034
	[1.98]*	[1.68]	[0.84]	[0.10]	[0.53]
Log Nat Resources Exports	-0.174	-0.197	-0.195	-0.148	-0.170
	[0.86]	[0.91]	[1.25]	[2.21]*	[2.65]**
Log Per Capita Mobile Phones	0.024	-0.092	0.092	0.257	0.277
	[0.18]	[0.65]	[0.94]	[2.96]**	[3.33]**
Democracy (Polity IV)	-0.026	-0.032	-0.061	-0.089	-0.106
	[0.24]	[0.29]	[0.70]	[1.01]	[1.21]
EU member	0.881	0.875	0.449	0.203	0.216
	[3.82]**	[3.62]**	[2.51]*	[1.39]	[1.46]
International capital flows	-0.355				
	[1.70]				
Financial reform (de jure ffn)		0.410			
		[0.20]			
Financial reform (de facto fd1)			-4.424		
			[3.57]**		
Financial reform (de facto be)				0.596	
				[0.72]	
Deposit Ratio (Beck)					-1.620
					[3.15]**
Constant	690.416	672.219	363.402	-94.571	-65.935
	[3.42]**	[3.04]**	[2.51]*	[1.44]	[1.03]
Observations	46	46	64	85	79
Number of Country	8	8	10	11	11
Sample: EU 15					
Log population	2.324	2.031	3.322	3.432	3.276
	[1.25]	[1.17]	[2.45]*	[2.79]**	[2.38]*
Log Per Capita GDP PPP	0.903	0.998	1.473	0.916	1.183
	[1.73]	[2.05]*	[3.39]**	[2.38]*	[2.66]**
Log inflation rate	0.045	0.039	0.050	0.049	0.068
	[1.14]	[1.05]	[1.25]	[1.33]	[1.69]
Log Nat Resources Exports	0.098	0.040	0.069	0.042	0.051
	[1.23]	[0.52]	[1.04]	[0.66]	[0.80]
Log Per Capita Mobile Phones	0.477	0.442	0.451	0.466	0.426
	[10.54]**	[10.11]**	[11.26]**	[11.84]**	[10.72]**
EU member	0	0	-68.854	0	0
	[.]	[.]	[3.54]**	[.]	[.]

Democracy (Polity IV)			0.072	0.061	0.063
			[0.94]	[0.80]	[0.82]
International capital flows	-15.598				
	[1.78]				
Financial reform (de jure ffn)		2.639			
		[3.21]**			
Financial reform (de facto fd1)			-0.615		
			[1.24]		
Financial reform (de facto be)				0.908	
				[2.08]*	
Deposit Ratio (Beck)					0.892
					[1.12]
Constant	0	-45.429	0	-65.836	-66.277
	[.]	[1.85]	[.]	[3.78]**	[3.47]**
Observations	83	83	102	110	103
Number of Country	14	14	14	14	14
Sample: EU 27					
Log population	5.337	6.269	0.949	4.317	7.03
	[3.03]**	[2.81]**	[0.45]	[3.76]**	[5.52]**
Log Per Capita GDP PPP	3.719	0.784	-0.115	-3.505	0.56
	[3.12]**	[0.60]	[0.20]	[3.44]**	[0.68]
Log inflation rate	-0.018	0.025	0.022	0.026	0.032
	[0.43]	[0.55]	[0.58]	[0.75]	[0.86]
Log Nat Resources Exports	0.06	0.095	0.02	-0.129	-0.106
	[0.66]	[0.96]	[0.25]	[3.80]**	[2.85]**
Log Per Capita Mobile Phones	0.432	0.306	0.367	0.386	0.36
	[7.40]**	[4.57]**	[7.87]**	[9.15]**	[7.68]**
Democracy (Polity IV)	-0.127	-0.057	-0.091	-0.106	-0.078
	[1.54]	[0.65]	[1.60]	[1.95]	[1.33]
EU member	0.307	0.265	0.131	0.077	0.148
	[2.36]*	[1.87]	[1.23]	[0.89]	[1.63]
International capital flows	9.29				
	[2.83]**				
International capital flows[X]	-1.099				
Log Per Capita GDP PPP	[2.98]**				
Financial reform (de jure ffn)		0.131			
		[0.01]			
Financial reform (de jure ffn)[X]		0.098			
Log Per Capita GDP PPP		[0.07]			
Financial reform (de facto fd1)			-35.599		
			[4.10]**		
Financial reform (de facto fd1) [X]			3.478		
Log Per Capita GDP PPP			[3.92]**		
Deposit Ratio (Beck)				-48.206	
				[5.18]**	
Deposit Ratio (Beck) [X]				5.061	

Log Per Capita GDP PPP				[5.03]**	
Financial reform (de facto be)					-2.529
					[0.29]
Financial reform (de facto be) [X]					0.297
Log Per Capita GDP PPP					[0.33]
Constant	-116.593	-109.091	-13.807	-35.658	-117.721
	[3.98]**	[2.65]**	[0.38]	[1.62]	[4.91]**
Observations	129	129	166	182	195
Number of Country	22	22	24	25	25

Absolute value of z statistics in brackets * significant at 5%; ** significant at 1%.

Table 7. FDI and Economic Crises. Dependent Variable: Log of FDI inflows (% GDP)	Estimation Method: Hausman-Taylor Estimator (institutional variables as endogenous)		
Sample: NMS			
Log population	1.307	3.116	0.983
	[0.32]	[0.76]	[0.23]
Log Per Capita GDP PPP	-0.591	-0.26	-0.609
	[0.94]	[0.41]	[0.92]
Log inflation rate	0.059	0.044	0.034
	[0.89]	[0.68]	[0.50]
Log Nat Resources Exports	0.337	0.339	0.375
	[2.21]*	[2.26]*	[2.41]*
Log Per Capita Mobile Phones	0.208	0.194	0.216
	[4.77]**	[4.44]**	[4.58]**
Democracy (Polity IV)	0.151	0.15	0.129
	[2.12]*	[2.15]*	[1.77]
EU member	0.036	-0.003	0.022
	[0.19]	[0.01]	[0.11]
Systemic Banking Crisis	-0.525		
	[2.17]*		
Currency Crisis		-1.161	
		[2.81]**	
Banking crisis output loss (% GDP)			-0.003
			[0.30]
Constant	-17.69	-52.388	-9.071
	[0.24]	[0.70]	[0.14]
Observations	142	142	140
Number of Country	10	10	10
Sample: EU 15			
Log population	-9.172	-9.632	-11.351
	[2.12]*	[2.22]*	[2.53]*
Log Per Capita GDP PPP	2.508	2.661	2.686
	[2.74]**	[2.86]**	[2.73]**
Log inflation rate	0.184	0.187	0.207
	[1.62]	[1.66]	[1.78]
Log Nat Resources Exports	0.1	0.096	0.059
	[0.61]	[0.59]	[0.35]
Log Per Capita Mobile Phones	0.182	0.179	0.219
	[3.06]**	[2.98]**	[3.35]**
Democracy (Polity IV)	-0.4	-0.399	-0.413
	[0.97]	[0.97]	[1.01]
EU member	0.676	0.718	0.458
	[2.48]*	[2.53]*	[1.47]
Systemic Banking Crisis	0.242		
	[0.43]		

Currency Crisis		0.409	
		[0.68]	
Banking crisis output loss (% GDP)			0.004
			[0.33]
Constant	123.877	129.566	157.068
	[1.96]*	[2.05]*	[2.40]*
Observations	229	229	217
Number of Country	14	14	14
Sample: EU 27			
Log population	2.227	2.098	1.273
	[1.24]	[1.18]	[0.69]
Log Per Capita GDP PPP	0.091	0.117	0.097
	[0.20]	[0.26]	[0.20]
Log inflation rate	0.103	0.099	0.111
	[1.59]	[1.54]	[1.69]
Log Nat Resources Exports	0.191	0.193	0.175
	[1.68]	[1.71]	[1.51]
Log Per Capita Mobile Phones	0.193	0.191	0.214
	[5.01]**	[4.98]**	[5.15]**
Democracy (Polity IV)	0.103	0.103	0.072
	[1.21]	[1.21]	[0.84]
EU member	0.13	0.106	0.029
	[0.84]	[0.68]	[0.18]
Systemic Banking Crisis	-0.337		
	[1.26]		
Currency Crisis		-0.785	
		[2.16]*	
Banking crisis output loss (% GDP)			-0.007
			[0.89]
Constant	-37.028	-35.241	-21.486
	[1.29]	[1.25]	[0.73]
Observations	371	371	357
Number of Country	24	24	24

Absolute value of z statistics in brackets * significant at 5%; ** significant at 1%.

The dynamics of portfolio holdings in Emerging Europe[35]

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ABSTRACT

In this paper we examine shifts in the bilateral patterns in international portfolio holdings in emerging Europe during the 2001-2008 period. In relation to the 2001-2007 pre-crisis period, we find some evidence that shifts in the geographical composition of portfolio equity liabilities reflect shifts in bilateral trade patterns. In addition, we find that the new member states disproportionately attracted portfolio equity investment from other members of the European Union after 2004. During the crisis period, we find that the bilateral composition of the shift in portfolio positions is affected by the scale of pre-crisis holdings and the geographical proximity of creditors. We also find that countries in the euro area are more likely to maintain portfolio positions in emerging Europe than were investors from other regions.

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1. INTRODUCTION

Emerging Europe was a major recipient of net capital inflows during the pre-crisis period but has experienced a significant capital flow reversal since the onset of the international financial crisis. Our goal in this paper is to investigate one dimension of this boom-bust cycle by examining shifts in the bilateral patterns in international portfolio holdings in emerging Europe during the 2001-2008 period.

This approach may provide some useful insights for several reasons. First, the bilateral composition of portfolio holdings during the pre-crisis period may have influenced the mechanics of the transmission of the international financial crisis to emerging Europe. Second, the dynamics of bilateral holdings during the crisis may reveal some information about the factors that determine which types of portfolio investors are likely to maintain their positions and which types of portfolio investors are more likely to sell off their holdings during periods of market pressure.

These concerns are reflected in the recent literature on the ``international financial multiplier'' which shows how shocks to an investor's net wealth in one region may result in forced asset sales in other regions (see, amongst others, Krugman 2008 and Devereux and Yetman 2009). The bilateral composition of portfolio positions may also influence aggregate portfolio dynamics in models of limited information, where the stability of investor confidence may relate to bilateral factors. In related fashion, the stickiness of portfolio positions may also be influenced by political economy factors, such as a common institutional framework (e.g. common membership of the European Union).

While there is by now a considerable literature that explores the cross-sectional variation in bilateral portfolio holdings, there is relatively little research on the evolution of bilateral patterns over time. We exploit the growing availability of portfolio data from the IMF's Coordinated Portfolio Investment Survey (CPIS) in order to obtain new empirical evidence on the time series evolution of portfolio positions.

As noted above, understanding the bilateral composition of international portfolios is important for several reasons. First, the scope for international risk sharing is dependent on the geographical composition of the international balance sheet, as is shown by Fratzscher and Imbs (2009). Second, by the same token, bilateral positions also influence the international transmission of financial shocks. Third, the composition of the international investor base may also be influential in determining the level and stability of demand for the liabilities issued by a given country.

The literature that empirically analyses bilateral investment patterns has grown in recent years. While Ghosh and Wolf (2000) and Portes and Rey (2005) examine the drivers of bilateral capital flows, most of the more recent literature has focused on bilateral patterns in portfolio holdings, with a primary emphasis on explaining the cross-sectional variation in the data. A partial list includes Lane (2006a), Lane and Milesi-Ferretti (2007, 2008a) and Aviat and Coeurdacier (2007).

Relative to these recent studies, our contribution innovates by more fully exploiting the time series dimension in the data. Moreover, by controlling for (time-varying) source- and destination-country fixed effects, our empirical specifications are designed to more precisely identify the contribution of bilateral factors in determining shifts in the bilateral patterns in portfolio allocations. Accordingly, we strip out the common components in portfolio dynamics (all countries increasing/decreasing allocations to particular destinations) in order to focus more narrowly on the variation across country pairs in portfolio dynamics.

In analysing the time variation in portfolio patterns over 2001-2008, we consider it useful to split the sample into two periods. First, we establish whether there was significant variation across country pairs in relation to shifts in bilateral portfolio weights during the 2001-2007 pre-crisis period. Second, we explore possible variation across country pairs in relation to portfolio adjustment during the initial phase of the crisis period itself (2007-2008). In particular, we wish to uncover whether some types of bilateral linkages proved to be more stable than others during the crisis period. For instance, is it the case that regional neighbours were less likely to dis-invest in a given country than investors from a more-distant source country? Are investors more likely to exit ``similar'' or “dis-similar” countries? Do institutional features (such as common membership of the European Union) increase the `stickiness' of international portfolio holdings?

In relation to the pre-crisis period, we find that the international variation in portfolio positions in emerging Europe is mostly attributable to aggregate factors and time-invariant bilateral characteristics. For the crisis period, we find that the bilateral composition of the shift in portfolio equity position can be linked to several factors. First, there is a systemic relation between the scale of pre-crisis holdings and the level of pull back during 2008: those countries with the largest portfolio holdings in emerging Europe at the end of 2007 undertook the largest portfolio adjustment during 2008. Second, investors from geographically-proximate countries were less likely to reduce exposures to emerging Europe than were investors from more distant countries. Third, investors from the euro area were more likely to maintain portfolio positions in emerging Europe than were investors from other regions. These results support the idea that the bilateral composition of portfolio inflows is an important factor that matters for the stability of capital flows and that intra-European positions are more stable than inflows from other regions.

The rest of the paper is organized as follows. Section 2 describes the empirical approach. In Sections 3 and 4, we describe the data and report the econometric results. We offer some conclusions in Section 5.

2. EMPIRICAL SETUP

2.1 THE PRE-CRISIS PERIOD

One aim is to explore the dynamics of bilateral portfolio holdings during the pre-crisis period in which the scale of cross-border investment grew very rapidly (Lane and Milesi-Ferretti 2008b). We are especially interested in capturing shifts in bilateral linkages, in order to understand which types of country pairs became especially strongly integrated during this critical period.[36]

The baseline panel specification can be written as

$$\ln(A_{ijt}) = \alpha_{it} + \alpha_{jt} + \gamma_{ij} + \theta_t + \beta X_{ijt} + \varepsilon_{it} \qquad (1)$$

where A_{ijt} is the level of assets held by source country i in a destination country j, α_{it} is a time-varying country source dummy, α_{jt} is a time-varying country host dummy, γ_{ij} is a country-pair fixed effect ($\gamma_{ij} <=> \gamma_{ji}$), θ_t is a common time effect and X_{ijt} is a set of time-varying bilateral variables.

The time-varying source dummy captures the fluctuations in the aggregate portfolio of country i: its level of investment in country j is in part just driven by the size of its overall portfolio. The time-varying host dummy captures the general level of attractiveness of country j as a destination: a high level of investment by country i in country j in year t may just reflect a high level of investment by all countries in destination j in year t. There is an extensive literature studying aggregate capital inflows and aggregate capital outflows - the inclusion of these time-varying source and host dummies means that we do not delve into the determinants of aggregate positions but rather focus on the bilateral dimension of the data.

The country-pair fixed effect captures fixed bilateral characteristics that help to explain average differences across country pairs in the level of bilateral holdings. Finally, the vector X_{ijt} includes variables that may help to explain the time variation in the level of bilateral investment from country i to country j.

The inclusion of the country-pair fixed effect means that it is redundant to include as regressors those bilateral characteristics that do not vary over time, such as the level of bilateral distance between countries i and j, a 'common language' dummy that captures whether a country pair shares a common language and a 'common colony' dummy that captures whether a country pair share a common colonial history. Such variables have been explored extensively in prior empirical work and it is more efficient to just include a general country-pair fixed effect.

In relation to the vector X_{ijt}, our main focus is exploring which factors may have been influential in explaining shifts in the composition of portfolios over the period. For instance, two time-varying forces are the degree of trade integration and the level of exchange rate stability. Accordingly, we include the level of imports by country i from country j to capture trade integration and the level of bilateral exchange rate volatility between countries i and j. Lane (2010) finds for a sample of Asian economies that shifts in bilateral trade are significant

[36] In what follows, we consider the pre-crisis period to be 2001-2007 and the crisis period [within our data span] to be 2008.

in explaining the time-variation in equity positions over 2001-2007, while shifts in bilateral currency volatility (measured over a rolling 36 month window) are significant in explaining the time-variation in bond positions.

In addition to the base specification we examine an expanded specification that includes regional dummies

$$\ln(A_{ijt}) = \alpha_{it} + \alpha_{jt} + \gamma_{ij} + \theta_t + \beta X_{ijt} + \mu EU27_{ij} + \eta EA_i + \pi NATO_{ij} + \varepsilon_{it} \quad (2)$$

where $EU27_{ij}$ takes a value of 0 before 2003 and 1 after 2004 if both source and host countries belong to the European Union.[37] We consider common membership of the European Union to be relevant in view of the extensive institutional linkages across these countries. EA_i is a dummy taking value of 1 if the source country is a member of Euro Area. We also include common $NATO_{ij}$ membership in a given year as a potentially important factor driving capital flows.[38]

2.2 THE CRISIS PERIOD

A core objective of this paper is to investigate shifts in bilateral positions during the crisis period. In particular, we wish to uncover whether some types of bilateral linkages proved to be more stable than others during the crisis period. For instance, is it the case that neighbours were less likely to disinvest in a given country than investors from a more-distant source country? The shifts in portfolio allocation during 2008 are explored by estimating various versions of the differenced equation

$$\Delta\ln(A_{ij}) = \alpha_i + \alpha_j + \gamma\ln(A_{ij2007}) + \lambda\ln(DIST_{ij}) + \omega BORD_{ij} + \mu EU27_{ij} + \eta EA_i + \pi NATO_{ij} + \varepsilon_{it} \quad (3)$$

In this set up, the source and host country fixed effects capture common portfolio dynamics during the crisis (the common exit from some destination countries across all investors; the common decline in aggregate outward investment across all destinations by some source countries). We control for the end-2007 level of the bilateral portfolio position, since the scale of portfolio adjustment during 2008 may be related to the scale of the initial exposure. We allow geographical factors to influence the crisis dynamics by including bilateral distance and a border dummy. As in the pre-crisis panel, we also explore the role of institutional factors, as captured by the $EU27_{ij}$, EA_i and $NATO_{ij}$ dummies. The equations are estimated by ordinary least squares, with robust standard errors.

3. DATA

We analyse the bilateral distribution of portfolio asset holdings, based on data from the Coordinated Portfolio Investment Survey (CPIS), which has been running since 2001.[39] Accordingly, the sample range covers seven years of data (2001 through 2008). The CPIS reports three categories: portfolio equity assets, long-term portfolio debt assets and short-term portfolio debt assets.[40]

It is important to be aware of the limitations of the CPIS data (see the extensive discussion in Lane and Milesi-Ferretti 2008a). First, the CPIS is intended to cover the portfolio allocations of entities resident in a given reporting country. However, in turn, a resident entity may be owned by foreign investors, such that the CPIS does not necessarily capture the true portfolio exposures of local households. Second, the CPIS cannot disentangle the impact of offshore financial centers on ultimate portfolio allocations. That is, the CPIS reports the level of holdings by a given reporting country in a given offshore financial center. However, we know that the offshore center is not the final destination, since the fund in the offshore center in turn will allocate the investment to its final destinations. Third, the quality of the CPIS data surely varies across reporting countries, in line with the level of technical expertise and the degree of compliance with the CPIS manual. For instance, holdings are surely under-reported by some countries due to incomplete coverage or the complexities of tax-driven asset management structures.

[37] We start with 2003 to allow for announcement effects.
[38] NATO members and the joining years are United States (1949), United Kingdom (1949), Belgium (1949), Denmark (1949), France (1949), Italy (1949), Luxembourg (1949), Netherlands (1949), Norway (1949), Canada (1949), Iceland (1949), Portugal (1949), Greece (1952), Turkey (1952), Germany (1955), Spain (1982), Czech Republic (1999), Hungary (1999), Poland (1999), Bulgaria (2004), Slovakia (2004), Estonia (2004), Latvia (2004), Lithuania (2004), Slovenia (2004), Romania (2004), Albania (2009), Croatia (2009).
[39] A trial survey was conducted in 1997 with only a limited number of reporting countries.
[40] Due to poor quality data on short-term portfolio debt assets in our sample, we analyse only portfolio equity liabilities and long-term portfolio debt liabilities.

The CPIS does not report the domestic holdings of investors, such that it does not provide a complete profile of the composition of portfolios but rather only details the geographical breakdown of the cross-border component of investment positions. Moreover, the CPIS reports only aggregate holdings: it does not provide the decomposition in terms of whether securities are issued (or held) by public or private institutions and or the relative holdings of individual investors versus financial intermediaries. For these reasons, the CPIS, while useful, by no means provides a complete profile of the investor base in international bond markets.

The level of bilateral imports is calculated from the IMF's *Direction of Trade Statistics* database. Bilateral nominal exchange rate volatility is measured as the standard deviation of the growth rate of the monthly bilateral exchange rate over 36-month moving window. The data on the nominal exchange rate are taken from IMF's *International Financial Statistics* database. The distance and border variables are taken from CEPII *Distances* database.

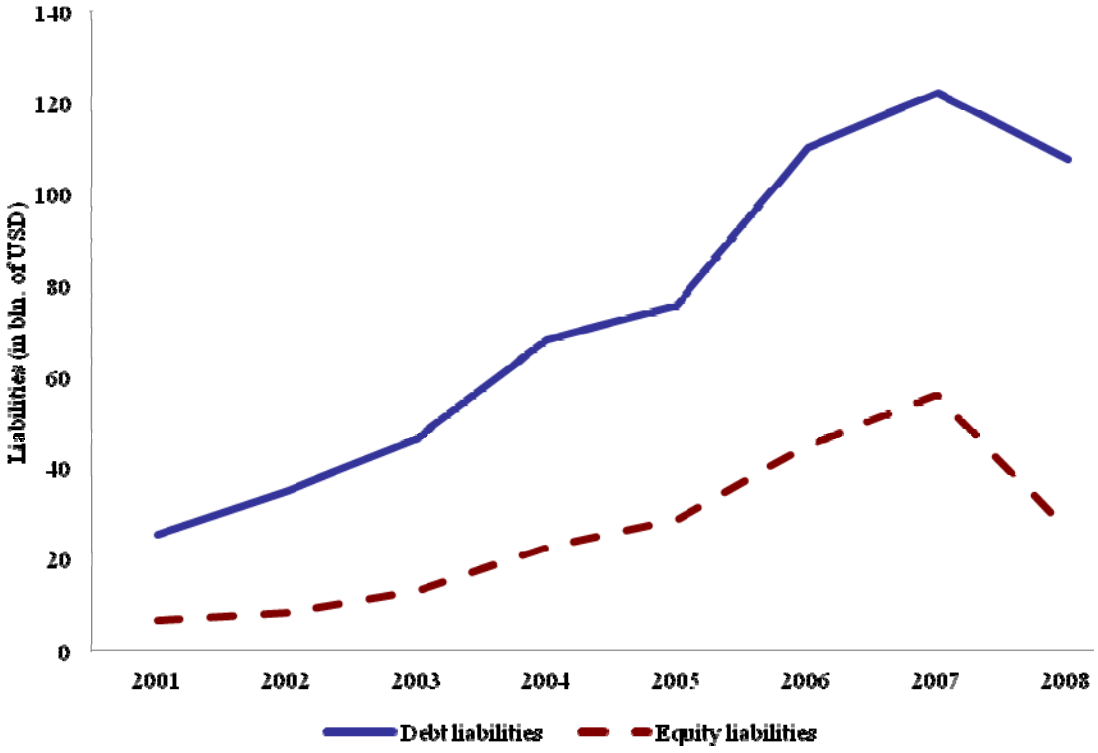
We consider several sample variations. The broadest definition of `emerging Europe' includes the new EU member states, South-Eastern Europe, the CIS and Turkey. However, in addition, we also examine narrower definitions, including a restricted version that focuses only on the EU new member states.[41]

4. EMPIRICAL RESULTS

4.1 STYLIZED FACTS

Figure 1 plots the evolution of portfolio debt and equity liabilities for the combined set of new members states. From 2001 to 2007, an upward trend is undeniable. But there was a sharp reversal in 2008 for both categories, with the decline especially severe for portfolio equity liabilities.

Figure 1: Portfolio debt and equity liabilities of NMS



Note: Author's calculations based on CPIS data.

[41] The main sample of destination countries includes Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, Slovenia, Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyz Republic, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Albania, Bosnia and Herzegovina, Croatia, FYR of Macedonia, Serbia and Turkey.

Table 1 and Table 2 present the stock of portfolio debt liabilities and portfolio equity liabilities as a share of GDP for a selected group of countries. Over the course of 2001-2007, Latvia experienced an increase in the long term debt from 58 to 125 percent of GDP. Latvia was not alone, the other Baltic countries together with Hungary and Slovenia also experienced a similar growth of long-term debt.

Other new member states experienced a relatively modest increase in portfolio debt liabilities. The Czech Republic, Poland and Romania experienced an average increase of portfolio debt by approximately 10 percentage points. Bulgaria and the Slovak Republic experienced declines of portfolio debt to GDP ratios over the period of 2001-2007. [42] During 2008, most countries faced a decline in portfolio debt to GDP ratios, with the contraction ranging from 12 percentage points for Latvia to 0.1 percentage points for Romania.[43] Among the other countries in our sample, only Albania, Croatia and Kazakhstan experienced large increases in the ratio of portfolio debt to GDP. In general, this ratio was either stable or facing a downward trend in the set of non-member countries.

Portfolio equity liabilities have a smaller share in total liabilities, but the dynamics are similar. All new member states experienced an increase in equity liabilities as a share of GDP over 2001-2007 but a substantial decline during 2008. In the set of non-member countries, the changes in equity liabilities are trivial, as are their shares relative to GDP. An exception is the Russian Federation. Its share of equity liabilities relative to GDP grew from 9 percent in 2001 to 24 percent in 2007 then collapsed to 5 percent in 2008.

Table 1: Summary of aggregate stocks: portfolio debt liabilities

	2001	**2007**	**2008**
Bulgaria	74.6	68.1	63.8
Czech Republic	29.7	37.7	32.3
Estonia	39.5	99.3	94.9
Hungary	52.3	85.4	89.2
Latvia	57.6	124.9	112.7
Lithuania	37.6	69.0	60.0
Poland	32.3	43.8	37.0
Romania	29.7	40.6	40.5
Slovak Republic	47.3	45.2	41.8
Slovenia	41.4	95.9	87.7
Armenia	65.9	26.3	25.6
Azerbaijan	30.2	22.2	20.1
Belarus	24.3	26.5	24.0
Kazakhstan	27.7	63.7	53.6
Kyrgyz Republic	112.0	70.3	56.1
Moldova	106.1	64.6	55.8
Russian federation	49.7	33.9	27.1
Tajikistan	120.4	40.9	43.5
Turkmenistan	26.9	2.4	2.7
Ukraine	53.7	53.7	54.2
Uzbekistan	41.9	17.4	13.6
Albania	0.3	17.6	16.9
Bosnia & Herzegovina	47.5	48.4	43.2
Croatia	48.3	72.8	69.9
Macedonia, FYR.	48.1	44.6	39.3
Montenegro	-	65.5	76.8
Serbia	97.3	64.9	61.8
Turkey	57.1	40.7	38.5

[42] Bulgaria had the highest level of debt as a share of GDP among all NMS in 2001.
[43] Hungary experienced and increase of 3.7 percentage points.

Note: Stock over GDP ratio in percent. The calculations are based on the updated version of the dataset constructed by Lane and Milesi-Ferretti (2007).

Table 2: Summary of aggregate stocks: portfolio equity liabilities

	2001	2007	2008
Bulgaria	0.7	2.6	1.4
Czech Republic	5.7	8.3	4.3
Estonia	6.5	11.7	3.1
Hungary	5.5	11.0	5.8
Latvia	0.5	1.3	0.7
Lithuania	0.8	1.9	0.7
Poland	2.3	7.8	3.0
Romania	0.6	4.0	1.1
Slovak Republic	4.0	9.5	6.5
Slovenia	1.1	6.4	1.6
Armenia	0.1	0.1	0.1
Azerbaijan	0.0	0.0	0.0
Belarus	0.1	0.1	0.0
Kazakhstan	0.7	9.7	3.0
Kyrgyz Republic	0.0	0.4	0.4
Moldova	0.9	0.9	0.8
Russian federation	8.9	23.5	4.9
Tajikistan	0.0	0.1	0.0
Turkmenistan	0.2	0.0	0.0
Ukraine	2.0	1.5	1.3
Uzbekistan	0.0	0.0	0.0
Albania	0.3	0.7	0.6
Bosnia & Herzegovina	0.0	0.3	0.2
Croatia	2.5	6.9	2.2
Macedonia, FYR.	0.2	4.1	2.9
Montenegro	-	0.9	0.6
Serbia	0.0	3.1	2.4
Turkey	2.9	9.9	3.2

Note: Stock over GDP ratio in percent. The calculations are based on the updated version of the dataset constructed by Lane and Milesi-Ferretti (2007).

Table 3 and Table 4 provide information on bilateral portfolio holdings. As can be seen from the table, the primary source of portfolio debt investment is the set of EU countries.[44] In relation to portfolio asset positions, the share of long-term portfolio debt allocated to destination countries is the highest for Latvia, reaching only 9 percent in 2007.

The pattern is more diverse in relation to portfolio equity liabilities. Almost all countries receive most of their equity liabilities from North America and the EU.[45]. The Slovak Republic is the only country that receives most of its equity funds from other new member states.

[44]These countries do not include new members of the EU that joined in 2004. The sample of countries varies among destination countries.
[45]These countries do not include NMS

Table 3: Summary of bilateral positions: long term portfolio debt liabilities

Host	Source	2001	2007	2008
Bulgaria	EU27	33.5	88.5	89.7
Bulgaria	NMS	0.0	0.5	1.2
Bulgaria	US+CAN	63.4	8.7	6.9
Bulgaria	ROW	3.2	2.3	2.3
Czech Republic	EU27	92.9	92.3	90.0
Czech Republic	NMS	1.4	0.5	1.5
Czech Republic	US+CAN	3.4	1.7	0.6
Czech Republic	ROW	2.3	5.5	7.8
Estonia	EU27	97.3	95.5	94.1
Estonia	NMS	1.6	2.3	3.0
Estonia	US+CAN	1.0	1.6	1.8
Estonia	ROW	0.0	0.7	1.1
Hungary	EU27	85.0	86.8	84.0
Hungary	NMS	1.9	2.5	3.1
Hungary	US+CAN	3.2	5.1	5.6
Hungary	ROW	9.9	5.6	7.3
Latvia	EU27	99.2	86.5	89.8
Latvia	NMS	0.8	9.4	7.4
Latvia	US+CAN	0.0	0.0	0.1
Latvia	ROW	0.0	4.1	2.7
Lithuania	EU27	93.1	96.8	96.9
Lithuania	NMS	1.2	0.6	1.2
Lithuania	US+CAN	5.6	1.2	1.1
Lithuania	ROW	0.0	1.4	0.8
Poland	EU27	60.2	76.0	74.4
Poland	NMS	3.0	2.2	2.9
Poland	US+CAN	36.1	10.2	9.2
Poland	ROW	0.7	11.6	13.5
Romania	EU27	97.7	98.1	98.5
Romania	NMS	0.0	1.4	1.4
Romania	US+CAN	1.1	0.0	0.0
Romania	ROW	1.1	0.4	0.0
Slovak Republic	EU27	85.6	89.9	60.4
Slovak Republic	NMS	3.8	8.1	6.7
Slovak Republic	US+CAN	8.3	1.1	0.3
Slovak Republic	ROW	2.3	1.0	32.5
Slovenia	EU27	99.2	95.2	92.3
Slovenia	NMS	0.0	1.6	1.2
Slovenia	US+CAN	0.7	0.9	0.7
Slovenia	ROW	0.1	2.4	5.9

Note: The numbers indicate percentage shares in total debt liabilities. Authors' calculations based on CPIS. The sample of source countries varies among destination countries.

Table 4: Summary of bilateral positions: portfolio equity liabilities

Host	Source	2001	2007	2008
Bulgaria	EU27	100.0	58.3	66.3
Bulgaria	NMS	0.0	11.8	6.3
Bulgaria	US+CAN	0.0	29.7	27.2
Bulgaria	ROW	0.0	0.2	0.2
Czech Republic	EU27	44.4	39.0	24.8
Czech Republic	NMS	2.1	3.5	11.6
Czech Republic	US+CAN	52.6	53.8	55.4
Czech Republic	ROW	0.9	3.7	8.2
Estonia	EU27	47.4	75.6	71.0
Estonia	NMS	0.0	10.7	12.4
Estonia	US+CAN	52.6	10.7	13.2
Estonia	ROW	0.0	3.0	3.4
Hungary	EU27	42.1	40.0	33.3
Hungary	NMS	0.4	6.8	6.6
Hungary	US+CAN	56.5	47.7	51.8
Hungary	ROW	1.0	5.5	8.4
Latvia	EU27	33.2	70.6	64.6
Latvia	NMS	7.5	16.2	6.7
Latvia	US+CAN	57.8	8.9	1.2
Latvia	ROW	1.5	4.3	27.5
Lithuania	EU27	46.7	73.8	76.0
Lithuania	NMS	35.5	16.6	14.4
Lithuania	US+CAN	16.0	6.4	6.2
Lithuania	ROW	1.8	3.2	3.4
Poland	EU27	43.4	53.0	45.3
Poland	NMS	0.8	3.8	4.4
Poland	US+CAN	54.6	39.3	42.6
Poland	ROW	1.2	3.8	7.7
Romania	EU27	86.9	69.8	81.7
Romania	NMS	0.4	6.6	1.5
Romania	US+CAN	7.2	22.8	16.8
Romania	ROW	5.5	0.9	0.1
Slovak Republic	EU27	30.8	13.4	25.5
Slovak Republic	NMS	64.6	86.2	74.5
Slovak Republic	US+CAN	4.6	0.0	0.0
Slovak Republic	ROW	0.0	0.4	0.0
Slovenia	EU27	98.4	56.7	69.3
Slovenia	NMS	0.1	0.6	0.2
Slovenia	US+CAN	1.4	42.7	24.6
Slovenia	ROW	0.0	0.0	5.9

Note: The numbers indicate percentage shares in total equity liabilities. Authors' calculations based on CPIS. The sample of source countries varies among destination countries.

4.2 PANEL ESTIMSTES: THE PRE-CRISIS PERIOD

Table 5 presents panel regressions for the long term debt category for the period of 2001-2007. Columns (1), (2) and (3) indicate results for the total sample, while columns (4), (5) and (6) indicate results for new member state destinations only. Imports are positive and marginally significant, implying that shifts in the bilateral composition of portfolio debt holdings can be weakly linked to shifts in the bilateral composition of trade. At the same time, shifts in the volatility of bilateral exchange rates and NATO membership do not help to explain portfolio shifts. Columns (4), (5) and (6) indicate that there is no trend portfolio shift towards intra-EU positions. Finally, $R^{2,control}$ represents the explained sum of squares from a regression of the endogenous variable on the time variant source, host and time invariant bilateral dummies, R^2 represents the explained sum of squares from a regression of the endogenous variable on the time variant source and host dummies, time invariant bilateral dummies and the controls presented in the table, while $R^{2,marginal}$ indicates percentage contribution of the additional variables in explaining the variance of the dependent variable. All of the regressions include common time effects. The results indicate that the main drivers of cross-country debt holdings are captured by the set of time-varying source and host dummies and the time-invariant country pair dummy: shifts in bilateral factors are not important in explaining shifts in portfolio shares.

Table 5: Panel: long term portfolio debt liabilities

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
imports	0.05	0.05	0.05	0.08	0.08	0.08
	(0.03)*	(0.03)*	(0.03)*	(0.06)	(0.06)	(0.06)
er.vol.	6.71	7.07	7.03	4.93	4.93	4.95
	(8.37)	(8.46)	(8.48)	(12.42)	(12.42)	(12.41)
EU27		0.08	0.02		-0.30	-0.43
		(0.21)	(0.21)		(0.66)	(0.62)
EA		0.07	-2.62		0.22	-0.19
		(1.08)	(0.94)***		(0.70)	(1.03)
NATO			0.18			-0.06
			(0.19)			(0.27)
$R^{2,control}$	0.92	0.92	0.92	0.92	0.92	0.92
R^2	0.92	0.92	0.92	0.92	0.92	0.92
$R^{2,marginal}$	0.001	0.001	0.002	0.001	0.001	0.001
Sample	All	All	All	NMS	NMS	NMS
Observations	4241	4241	4241	1869	1869	1869

Note: Columns (1), (2) and (3) present the results from our expanded sample. Columns (4), (5) and (6) present the results for the new member states only. All regressions include a fixed bilateral dummy and a common time fixed effect. $R^{2,control}$ represents the explained sum of squares from a regression of the endogenous variable on the time variant source, host and time invariant bilateral dummies, while R^2 represents the explained sum of squares from a regression of the endogenous variable on the time variant source and host dummies, time invariant bilateral dummies and the controls presented in the table. $R^{2,marginal}$=1-RSS/$RSS^{control}$, where RSS is the residual sum of squares. Imports are in logs. Robust standard errors in parenthesis.
***,**,* significant at 1, 5 and 10 percent respectively.

Table 6 presents panel regressions for portfolio equity liabilities for the period of 2001-2007. Columns (1), (2) and (3) indicate results for the total sample, while columns (4), (5) and (6) indicate results for new member states destinations only. Neither imports nor exchange rate volatility is significant in explaining shifts in portfolio equity positions. However, in both samples, common EU membership has a positive and significant effect on portfolio equity liabilities. Euro area dummy is also positive and statistically significant in columns (2), (5) and (6). Finally, the explained sum of squares from different regressions indicate that, even though being a member of the EU is important, the main drivers of cross-country portfolio equity liabilities are captured by the set of dummies.

Table 6: Panel: portfolio equity liabilities

	(1)	(2)	(3)	(4)	(5)	(6)
imports	-0.01	-0.01	-0.01	0.02	0.02	0.01
	(0.02)	(0.02)	(0.02)	(0.05)	(0.05)	(0.05)
er.vol.	8.66	11.12	11.18	5.79	5.79	6.00
	(9.33)	(9.47)	(9.47)	(11.80)	(11.80)	(11.81)
EU27		0.54	0.55		2.89	1.00
		(0.21)**	(0.22)**		(0.72)***	(0.87)
EA		2.79	-0.08		3.23	1.95
		(1.05)***	(1.28)		(1.07)***	(0.78)**
NATO			-0.06			-0.24
			(0.21)			(0.25)
$R^{2,control}$	0.90	0.90	0.90	0.91	0.91	0.91
R^2	0.90	0.90	0.90	0.91	0.91	0.91
$R^{2,marginal}$	0.000	0.003	0.003	0.000	0.000	0.001
Sample	All	All	All	NMS	NMS	NMS
Observations	4238	4238	4238	1877	1877	1877

Note: Columns (1), (2) and (3) present the results from our expanded sample. Columns (4), (5) and (6) present the results for the new member states only. All regressions include a fixed bilateral dummy and a common time fixed effect. $R^{2,control}$ represents the explained sum of squares from a regression of the endogenous variable on the time variant source, host and time invariant bilateral dummies, while R^2 represents the explained sum of squares from a regression of the endogenous variable on the time variant source and host dummies, time invariant bilateral dummies and the controls presented in the table. $R^{2,marginal}$=1-RSS/$RSS^{control}$, where RSS is the residual sum of squares. Imports are in logs. Robust standard errors in parenthesis.
***,**,* significant at 1, 5 and 10 percent respectively.

4.3 CROSS-SECTION ESTIMATES: THE CRISIS PERIOD

In this subsection, we turn to the shifts in bilateral portfolio positions between end-2007 and end-2008. In particular, we estimate the relation between the bilateral variation in the shift in portfolio holdings during 2008 and a set of fundamentals. Table 7 presents the results for long-term portfolio debt. Columns (1), (2) and (3) indicate results for the total sample, while columns (4), (5) and (6) indicate results for new member state destinations only. We find that the change in the long-term debt position is negatively related to the initial value of the position: creditors with larger initial stocks ran faster. One interpretation is that those entities holding the largest positions may have faced the most pressure to exit. Another is that large initial positions may have indicated an over-weighting that required rapid correction during the crisis.

In addition, we find that geographical proximity is a stabilising factor: investors from neighbouring countries are more likely to maintain positions than than investors from more distant countries. The distance variables may be interpreted as a proxy for the level of information or knowledge about the destination countries, with more informed investors more likely to maintain positions.

Finally, $R^{2,control}$ represents the explained sum of squares from a regression of the endogenous variable on the time invariant source and host dummies, R^2 represents the explained sum of squares from a regression of the endogenous variable on the source, host dummies and the controls presented in the table, while $R^{2,marginal}$ indicates percentage contribution of the additional variables in explaining the variance of the dependent variable. Although a good share of cross-country variation in portfolio debt flows is explained by common exit from destination countries and common decline of outward investments across all destinations by some source countries, the initial scale of the portfolio position and the distance variables have a non-negligible degree of explanatory power.

Table 7: Cross-sectional Regressions: Long Term Portfolio Debt Liabilities

	(1)	(2)	(3)	(4)	(5)	(6)
$stock_{2007}$	-0.16	-0.16	-0.16	-0.22	-0.21	-0.21
	(0.03)***	(0.03)***	(0.03)***	(0.06)***	(0.06)***	(0.06)***
distance	-0.27	-0.01	-0.01	-0.44	0.01	0.01
	(0.13)**	(0.14)	(0.14)	(0.22)**	(0.24)	(0.24)
border		0.85	0.85		1.23	1.23
		(0.32)***	(0.32)***		(0.48)**	(0.48)**
EU27	0.04	0.12	0.17	-0.32	0.18	1.26
	(0.22)	(0.22)	(0.23)	(0.82)	(0.73)	(0.29)***
EA	0.32	0.63	0.67	0.18	0.35	0.35
	(0.43)	(0.46)	(0.57)	(0.80)	(0.76)	(0.76)
NATO			-0.15			-1.07
			(0.21)			(0.51)**
$R^{2,control}$	0.13	0.13	0.13	0.20	0.20	0.20
R^2	0.19	0.21	0.21	0.26	0.29	0.29
$R^{2,marginal}$	0.068	0.088	0.089	0.080	0.117	0.117
Sample	All	All	All	NMS	NMS	NMS
Observations	605	605	605	269	269	269

Note: The dependent variable is the flow. All regressions include fixed host and source dummies. $R^{2,control}$ represents the explained sum of squares from a regression of the endogenous variable on the time invariant source and host dummies, while R^2 represents the explained sum of squares from a regression of the endogenous variable on the time invariant source and host dummies and the controls presented in the table. $R^{2,marginal}$=1-RSS/$RSS^{control}$, where RSS is the residual sum of squares. $Stock_{2007}$ and distance are in logs. Robust standard errors in parenthesis.
***,**,* significant at 1, 5 and 10 percent respectively.

Table 8 presents the results for the dynamics of portfolio equity liabilities during 2008. Columns (1), (2) and (3) indicate results for the total sample, while columns (4), (5) and (6) indicate results for new member state destinations only. As was the case for portfolio debt, the degree of portfolio equity adjustment is negatively related to the initial value of the stock of portfolio equity liabilities: creditors with larger initial stocks ran faster. Similarly, we find that the distance variables matter, with investors from proximate countries more likely to maintain positions. We also find that investors from the euro area were more likely to maintain equity positions in the new member states in columns (2)-(6). Common membership to NATO is positive and statistically significant in column (3).

Table 8: Cross-sectional regressions: portfolio equity liabilities

	(1)	(2)	(3)	(4)	(5)	(6)
$stock_{2007}$	-0.35	-0.35	-0.35	-0.31	-0.32	-0.32
	(0.05)***	(0.05)***	(0.05)***	(0.06)***	(0.06)***	(0.06)***
distance	-0.71	-0.64	-0.62	-0.84	-0.61	-0.61
	(0.15)***	(0.16)***	(0.15)***	(0.24)***	(0.24)**	(0.24)**
border		0.25	0.27		0.59	0.59
		(0.32)	(0.32)		(0.50)	(0.50)
EU27	0.02	0.05	-0.18	-3.79	-1.87	-4.97
	(0.25)	(0.26)	(0.25)	(1.01)***	(0.69)***	(0.89)***
EA	0.95	2.73	1.23	2.32	2.89	4.38
	(0.69)	(0.66)***	(0.72)*	(0.56)***	(0.74)***	(1.33)***
NATO			0.53			1.50
			(0.25)**			(0.93)
$R^{2,control}$	0.26	0.26	0.26	0.34	0.34	0.34
R^2	0.42	0.42	0.43	0.45	0.45	0.45
$R^{2,marginal}$	0.216	0.218	0.224	0.170	0.177	0.177
Sample	All	All	All	NMS	NMS	NMS
Observations	610	610	610	268	268	268

Note: The dependent variable is the flow. All regressions include fixed host and source dummies. $R^{2,control}$ represents the explained sum of squares from a regression of the endogenous variable on the time invariant source and host dummies, while R^2 represents the explained sum of squares from a regression of the endogenous variable on the time invariant source and host dummies and the controls presented in the table. $R^{2,marginal}$=1-RSS/$RSS^{control}$, where RSS is the residual sum of squares. $Stock_{2007}$ and distance are in logs. Robust standard errors in parenthesis.
***,**,* significant at 1, 5 and 10 percent respectively.

5. CONCLUSIONS

Our goal in this paper is to examine shifts in the bilateral patterns in international portfolio holdings in emerging Europe during the 2001-2008 period. Accordingly, our approach in this paper is complementary to other studies that focus on the determinants of aggregate capital inflows and aggregate capital outflows.

In relation to the 2001-2007 pre-crisis period, we find some evidence that shifts in the geographical composition of portfolio equity liabilities reflect shifts in bilateral trade patterns. In addition, we find that the new member states disproportionately attracted portfolio equity investment from other members of the European Union after 2004.

During the 2008 crisis period, we find that the bilateral composition of the shift in portfolio positions can be linked to several factors. First, there is a systemic relation between the scale of pre-crisis holdings and the level of pull back during 2008. Second, investors from geographically-proximate countries were less likely to reduce exposures to emerging Europe than were investors from more distant countries. Third, investors from the euro area were more likely to maintain portfolio positions in emerging Europe than were investors from other regions. These results support the idea that the bilateral composition of portfolio inflows is an important factor that matters for the stability of capital flows and that intra-European positions are more stable than inflows from other regions.

We have focused on the geographical composition of portfolio positions in emerging Europe. It would be desirable to complement this study by looking at other dis-aggregations of the portfolio data. For instance, it would be interesting to know whether there are differences in behaviour across retail-based mutual funds, hedge funds and institutional investors such as pension funds and insurance companies. Along another dimension, it would be valuable to compare behaviour across specialist funds with a focus on emerging Europe versus global-type funds.

In addition, it would be helpful to conduct a similar study for the bilateral patterns in banking positions and in foreign direct investment. Finally, our dataset only extends to 2008. Once the 2009 data are released, it will be important to revisit our estimates since the end-2008 data only capture the initial stages of the global crisis.

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The determinants of cross-border bank flows to emerging markets: new empirical evidence on the spread of financial crises

Sabine Herrmann and Dubravko Mihaljek[46]

ABSTRACT

This paper studies the nature of spillover effects in bank lending flows from advanced to the emerging market economies and identifies specific channels through which such effects occur. We examine a panel data set of cross-border bank flows from 17 advanced to 28 emerging market economies in Asia, Latin America and central and eastern Europe from 1993 to 2008. Our empirical framework is based on a gravity model of financial flows. We augment this model with global, lender and borrower country risk factors, as well as financial and monetary integration variables. The empirical analysis suggests that global as well as country specific factors are significant determinants of cross-border bank flows. Greater global risk aversion and expected financial market volatility have been the most important factors behind the decrease in cross-border bank flows during the crisis of 2007–08. The decrease in cross-border loans to central and eastern Europe was more limited compared to Asia and Latin America, in large measure because of the higher degree of financial and monetary integration in Europe, and relatively sound banking systems in the region. These results are robust to various specification, sub-samples and econometric methodologies.

JEL classification: F34, F36, G01, O57, C23

Keywords: gravity model, cross-border bank flows, financial crises, emerging market economies, spillover effects, panel data.

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1 INTRODUCTION

International banks have been a major source of external finance for emerging market economies (EMEs) over the past decade. It is therefore not surprising that financial linkages, and in particular bank lending ties, have been identified as one of the main channels of transmission of the 2007–09 crisis from advanced to the emerging markets (IMF, 2009a). Understanding the determinants of cross-border bank flows should therefore be a key to understanding how the crisis was transmitted, and why different EMEs were affected differently. It is also important for financial stability in advanced economies, considering the negative feedbacks of financial crises in EMEs on advanced economy banks.

This paper tries to clarify the nature of spillover effects in cross-border lending and to identify specific channels through which crises spread from advanced to the emerging markets. The empirical investigation is based on a gravity model of financial flows. The basic idea of gravity models, which have become the workhorse in the empirical trade literature, is to explain bilateral trade with distance between the countries and their economic size (Anderson, 1979). Recently, gravity models have also been used to explain financial flows. Martin and Rey (2004) developed a two-country model that allowed to link home bias, financial market size and asset returns to the size of an economy. Portes and Rey (2005) applied gravity equations to cross-border equity transactions, and Aviat and Coeurdacier (2007) to bilateral asset holdings.

Our paper extends this literature to the study of cross-border bank flows. Our basic model includes distance, GDP of lender and borrower countries, growth differentials, interest rate differentials, and bilateral exchange rate changes as the determinants of cross-border bank flows. We extend this model with four additional sets of factors affecting the cross-border flows: (i) global risk and global financial market volatility; (ii) the state of financial health of banks in advanced economies and their exposure to a primary crisis country; (iii) macroeconomic vulnerabilities in borrowing countries; and (iv) the degree of monetary and financial integration with borrower countries. The paper thus forms part of a small and fairly recent literature linking the determinants of cross-border bank flows and financial stress indicators (see eg Buch et al, 2009; McGuire and Tarashev, 2008; World Bank, 2008).

Our data set contains some 30,500 observations on bilateral credit flows from banks in 17 advanced economies to 28 emerging market countries between 1993 and 2008. Besides this unique data set, the paper makes some methodological contributions. In order to exploit full information contained in the data on zero bilateral flows, we estimate separately the decisions whether banks in advanced economies lend to emerging markets, and how much they lend. To this end, we estimate in addition to the standard random effects panel model a two-step Heckman selection model for panel data, following Wooldridge (1995, 2002), Mundlak (1978) and Chamberlain (1980, 1982).

Our analysis suggests that global as well as country specific factors are significant determinants of cross-border bank flows. In the latest financial crisis, greater global risk aversion and expected financial market volatility seem to have been the most important channels through which spillover effects occurred. In central and eastern Europe (CEE), sound banking systems, stronger financial integration with advanced economies, and fixed exchange rate regimes have limited the decrease in cross-border bank flows despite pronounced vulnerabilities of these economies on the eve of the crisis.

The rest of the paper is organised as follows. Chapter 2 reviews stylised facts on cross-border bank flows to emerging markets. Chapter 3 links our approach to the existing literature. Chapter 4 specifies the model and the data and summarises the main results. Chapter 5 provides a comprehensive set of robustness checks. Chapter 6 concludes.

2. STYLIZED FACTS ON CROSS-BORDER BANK FLOWS TO EMERGING MARKETS

Data in Table 1 provide some key stylised facts on the development of cross-border bank flows to emerging markets. The external positions of BIS reporting banks vis-à-vis emerging markets increased more than four times between 1990 and 2008.[47] The expansion in cross-border financing was most pronounced in CEE, where external positions and cross-border loans outstanding at the end of 2008 were 13 times higher than at the end of 1990. The exposures of BIS reporting banks in CEE at the end of 2008 were roughly the same as those in emerging Asia, which is five times larger in terms of GDP compared to CEE.

Table 1. Cross-border loans to emerging market economies[1]

	All EMEs	Asia	Latin America	CEE
Amounts outstanding In billions of USD, end of period				
1990	406	165	191	50
1999	646	303	249	94
2008	1,695	679	351	666
Growth rates In percent, y/y, period average[2]				
1990–2008	9.3	11.3	3.5	17.4
1990–1999	5.9	10.6	1.7	9.3
2000–2008	13.2	12.0	5.5	26.5

[1] External positions of 17 BIS reporting banks from advanced economies vis-à-vis all sectors (banks and the non-bank sector) in 28 emerging market countries.

[2] Calculated from quarterly data; four-quarter percentage changes, period averages.

Source: BIS, locational banking statistics; authors' calculations.

Graph 1 shows that the dynamics of cross-border bank flows differed across time and emerging market regions. During the 1990s there were two distinct crisis episodes: the Mexican crisis of 1994–95, and the Asian crisis of 1997–99. The Mexican crisis was short-lived and affected only Latin America.[48] The effects of the Asian financial crises on cross-border bank flows were much bigger and lasted longer. Indonesia, Korea, Malaysia, the Philippines and Thailand were hit the hardest and experienced strong and long-lasting reductions in cross-border bank flows between mid-1997 and end-1999. Latin America was strongly affected by contagion from the Russian domestic debt default in 1998. Despite the proximity of the Russian market, CEE was less affected at the time.

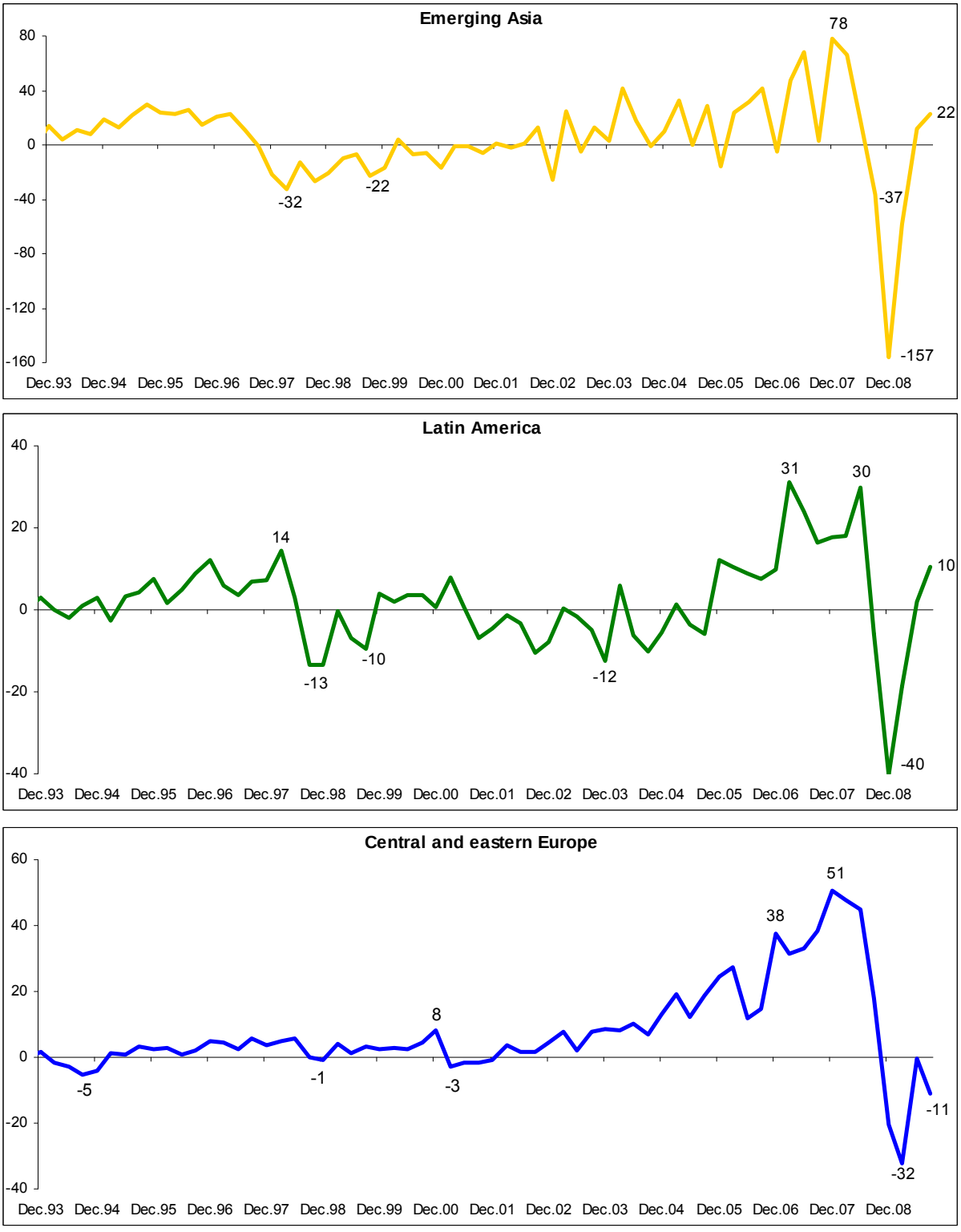
The early 2000s were a period of muted inflows in all three regions, interrupted by occasional sharp reductions of inflows. Bank flows to Asia and CEE resumed strongly in 2003, and to Latin America in 2006. Financial liberalisation, sophisticated new financial products, and the search for yield in an environment of low global interest rates led the international banks to expand their operations in emerging markets, particularly CEE (see Mihaljek, 2008). During 2005–08, the CEE region received on average over $40 billion in cross-border loans per year, emerging Asia over $20 billion and Latin America about $16 billion.

[47] This data series is taken from the BIS locational banking statistics, which comprise data on gross international financial claims and liabilities of banks resident in a given country ("BIS reporting banks"), on banks and the non-bank sector in other countries. About 80% of external positions consist of standard cross-border loans; the remainder includes holdings by BIS reporting banks of bonds, money market instruments and equities issued by banks and the non-bank sector in other countries. The external positions include quarterly stocks ("amounts outstanding") and flows ("changes"); the latter are adjusted for exchange rate changes. For details, see the list of variables in the Appendix.

[48] The decrease in cross-border loans to CEE in 1994 reflected the implementation of deep financial sector reforms at the time, rather than developments in the external or domestic financial cycle.

Graph 1 External positions of reporting banks vis-à-vis emerging markets

Exchange rate adjusted changes (Q/Q), in billions of USD



Source: BIS, locational banking statistics.

The external lending boom peaked in absolute terms between mid-2007 and mid-2008. Emerging Asia and Europe received a combined total of, respectively, $78 billion and $51 billion (in exchange rate adjusted terms) in cross-border bank flows in Q4:2007; Latin America received a total of $30 billion in Q2:2008 (Graph 1). Relative to GDP, the inflows were the largest in CEE (10.8% in Q4:2007). In emerging Asia and Latin America, peak inflows exceeded 4% of GDP.

Following the collapse of Lehman Brothers in Q3:2008, major international banks started to reduce their financing of banks and the non-bank sector in emerging markets. The largest reductions took place in Q4:2008 and Q1:2009 vis-à-vis emerging Asia (Graph 1).[49] Interestingly, banks and the non-bank sector in many smaller CEE countries with a large share of foreign-owned banks received further cross-border loans during this period. This suggests that foreign bank presence provided some stability to cross-border bank flows (see Mihaljek, 2010). In the second and third quarter of 2009, international banks for the most part resumed their lending to emerging markets.

3. CROSS-BORDER BANK FLOWS AND FINANCIAL CRISES: A LITERATURE REVIEW

The early literature on the determinants of capital flows focused on the role of trade linkages in the propagation of emerging market crises (see eg Glick and Rose, 1998; Eichengreen et al, 1996). With the spread of the financial globalisation to emerging markets, the literature started to investigate how financial linkages contributed to the spread of crises. Calvo (1998) argued that contagion typically spread through the balance sheet effects of international financial intermediaries. Kaminski and Reinhart (2000) found that the bank lending channel outperformed the trade channel in explaining the vulnerability of emerging markets to contagion.[50] Van Rijckeghem and Weder (2003) found that common bank lenders were a fairly robust predictor of contagion. Similarly, Kaminski et al (2003) identified a leveraged common creditor in all episodes of international spillovers they studied. Caramazza et al (2004) and Calvo et al (2008) confirmed that strong financial linkages substantially raised the probability of contagion. For the latest crisis, the IMF (2009a) highlighted financial interconnectedness within Europe as a factor increasing the risk of crises.[51] In summary, the main conclusion of the literature is that "even if banks are not the immediate trigger of financial contagion, their actions certainly contribute to the spillover" (Kaminski and Reinhart, 2000, p. 79).

Against this background, the literature on the determinants of cross-border bank flows focused in the past on various "push" and "pull" factors.[52] One general conclusion (see eg Jeanneau and Micu, 2002) is that both sets of factors help explain cross-border bank flows. For instance, macroeconomic conditions in host countries (Garcia-Herrero and Martinez-Peria, 2005; Hernandez et al, 2001) as well as home countries (Goldberg, 2001) were found to have a major influence on bank lending to emerging markets. Papaioannou (2009) in addition referred to geographical, historical and institutional factors. In his model, institutional underdevelopment explained a large part of the observed flow of capital from less developed countries to some advanced economies.

So far, there has been little empirical work on the determinants of cross-border bank flows to emerging markets in periods of crises. To our knowledge, Van Rijckeghem and Weder (2003) were the first who combined the traditional push and pull factors with financial stress indicators and highlighted the importance of common lender effects. Heid et al (2004) confirmed such effects at the micro level. They also noted that a sudden increase in risk aversion played a fundamental role in explaining cross-border lending by German banks.[53] The World Bank (2008) showed that tensions in the global interbank market were associated with lower growth of bank loans during the current crisis. McGuire and Tarashev (2008) established a link between cross-border loans and measures of bank health in host countries. Buch et al (2009) examined the relationship between macroeconomic shocks and international banks' foreign assets. They found that bank responses were characterised by temporary overshooting and subsequent adjustment over several quarters.

[49] At the time of writing, Q3:2009 was the latest observation available. In our regressions we used observations through Q4:2008 because other data for 2009 were not yet complete.

[50] Forbes and Chinn (2009) found that bilateral trade flows were nonetheless a large and significant determinant of the transmission of shocks to emerging markets.

[51] Hernandez et al (2001) provided empirical evidence that contagion was more important during the 1990s' than the earlier crises, and argued that one reason was stronger financial integration in the 1990s.

[52] One strand of the literature focused on the determinants of portfolio equity investment; see eg Lane and Milesi-Ferretti (2004).

53 There is a large literature analysing the determinants of bank lending at the micro level. One strand of this literature focuses on the impact of bank capital, especially in times of stress (see eg Gambacorta and Mistrulli, 2004). Another strand studies the impact of financial innovation (eg Scheicher and Marques-Ibanez, 2008).

4. ECONOMETRIC ESTIMATES

4.1 EMPIRICAL MODEL

Building on the existing empirical literature we first examine how far the standard gravity model helps explain changes in cross-border bank flows to EMEs. In the second step we study how far financial stress at the global, lender and borrower country levels affect these flows, especially in periods of financial crises. These issues have not yet been studied in the literature in sufficient detail. We also extend the literature in several other dimensions, including the data sample and the empirical model.

Our sample covers cross-border bank flows from 17 advanced to 28 emerging market economies between 1993 and 2008.[54] The analysis is based on bilateral, country pair data from the BIS locational banking statistics (eg loans from banks located in Austria to banks and the non-bank sector in Hungary). The dependent variable in our estimations (*LOANS*) is the change in the external position of BIS reporting banks in an advanced economy I (= 1, , 17) vis-à-vis banks and the non-bank sector in an emerging market j (j = 1, …, 28) at time t (t = Q1:1993 – Q4 :2008). Changes in external positions are adjusted for exchange rate valuation effects in a given quarter (discussed below).

The empirical framework used in this paper is the **standard gravity model**. A pioneering work in this field was done by Tinbergen (1962), who set out to explain the volume of bilateral trade with distance between two countries and their GDPs. The model in this paper is related to the gravity model for asset flows used in Martin and Rey (2004) and includes interest rate and growth differentials as additional explanatory variables. In particular, our *basic model* is described by the following equation:

$$LOANS_{ijt} = \rho_0 + \rho_1 DIST_{ij} + \rho_2 GDP_{it} + \rho_3 GDP_{jt} + \rho_4 INT\_diff_{jit} + \rho_5 GR\_diff_{jit} + \rho_6 ER_{jit} + \rho_7 X_{ijt} + \varepsilon_{ijt} \quad (1)$$

where *DIST* is the distance between the capitals of countries i and j; GDP_i and GDP_j are the respective GDPs of lender and borrower countries; *INT_diff* is the nominal interest rate differential and *GR_diff* is the growth differential between borrower and lender countries; *ER* is change in the bilateral exchange rate; X is a vector of control variables; and ε is a vector of error terms. The exact definitions of variables are provided in the Appendix.

The exchange rate adjustment of our dependent variable is necessary because stocks of outstanding loans from BIS reporting banks to emerging markets are reported in US dollars. The adjustment (done by the BIS) involves first converting US dollar stocks into home currency of reporting banks.[55] This conversion is done at end-quarter exchange rates. The resulting (quarterly) flow of cross-border loans in home currency (eg, euros) is then converted back into US dollars at quarterly average exchange rates. In other words, our dependent variable is measured in constant US dollars.

The rationale for including the exchange rate among explanatory variables is then a separate issue: lenders need to consider exchange rate movements of emerging market ("host") currencies vis-à-vis their home currency as an indicator of the borrower's ability to repay the loan. Weaker currency in the host country makes it more difficult for borrowers to repay the cross-border loan; an appreciating currency makes it easier to repay the loan.

Interest rate differentials, growth differentials and exchange rate changes are expressed in percentage points, and all other variables in logarithms. Our dependent variable can take on negative values: these can be observed when repayments of old loans are greater than new loans provided to emerging markets. In order to use the logarithms for such observations we follow a method proposed by Papaioannou (2009): for negative values of the dependent variable we take the logarithm of the absolute value and assign it the negative sign. This transformation preserves the sign in the original variable and retains the symmetry between increases and decreases in cross-border bank flows.

The null hypotheses on the signs of estimated coefficients ρ_i are as follows:

[54] The advanced economies (BIS reporting countries) in our sample are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Japan, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States. The emerging market countries in Asia are: China, India, Indonesia, Korea, Malaysia, the Philippines, Taiwan, Thailand and Vietnam; in Europe: Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia and Turkey; and in Latin America: Argentina, Brazil, Chile, Columbia, Mexico, Peru and Venezuela.

[55] Given that reporting banks in our sample are all from advanced economies, this means converting US dollar stocks into other major international currencies.

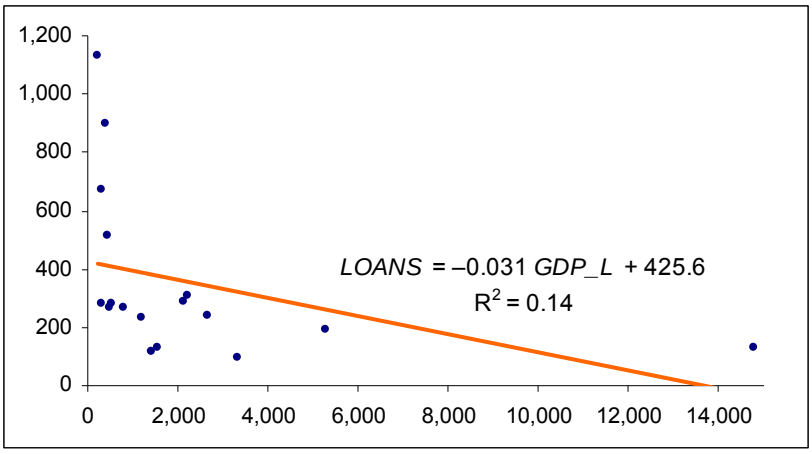
$\rho_1 < 0$ Greater distance should decrease the flow of cross-border loans from country *i* to country *j*. As argued by Martin and Rey (2004), information and monitoring costs increase with distance: the cost of travelling is higher, cultural differences are likely to be stronger, and business links weaker. The distance is the simplest proxy that captures this informational dimension of cross-border banking.

$\rho_2, \rho_3 \gtrless 0$ Gravity models of trade stipulate positive coefficients for the size of both lender and borrower economies. However, for cross-border loans from advanced to the emerging markets one can observe a negative relationship between the GDP of lender countries and cumulative change in loans over the past two decades. Banks from smaller countries (eg Austria and Belgium) generally increased their lending to emerging markets more than banks from large countries (Graph 2). One reason is that banks in countries with a small home market have become more dependent on business in foreign markets. The sign of GDP coefficients therefore has to be determined empirically.

$\rho_4 > 0$ Higher interest rate in the borrower country should, ceteris paribus, increase the flow of cross-border loans from the lender country;[56]

$\rho_5 > 0$ Stronger growth in the borrower country should, ceteris paribus, increase the inflow of cross-border loans;

Graph 2 Change in cross-border loans and size of lender's economy[1]



Note: Horizontal axis measures lender countries' GDP in 2008, in millions of USD. Vertical axis measures percentage change in external positions of banks from lender countries vis-à-vis EMEs, cumulative from 1993 to 2008.

Source: BIS, locational banking statistics; IMF, WEO database.

$\rho_6 < 0$ Weaker currency in the borrower country, ceteris paribus, reduces the flow of cross-border loans by reducing the expected rate of return measured in lender's currency – a depreciating currency makes it more difficult for borrowers to repay their external loans. Conversely, an appreciating currency increases the expected rate of return measured in lender's currency and makes it easier for borrowers to repay their external loans; hence, it induces additional inflows.

This basic model can be expected to explain a fair proportion of cross-border bank flows in normal times. However, to study bank flows in periods of financial crises this model needs to be expanded, building on theoretical and empirical considerations discussed in Sections 2 and 3. For this purpose we add four additional sets of variables representing potential crisis transmission channels.

In the ***global financial factors model***, the hypothesis is that variables determined in global financial markets exert strong influence on cross-border bank flows. To assess the state of the global financial market we use the S&P 100 Volatility Index (*VIX*) of the Chicago Board Options Exchange; and the average difference in yields between US corporate bonds and ten-year treasuries (*RISK_AVERS*). The former is widely used as an indicator of expected short-term (up to 30 days) volatility of the global financial market: a high value of the *VIX* corresponds to more volatile market expectations and hence higher cost of options to defray the volatility risk. The latter is widely used

[56] The rationale for using nominal rather than real interest rate differentials is that banks make all expected profit and loss calculations when granting loans in terms of nominal rates. In addition, the choice of inflation rate to deflate the nominal interest rate – home vs. host country inflation – would be arbitrary, as international banks can decide to reinvest profits in the host country or repatriate them to the home country.

as an indicator of global risk aversion: a high yield differential between US corporate and sovereign bonds signals heightened risk aversion on the part of global investors.

The null hypothesis is that both indicators are negatively correlated with cross-border bank flows: higher expected global market volatility and growing risk aversion will reduce the flow of cross-border loans from advanced to emerging markets.

In the ***lender exposure model***, the hypothesis is that certain characteristics of banks in lender countries strongly affect the flow of cross-border loans to emerging markets (see Van Rijckeghem and Weder, 2003). In line with Krugman (2008), who argued that banks' balance sheets were a major source of spillovers in international bank lending, we focus on the *common lender effect*, ie the proposition that financial stress in creditor country banks (eg in Spain) is determined by their exposure to the primary crisis country (eg the United States). We measure the common lender effect as:

$$CLE_{i,k} = \frac{External\ assets\ of\ BIS\ reporting\ banks\ in\ country\ \ i\ \ vs.\ primary\ crisis\ country\ k}{External\ assets\ of\ BIS\ reporting\ banks\ in\ country\ \ i\ \ vs.\ all\ countries}$$

We distinguish three sets of primary crisis countries: Mexico during 1994–95; Indonesia, Korea, Malaysia, Thailand and the Philippines during the Asian crisis of 1997–98; and the United States during the crisis of 2007-08. The greater the exposure of banks to a primary crisis country (or countries), the more they are expected to reduce their cross-border loans to emerging markets. Outside of crisis periods the common lender effect is by definition set to zero.

The second characteristic of lender banks that affects their loans to emerging markets is the state of their own health (*BK_HLTH_L*). To assess this variable we look at the deviation of the banking industry subindex from the main equity price index. We expect a positive relationship, as the banking sector under stress – eg with large non-performing loans in the home market – is normally forced to reduce cross-border loans.

In the ***borrower country risk model***, the hypothesis is that cross-border bank flows respond to indicators of external and domestic vulnerability in emerging markets. As a summary indicator of borrower country risks we use initially general government balance (*GVT_BAL*). A higher fiscal deficit is positively correlated with the probability of default on government debt, and should therefore reduce cross-border bank inflows. In an extended analysis we use other vulnerability indicators as well.

By analogy to the lender exposure model, we use a measure of bank soundness (*BK_HLTH_B*) as an additional borrower country risk factor. A stronger banking sector in the borrowing country should normally attract higher cross-border bank inflows. As in the lender exposure model, we measure bank health by looking at the deviation of the banking industry from the overall equity price index.

In the ***financial and monetary linkages model*** one hypotheses is that a higher degree of financial integration between the borrower and lender countries (*FIN_OPEN*) increases cross-border bank flows. We measure bilateral financial openness with the ratio of external assets and liabilities of country *j* (the borrower) vis-à-vis banks in country *i* (the lender) relative to the borrower country's GDP. We expect borrower countries that are financially more integrated with lender countries (eg the Baltic states and Sweden) to attract larger inflows than those that are not (eg Vietnam and Sweden).

The second hypothesis of this model is that borrower countries with more rigid exchange rate regimes will attract larger cross-border bank inflows. By fixing the exchange rate of its currency vis-à-vis that of a major lender country, the borrower country becomes more tightly integrated with the lender country. We measure the degree of monetary integration with the Reinhart-Rogoff (2004) exchange rate regime index (*ER_REGIME*), which varies from 1 (fixed exchange rate) to 6 (free float).

We expect the positive linkage between financial openness and cross-border inflows to hold in both normal and crisis periods. However, the positive linkage between monetary integration and cross-border bank flows need not hold in a crisis. The tendency for fixed exchange rates to come under pressure in a crisis makes countries with fixed exchange rate regimes more vulnerable, and hence more likely to experience a reduction of cross-border bank inflows (see eg Berkmen et al, 2009; Gosh et al 2010; and Gerdesmeier et al, 2009).

Potential issues in econometric analysis of these models include multicollinearity and endogeneity of variables. Multicollinearity is a lesser concern because it is partly unavoidable and because the correlation matrix does not show perfect collinearity between any of the regressors. Endogeneity is potentially a bigger problem. However, in this particular setup the dependent variable is the change in *bilateral* external positions, while independent variables are mostly based on aggregate data for home and host countries or the global financial market. Moreover, for most host and the home countries bilateral cross-border flows are relatively small. Changes in these flows are therefore unlikely to condition the evolution of explanatory variables.

One case in point is exchange rates: *aggregate* capital flows do affect exchange rates (and vice versa); however, *bilateral* cross-border bank loans are only one small part of overall capital flows, and only one of many factors affecting bilateral exchange rates. Therefore, endogeneity between cross-border bank flows and nominal exchange rates is unlikely to arise. One should also note that the countries in our sample for which cross-border bank flows are large relative to GDP and hence endogeneity issues are potentially pronounced – such as the Baltic states and Bulgaria – have fixed exchange rate regimes.

There are several potentially relevant empirical issues that could not be studied because of the lack of data. One is the maturity structure of cross-border loans. With data available on a quarterly basis, short-term flows (eg those motivated by short-term interest rate differentials) cannot be distinguished from loans with longer maturities. Similarly, there is no information on the relative shares of new loans and repayments of maturing loans. Possible effects of capital controls on inflows of bank loans cannot be assessed, either, given the lack of consistent data and a large variety of capital controls. The demand for cross-border loans also depends on the schedule of external debt repayments, which is rarely available on a quarterly basis even for aggregate debt, let alone for bilateral debt.

4.2 ESTIMATION RESULTS

We estimated all five models using a random effects estimator with panel-corrected standard errors (PCSE), taking into account a heteroskedastic structure of errors and correlation between countries. In addition, country specific fixed effects (for 17 advanced and 28 emerging markets) were introduced.[57] One should note that this approach is not equivalent to a de facto fixed effects model, which would include bilateral country fixed effects for 17 advanced times 28 emerging market economies. The disadvantage of the de facto fixed effects model is that the distance variable drops out of the equation due to a near-singular matrix. The Hausman specification test indicated that there was no systematic difference between the fixed and random effects models we used, thus confirming that the random effects estimator was efficient in our empirical framework.

We estimated the four financial stress models outlined above separately rather than jointly (ie nested in one large model) and compared different models in terms of their explanatory power by looking at the coefficients of determination R^2 and the *F*-tests. We opted for this approach because the determinants of cross-border flows examined in these models are not completely independent of each other. For instance, indicators of bank health in lender and borrower economies are not entirely independent from global financial market variables; and indicators of financial openness are not entirely independent from common lender effects.

The estimates of five models are summarised in *Table 2*.[58] Most estimated parameters have the expected signs, are statistically highly significant, and are robust with respect to different model specifications. The low R^2 is not unusual in such large panels and is primarily due to the fact that we are trying to explain the (quarterly) flow data, which are by their very nature extremely volatile and often switch the sign or take on the zero value. More precisely, bilateral flows in our sample ranged from a maximum of $14.6 billion per quarter and country to a minimum of –$15.6 billion per quarter and country. The average size of a bilateral loan for the entire sample of more than 30,000 observations was $21 million, and the standard deviation was as much as $546 million. Zero flows accounted for about 20% of observations in the sample.

Table 2 Determinants of cross-border bank flows from advanced to emerging markets Random effects estimator with country specific fixed effects and PCSE

Dependent variable: log of quarterly, exchange-rate adjusted change in external position (in millions of USD) of country *i* vis-à-vis country *j*

	(1) BASIC Model	(2) GLOBAL Model	(3) LENDER Model	(4) RISK Model	(5) LINKAGES Model
DIST	–0.594	–0.660	–0.693	–0.690	–0.315
	(–8.51)***	(–3.20)***	(–8.77)***	(–4.64)***	(–1.93)***
GDP_B	1.038	1.198	1.098	0.789	1.14
	(10.67)***	(12.24)***	(8.77)***	(6.75)***	(9.26)***

[57] In order to avoid a near-singular matrix, some fixed effects had to be dropped (basic model: US/MX; global model: US/MX; lender model: FI/GR/NO/US/CH; risk model: US/LT; linkages model: GR/NO/CN).

[58] To verify that variables used in regressions are stationary we used the panel unit root tests of Levin, Lin and Chu (2002); Breitung (2000); Im, Peasaran and Shin (2003); and the ADF test of Maddala and Wu (1999). The dependent variable and most explanatory variables were stationary. For some variables the tests showed signs of non-stationarity. However, as for large N and small T the cross-section dimension dominates, the possibility of non-stationarity can be ignored. The regressions were estimated using Eviews 6 and Stata 10.

GDP_L	–0.715	–0.972	–0.733	–0.656	–0.667
	(–5.14)***	(–6.40)***	(–3.55)***	(–3.95)***	(–2.96)***
INT_diff	0.011	0.005	0.012	0.016	0.015
	(4.50)***	(1.93)**	(4.30)***	(3.82)***	(5.19)***
GR_diff	0.044	0.030	0.046	0.040	0.049
	(7.84)***	(5.03)***	(7.00)***	(6.10)***	(7.12)***
ER	–0.015	–0.011	–0.016	–0.028	–0.011
	(–6.76)***	(–4.99)***	(–6.27)***	(–8.31)***	(–4.49)***
VIX		–0.027			
		(–5.80)***			
RISK_AVERS		–0.002			
		(–4.02)***			
CLE_US			–0.023		
			(–2.20)**		
CLE_AS			–0.010		
			(–0.95)		
CLE_MX			–0.286		
			(–3.88)***		
BK_HLTH_L			0.001		
			(2.52)**		
GVT_BAL				0.080	
				(6.59)***	
BK_HLTH_B				0.006	
				(11.01)***	
FIN_OPEN					0.165
					(10.50)***
ER_REGIME					–0.380
					(–9.66)***
R^2	0.04	0.05	0.05	0.05	0.06
F-Test	14.75 *(0.000)*	12.45 *(0.000)*	13.87 *(0.000)*	11.12 (*0.000*)	13.23 *(0.000)*
N	30,464	30,464	30,464	30,464	30,464
Durbin-Watson	2.02	2.03	2.05	2.08	2.09

Note: Standard errors in parentheses. *** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level. PCSE = panel-corrected standard errors.

The main conclusions one can draw from these estimates are as follows.

The ***basic gravity model*** shows, first, that cross-border bank flows decrease by about 6% for a 10% increase in the distance between the capitals of lender and borrower countries. In other words, despite considerable improvements in transportation, communication and information technology, distance still matters for cross-border bank flows. This result holds in all five models, with estimated parameters varying from –0.3 to –0.7. Other empirical studies found a similar impact of the distance on capital flows (see Buch, 2005). Furthermore, the impact of the distance on bank flows is comparable to its impact on trade flows.

The second result that is consistent across specifications is the positive correlation of the borrower country GDP and cross-border bank flows. The estimated elasticity implies that a 10% higher GDP in the borrower country will increase cross-border bank flows between 8.0 and 10.2%.

The third main result of the basic gravity model is that the larger the economy of the lender country, the less its banks will engage in cross-border lending to the emerging markets. More specifically, a 10% increase in the GDP of a lender country reduces its banks' cross-border loans to EMEs by 7% on average. Graph 2 and the observation that financial centres are often located in small countries also support the negative relationship with lender country GDP in our sample.

One should note that by using the locational rather than consolidated banking statistics of the BIS we cannot control for third-party effects, ie bank lending by country A (eg Germany) ultimately flowing to an institution residing in country C (eg Thailand) via a financial centre in country B (eg the United Kingdom). Rather, we consider bank flows from Germany to the UK and from the UK to Thailand as separate. The consolidated banking statistics would be more appropriate if we analysed cross-border bank flows from the lender country perspective. However, we focus on the determinants of bank flows from the borrower country perspective. Moreover, in our sample there are only two major financial centres in terms of cross-border bank flows to EMEs – Switzerland and the United Kingdom.[59] By using the locational statistics we also have a longer sample (the consolidated data are available on a quarterly basis only since 2000), and we can use data on exchange rate adjusted flows. Most importantly, by using the locational data we do not lose information on flows between parent banks and their emerging market subsidiaries, which are netted out in the consolidated statistics. Nevertheless, in one of our robustness checks we drop Switzerland and the UK from the sample and show that the coefficient ρ_3 does not differ significantly from the above estimates.

The fourth main result of the basic gravity model is that cross-border flows respond positively to interest rate and growth differentials between borrower and lender countries, and negatively to depreciation of the borrower country currency. All three estimates are statistically significant, confirming the theoretical result of Obstfeld and Rogoff (1996) that capital flows respond to relative return differentials and income growth expectations. At first sight, none of these three semi-elasticities is large: a percentage point interest rate differential will induce 0.01% larger inflows; a percentage point growth differential will induce 0.04% larger inflows; and a percentage point depreciation of the borrower country currency (vis-à-vis the lender country currency) will reduce the flows by 0.02%. However, one has to keep in mind that they refer to bilateral and not total cross-border bank flows – an interest rate differential of 1 percentage point thus needs to be added up across many different advanced/emerging economy pairs for which it holds.

In the ***global financial factors model***, the two additional variables, *VIX* and *RISK_AVERS,* are both significant at the 1% level and have the expected negative sign. This result confirms that global financial market factors - a higher degree of financial market volatility and more pronounced risk aversion on the part of global investors - dampen cross-border bank flows from advanced to the emerging markets. The estimated size of coefficients is low; however, as the volatility index and the corporate bond spread both display considerable variation, these global factors are a significant channel through which spillover effects in international bank lending occur (see the contribution analysis below).

The results of the ***lender exposure model*** indicate that exposure of banks in lender countries to a primary crisis country, and the health of these banks strongly affect cross-border lending to emerging markets. The model confirms in particular the *common lender effect*, according to which financial stress in the creditor country is determined by its exposure to the primary crisis country (see Van Rijckeghem and Weder, 2003) – the more the lender country is exposed to the primary crisis country (or countries), the more it will reduce lending to the emerging markets. The impact of the common lender effect is confirmed for all three crisis episodes studied in this paper, with the coefficient being statistically significant for the Mexican and current financial crises. Similarly, the positive coefficient on the second lender model variable, *BK_HEALTH_L*, confirms that better health of the banking sector in lender countries increases cross-border loans to emerging markets.

The results of the ***borrower country risk model*** indicate that risk factors specific to the borrower country strongly affect cross-border bank flows. A percentage point higher budget deficit is on average associated with a 0.08% reduction in bilateral cross-border loans to the country. This result is in line with the empirical literature that identified high budget deficits as an early warning indicator of EME crises.[60]

By contrast, good health of the banking sector in the borrower country helps attract cross-border inflows. For instance, if bank share prices increased by 10% relative to the overall share price index in a given quarter, the country received on average 0.06% more bilateral cross-border bank loans. One should recognise, however, that a strong standing of bank share prices relative to the overall equity price index might reflect not only the intrinsic health of the banking sector, but also the build-up of an equity price bubble in the banking sector.

[59] Banks in Germany, Japan and the United States provide on their own large amounts of cross-border bank loans to emerging markets, but they do not book these loans on behalf of banks from other advanced economies to the extent that banks in Switzerland and the United Kingdom do (German banks, for instance, book significant amounts of loans to emerging markets via their London subsidiaries). Recall also that Hong Kong SAR and Singapore are not included in our sample.

[60] See eg Goldstein, Kaminski and Reinhart (2000).

According to the ***financial and monetary linkages model***, a borrower country that was 10% financially more open attracted as much as 1.7% more bilateral cross-border bank loans.[61] Similarly, countries with fixed exchange rate regimes received on average 1.9% more inflows compared to those with floating regimes.[62]

How the financial and monetary linkages work in a crisis is an empirical question. To the extent that lenders reduce cross-border loans and borrowers withdraw deposits from banks in advanced economies, financial openness would amplify the effects of the crisis. Likewise, to the extent that fixed exchange rate regimes come under pressure, foreign creditors would stop lending to emerging market borrowers. In Section 5 we show, however, that financial openness and fixed exchange rate regimes both acted as stabilising factors during the latest crisis, especially in central and eastern Europe.

As noted above, in order to test whether it is worth adding or dropping a particular group of variables from a model we used the *F*-tests and the coefficients of determination R^2. The results of *F*-tests for all models show that we can reject the null-hypothesis that all slope coefficients are simultaneously zero – the specifications we estimated are statistically highly significant. Moreover, the four models that examine additional determinants of bank flows increase the explanatory power of the basic gravity model, as indicated by slightly higher coefficients of determination relative to the basic model.

4.3 CONTRIBUTION ANALYSIS

The analysis in this section goes beyond the identification of statistically significant determinants of cross-border bank flows and provides additional information on the economic significance of estimated parameters. In particular, the contribution analysis quantifies the impact of global and country specific factors on cross-border bank flows, and thus enables us to assess how financial stress gets transmitted from advanced to the emerging market economies. The contribution of each variable is calculated by multiplying the estimated parameter from the above regressions with the average value of the corresponding variable over a given period. The contribution of each model is then the sum of the contributions of all explanatory variables included in the model.

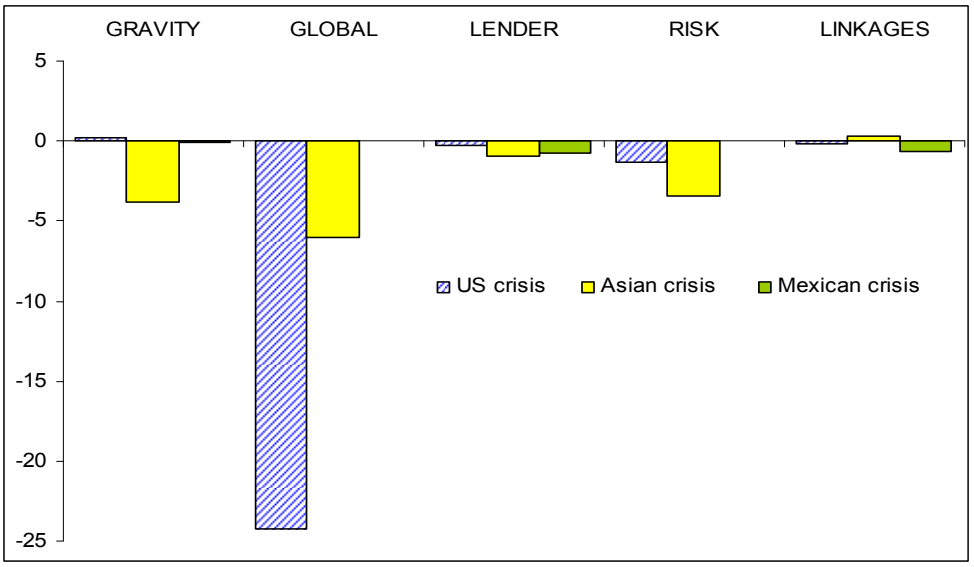
Graph 3 shows the percentage change in cross-border bank flows that different models explain during the three financial crises under review. In the *current crisis*, global factors have been the main driver of cross-border bank flows – higher expected global financial market volatility explains almost a quarter of the reduction in bank flows to emerging markets between Q3:2007 and Q4:2008.[63] The only other larger contribution came from borrower-specific risk factors, in particular the weakening performance of emerging market banks.

[61] Recall that financial openness is the sum of external assets and liabilities of all sectors in the borrower country vis-à-vis banks in the lender country, as a percentage of the borrower country's GDP.

[62] In the Reinhart and Rogoff (2004) classification, fixed exchange rate regimes are assigned the rank 1 and floaters the rank 6; relative to the floaters the fixers would thus receive on average (1 – 6) x (–0.38) = 1.9% more cross-border bank loans.

[63] These contributions do not sum up to 100% because the models are estimated separately. For detailed regression estimates for different crises episodes, see Section 5.5 below.

Graph 3 Contributions of five models to changes in cross-border bank flows in three crisis periods



Note: Vertical axis measures percentage change in bilateral, quarterly cross-border bank flows (in millions of US dollars, exchange-rate adjusted) explained by the respective model for each crisis period.

Source: Authors' calculations.

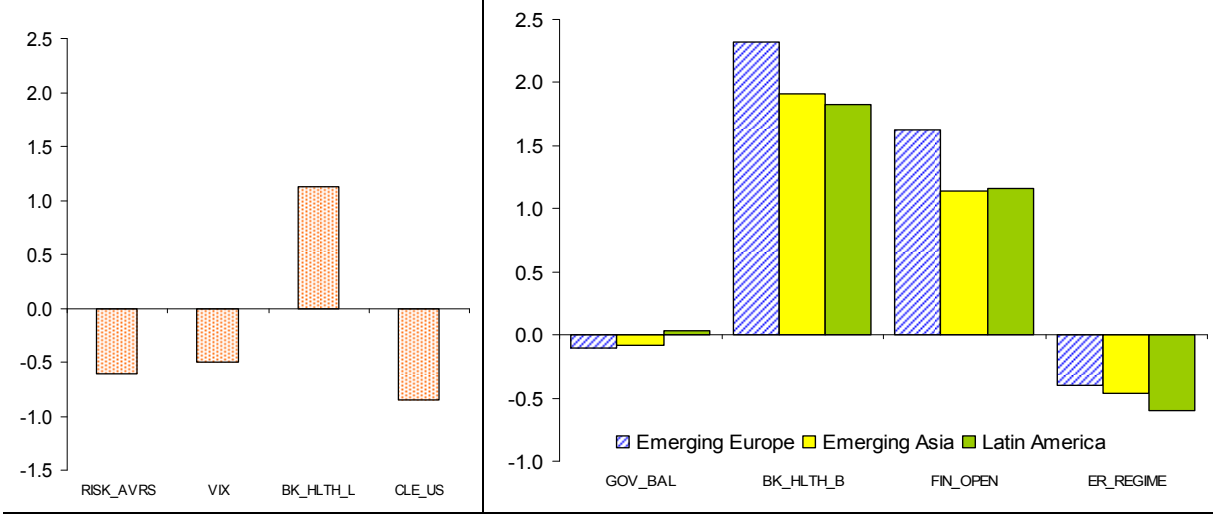
During the *Asian crisis*, global risk factors also made the largest contribution to the reduction in cross-border lending – at the time, higher global market volatility and greater risk aversion among global investors both had a significant negative impact on cross-border bank flows (see Section 5.5). Two other sets of variables also made a large contribution to the decline in cross-border bank flows: first, weaker growth and depreciating exchange rates in emerging markets (from the basic gravity model); and second, deteriorating fiscal positions and banking sector performance in emerging markets (from the borrower risk model).

During the *Mexican crisis*, the reduction in cross-border flows in our empirical framework was mainly the result of risk factors specific to lender countries, especially the exposure of lender banks to Mexico and their weakening performance. The second contributing factor was lower degree of monetary integration (see Section 5.5).

Next we look at the contribution of four financial stress models to bank flows during the latest financial crisis. Global and lender country factors had by definition the same impact across all three emerging market regions (*Graph 4*, left-hand panel). Greater risk aversion, expected global financial market volatility, and exposure of lenders to the US economy (the common lender effect) contributed to a reduction in cross-border bank flows to EMEs. The only factor in this group that contributed to higher inflows during 2007–08 was the health of banking sectors in lender countries.

Graph 4 Contribution of financial stress factors to cross-border bank flows in different emerging market regions during the current financial crisis

Global and lender-country factors with the same impact on all EM regions	Borrower-country risk factors, and financial and monetary integration factors with differentiated impact



Note: Vertical axis measures the change in bilateral, quarterly cross-border bank flows, in millions of US dollars (exchange-rate adjusted), explained by the respective factors during the 2007-08 financial crisis.

Source: Authors' calculations.

Turning to the contribution of borrower-country and financial and monetary integration factors, the broad picture that emerges is that central and eastern Europe experienced a less severe reduction in cross-border flows in 2007–08 than emerging Asia and Latin America (*Graph 4*, right-hand panel). This is surprising, given that countries in CEE had more pronounced external and domestic financial vulnerabilities on the eve of the crisis. The contribution analysis points to two sets of factors that accounted for this difference.

First, banking sectors in central and eastern Europe were healthier: they induced higher inflows per country pair and quarter compared with banks in emerging Asia and Latin America (*Graph 4*, right-hand panel). This is most likely the consequence of the high share of foreign-owned banks in CEE – there is a strong positive correlation of 0.7 between the foreign bank share in total assets and the bank health indicator in CEE – and the fact that these banks were not heavily exposed to US toxic assets.[64]

Second, greater financial openness contributed to significantly higher inflows of cross-border bank loans per country pair and quarter in central and eastern Europe compared with either emerging Asia or Latin America.

Regarding other factors in this group, fiscal positions had a small negative impact on cross-border bank inflows in CEE and Asia, and a small positive impact in Latin America. A more interesting result is the effect of exchange rate regimes: central and eastern Europe's often less flexible regimes apparently moderated the reduction of inflows compared to the more flexible exchange rate regimes in emerging Asia and Latin America.

5. ROBUSTNESS CHECKS

To check whether estimates of our five models are robust with regard to different econometric methodologies and sample specifications we conducted five sets of checks: (i) estimates using different econometric options (time effects, dynamic instrumental variables, and the Wooldridge approach); (ii) estimates accounting for the financial centres effect; (iii) an extended analysis of country specific risk factors; (iii) analysis of regional sub-samples; and (v) analysis of different crisis periods. The overall conclusion that emerges from these checks is that the results shown in Table 2 are fairly robust to alternative econometric methodologies and sample specifications.

[64] For the same conclusion using different approaches see EBRD (2009) and Mihaljek (2010).

5.1 ECONOMETRIC OPTIONS[65]

Time effects. We added period fixed effects and re-estimated the five models using a random effects estimator with country specific fixed effects and panel-corrected standard errors. This correction might be relevant because some explanatory variables show signs of trend-stationarity. The inclusion of time dummies did not significantly alter the original results. The main differences are that the interest rate variable becomes statistically less significant (eg in the global financial factors model); and the common lender effect becomes highly significant for all three crisis periods.

Dynamic instrumental variables approach. As an alternative estimation technique we used the instrumental variables approach proposed by Anderson and Hsiao (1981). In particular, we added a lagged dependent variable to regression equations. The instrumental variables estimates were on the whole quite similar to the original ones from Table 2. In particular, the lagged dependent variable was significant at the 1% level in all estimated models, pointing to a certain degree of persistence in bank lending flows – without, however, offering a clear explanation for it.

Wooldridge approach. Helpman, Melitz and Rubinstein (2008) pointed out that gravity models should not rely only on country samples with positive trade flows – samples with zero trade flows between countries also contained useful information. They argued that the selection bias embedded in the commonly used data sets could be substantial, and proposed an alternative, two-step estimation method in order to exploit full information contained in the data on zero flows.

Compared to other studies, where about half of observations are zeros (up to 95% in some data sets), zeros account for approximately 20% of observations in our sample. Nevertheless, in order to exploit the full extent of information, we used the estimator proposed by Wooldridge (1995 and 2002), who postulated a two-step Heckman selection model for panels. This approach is based on the idea that a country will first decide whether to lend to an emerging market, and then how much it will lend. In the first step we thus introduced an additional variable ("Mundlak-Chamberlain correction") in a panel probit model in order to control for fixed effects. In the second step, we estimated a simple fixed effects model for all the countries that engaged in cross-border lending, using the inverse Mills ratio calculated from the first-step estimation. The results showed that the inverse Mills ratio was significant in all models, suggesting that it was appropriate to take account of the selection bias. But even after this correction the estimated parameters were quite comparable to the original ones in Table 2. One difference was that the coefficients on lender and borrower country GDP were higher than in the original model.

5.2 FINANCIAL CENTRES EFFECT

As noted above, the use of the locational banking statistics in a gravity model poses problems if some exposures are booked in financial centres. These problems could be addressed by shifting to the consolidated statistics, but at the expense of a shorter sample period and exchange rate adjusted data. We therefore decided to stick with the locational data and perform a robustness test by dropping two major financial centres in our data sample - Switzerland and the United Kingdom - to see whether the presence of these centres affects the results. The results of estimates without financial centres indicated that, with the exception of lender country GDP, which becomes statistically insignificant in the first three models, estimates of other parameters were quite comparable to the original results presented in Table 2 (for details, see Herrmann and Mihaljek, 2010). This confirmed that the inclusion of financial centres did not bias the results of our estimates.

5.3 COUNTRY-SPECIFIC RISK FACTORS: AN EXTENDED ANALYSIS

Our empirical analysis has so far come to the conclusion that country specific factors – fiscal balance and borrower country bank health – were significant determinants of cross-border bank flows. To test how far some other risk factors contributed to the transmission of financial stress, we introduced five country specific vulnerability indicators suggested among others by Goldstein et al (2000).

First, we introduced the spread between lending and deposit interest rates charged by commercial banks (*SPREAD_L_D*) as a proxy for financial sector efficiency – inefficient or loss-making banks need larger spreads to ensure profitability. The spread is expected to be negatively correlated with the dependent variable, as deteriorating bank efficiency in the borrower country should reduce cross-border bank flows to the country.

[65] For details of estimates, see the Appendix in Herrmann and Mihaljek (2010).

Second, we replaced general government balance with short-term debt as a percentage of GDP (*SHT_DBT*). This indicator reveals more directly short-term foreign liabilities of the economy as a whole, rather than a mixture of domestic and foreign liabilities of the government that is implicit in the budget deficit figures. A higher ratio of short-term debt could indicate future liquidity problems and induce foreign lenders to reduce their cross-border loans.

Third, we added a foreign reserves indicator – the official foreign exchange reserves as a percentage of M2 (*FOR_RES*). Large precautionary holdings of foreign exchange reserves provide self-insurance against external payment shocks, so one would expect them to be positively correlated with cross-border loans (Aizenman, 2009; Obstfeld at al, 2009).

Fourth, we added the external current account balance in percent of GDP (*CUR_ ACT*). We expect a higher external deficit to reduce foreign bank inflows, as it signals that domestic absorption is higher than domestic saving, and, therefore, that the borrowing country may face external sustainability problems in the longer run.

Fifth, we added real growth rate of domestic private sector credit (*CREDIT_GR*). Rapid credit growth sustained over several years typically signals a credit boom, which is usually followed by an increase in non-performing loans. One can therefore expect foreign lenders to be more cautious in extending additional cross-border loans to a country experiencing a credit boom.

Again, the analysis is done with the random effects estimator. In order to avoid endogeneity stemming from the fact that higher inflows of capital lead to more pronounced current account deficits and domestic credit growth, we lag the current account and credit growth variables by one period. *Table A1* in the Appendix summarises the results.

All additional country specific risk variables are statistically highly significant. Except for credit growth, all coefficients have the expected signs. The positive sign of the coefficient on credit growth indicates that external lenders provided more rather than less loans to the emerging markets with faster domestic credit growth. In other words, this variable did not operate as an early warning indicator of domestic vulnerabilities, but rather as a sign of buoyant demand for external financing. This interpretation of domestic credit growth may have contributed to excessive lending to some emerging markets, especially the catching-up economies in CEE, where credit kept expanding for several years in expectation of smooth convergence to the EU. Consumption smoothing is legitimate for emerging markets up to a point. However, as the recent experience of countries such as Greece, Ireland, Portugal and Spain shows, consumption smoothing is not risk-free, as the catching-up economies eventually need to generate sufficient productivity gains to increase domestic saving.

5.4 REGIONAL SAMPLES

To assess regional differences in the determinants of cross-border bank flows we estimated regressions of five models from *Table 2* separately for emerging Asia, Latin America and central and eastern Europe. The analysis was done using the random effects estimator from the original set of regressions and covered the full time span of the data set from 1993 to 2008. The results are presented in *Tables A2–A4* in the Appendix.[66]

On the whole, regional estimates are in line with the original estimates for the full sample. For some variables we obtain less significant estimates, and for a few of those the sign changes, which is not surprising taking into account the smaller number of observations and regional differences.[67] In particular, distance retains statistical significance at the regional level only for the CEE sample and the global factors model in the Asian sample. This suggests that the gravity model might be more relevant for studying credit flows across several regions than to individual regions.

Another interesting result is that, unlike the Asian and Latin American samples, several macroeconomic variables are not significant in the CEE sample. These include interest rate differentials (insignificant in all five CEE regressions); the exchange rate differential (insignificant in two out of five CEE regressions); and the fiscal balance (insignificant and the "wrong" sign in the risk model) (*Table A4*). This suggests that higher interest rates and appreciating exchange rates in the CEE region did not by themselves attract foreign bank inflows – nor did fiscal imbalances deter them. As the bulk of cross-border lending to CEE comes from western European banks, this result suggests that "soft" aspects of lending, such as strong linkages between parent banks and their subsidiaries, have been more important determinants of cross-border bank flows than the "hard" aspects such as interest rate and exchange rate differentials or fiscal imbalances.

The financial stress variables keep their signs but not always significance in regional regressions. For instance, in the Asian sample estimates of parameters for global risk aversion and, surprisingly, exposure of lender banks to the

[66] Note that the analysis of regional differences done in Graph 4 refers only to the latest crisis in 2007–08.

[67] The estimations include 153 cross sections for the Asian sample, 204 for the European sample, and 119 for the Latin American sample, compared to the 476 cross sections in the original full sample. The only statistically significant estimate (though at just the 10% level) with the "wrong" sign is the distance parameter in Latin America's lender model (Table A3).

Asian crisis countries are insignificant. In the Latin American sample, estimates of the US and Asian common lender effects are insignificant. And in the CEE sample, the parameter estimate for the health of lender banks is statistically insignificant (though positive). This suggests that spillovers to different emerging market regions do not always take place through the same channels.

Central and eastern Europe stands out with respect to the significance of the common lender effect across all three crisis episodes. This result might simply reflect the fact that banks lending to CEE – ie, major western European banks – are more international in the scope of their operations, and hence more likely to be affected by the crises occurring in different parts of the world, than banks lending to other emerging market regions. Thus, when exposure to a crisis country (or countries) forces European banks to de-leverage, lending to CEE might fall more than lending to Asia or Latin America.

5.5 DIFFERENT CRISIS PERIODS

To assess how determinants of cross-border bank flows differ across crisis episodes, we estimated separate regressions for all emerging market countries during the Mexican crisis of 1994–95, the Asian crisis of 1997–98, and the global financial crisis of 2007–08. The estimates were done using the random effects estimator. The results are presented in *Tables A5–A7* in the Appendix.

For the Mexican crisis, the only model that performed somewhat better was the lender exposure model, in which the common lender effect and the coefficient on bank health in lender countries both are significant (*Table A5*). One difference with the full sample (as well as the Asian and current crisis samples) is that the coefficient on lender country GDP switched sign to positive, implying that banks from larger lender countries increased loans to emerging markets during the Mexican crisis.

For the Asian crisis, several models provide useful estimates. In addition to the basic gravity model, estimates of global financial factors, borrower country risk and financial/monetary linkages were all statistically significant (*Table A6*). However, some estimates of the basic gravity parameters from these models are insignificant (although in almost all cases correctly signed). One set of factors that did not help explain the reduction of cross-border lending to emerging markets during the Asian crisis is lender exposure: coefficients on the common lender effect and lender banks' health are both insignificant.

For the current crisis, the global, lender exposure and linkages models yielded statistically significant estimates of some of the key variables, including global financial market volatility, health of lender banks, the degree of financial openness and exchange rate regime (*Table A7*). Tighter financial and monetary integration seemed to have a particularly strong stabilising effect on cross-border bank flows during the latest crisis. However, other key variables, including global investors' risk aversion and exposure of lender banks to the US, did not have statistically significant parameter estimates.

In addition, the interest rate differential became negative and statistically significant in all specifications, suggesting that (higher) emerging market interest rates may have properly reflected increased risk premia during the crisis. Moreover, the sign of the coefficient on lender country GDP was reversed. Our hypothesis on this change in sign is that larger advanced economies had greater fiscal and monetary policy freedom to handle the negative effects of the crisis, and their international banks were therefore not forced to reduce cross-border loans to such an extent as banks from smaller advanced economies.

6. CONCLUSIONS

This paper studied the nature of spillover effects in bank lending flows from advanced to the emerging markets and tried to identify the main determinants of such flows. We constructed a panel data set of bilateral cross-border bank flows from 17 advanced economies to 28 emerging market countries in Asia, Latin America and central and eastern Europe. The observation period covered quarterly data from 1993 to 2008. We found that variables of the standard gravity model were significant determinants of international bank lending. Greater distance between lender and borrower countries and larger home markets in lender countries reduced cross-border loans to the emerging markets. Larger markets in borrower countries were associated with larger cross-border bank lending. Cross-border bank flows also responded positively to interest rate and growth differentials, and negatively to appreciation of the borrower country currency.

Regarding transmission of financial stress, the analysis revealed that both global and country specific risk factors, in lender as well as borrower countries, were significant determinants of cross-border bank flows. This result applied to all three emerging market regions, suggesting that spillover effects were transmitted through similar channels.

In particular, banks from advanced economies tend to adjust cross-border loans in response to a reassessment of global risk and global financial market volatility, and in response to their own exposure to a primary crisis country. In addition, weak performance of banks in advanced economies was associated with lower cross-border loans to emerging markets. Lenders also reduced cross-border loans in response to the worsening of country-specific risk factors in emerging markets, in particular higher fiscal deficits and deteriorating banking sector performance in emerging market economies. Stronger financial and monetary linkages between lender and borrower countries helped stabilise cross-border flows even in times of financial stress.

A comparison of crisis periods revealed that, in the latest financial crisis, the most important channel for spillovers in cross-border lending between advanced and emerging markets were reassessment of global risk and greater expected volatility of global financial markets. Healthier banking sectors, more rigid exchange rate regimes and stronger financial integration contributed to the stability of cross-border bank flows to central and eastern Europe compared to other emerging market regions.

APPENDIX

Table A1 Determinants of cross-border bank flows from advanced to emerging markets
Random effect estimator with country fixed effects/time effects and PCSE

Extended analysis of borrower country risk factors

Dependent variable: log of quarterly, exchange-rate adjusted change in external position (in millions USD) of banks in country *i* vis-à-vis all sectors in country *j*

	Extended RISK
Model	
DIST	–0.688
	(–9.46)***
GDP_B	1.247
	(9.12)***
GDP_L	–0.806
	(–4.28)***
INT_diff	0.017
	(3.25)***
GR_diff	0.020
	(2.61)***
ER	–0.015
	(–4.02)***
SPREAD_L_D	–0.0003
	(–2.67)***
SHT_DBT	–0.010
	(–1.98)**
FOR_RES	0.008
	(2.74)***
CUR_ACT_(t-1)	–0.037
	(–1.88)*
CREDIT_GR_(t-1)	0.006
	(3.10)***
BK_HLTH_B	0.005
	(8.41)***
R^2	0.06
N	30,464

Note: Standard errors in parentheses. *** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level.

To avoid a near-singular matrix, US/IN/TR/TW/VN country fixed effects had to be eliminated.

Table A2 Determinants of cross-border bank flows from advanced to emerging markets

Random effects estimator for **emerging Asia** with country fixed effects and PCSE

Dependent variable: log of quarterly, exchange-rate adjusted change in external position (in millions USD) of banks in country *i* vis-à-vis all sectors in country *j*

	BASIC Model	GLOBAL Model	LENDER Model	RISK Model	LINKAGE Model
DIST	–0.136				
	(–0.29)	–0.147			
	(–0.33)***	0.082			
	(0.17)	0.018			
	(0.04)	–0.010			
	(–0.02)				
GDP_B	0.339				
	(1.45)	0.605			
	(2.58)**	0.530			
	(1.89)**	–0.172			
	(–0.69)	1.067			
	(3.60)***				
GDP_L	–0.188				
	(0.73)	–0.550			
	(–1.99)	–0.394			
	(–1.07)	–0.206			
	(–0.73)	–0.160			
	(–0.43)				
INT_diff	0.051				
	(4.97)***	0.045			
	(4.31)***	0.060			
	(5.02)***	0.024			
	(2.28)**	0.082			
	(6.53)***				
GR_diff	0.114				
	(8.17)***	0.087			
	(6.15)***	0.117			
	(7.19)***	0.078			
	(5.32)***	0.093			
	(5.35)***				
ER	–0.022				
	(–4.42)***	–0.019			
	(–3.85)***	–0.026			
	(–4.56)***	–0.028			
	(–5.79)***	–0.008			
	(–1.31)				
VIX	–0.046				
	(–5.06)***				
RISK_AVERS		–0.001			
	(–1.24)				
CLE_US			–0.034		
	(–1.66)*				
CLE_AS			–0.003		
	(–0.12)				
CLE_MX			–0.294		
	(–2.56)***				
BK_HLTH_L			0.004		
	(4.42)***				
GVT_BAL				0.257	
	(6.99)***				
BK_HLTH_B				0.664	
	(11.57)***				
FIN_OPEN					0.158
	(2.22)**				
ER_REGIME					–0.605
	(–6.14)***				
R^2	0.02	0.04	0.03	0.04	0.04
N	9,792	9,792	9,792	9,792	9,792

Note: Standard errors in parentheses. *** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level. PCSE = panel-corrected standard errors.

Due to near-singular matrix the following country fixed effects had to be eliminated from the regression:

Basic model: US/VN; Global model: US/VN; Lender model: GR/NO/SE/US/VN; Risk model: US/VN; Linkages model: GR/NO/US/VN.

Table A3 Determinants of cross-border bank flows from advanced to emerging markets

Random effects estimator for **Latin America** with country fixed effects and PCSE

Dependent variable: log of quarterly, exchange-rate adjusted change in external position (in millions USD) of banks in country *i* vis-à-vis all sectors in country *j*

	BASIC Model	GLOBAL Model	LENDER Model	RISK Model	LINKAGE Model
DIST	0.299				
	(0.23)	–0.407			
	(–0.09)	2.382			
	(1.65)*	–4.26			
	(–1.38)	–1.023			
(–0.70)					
GDP_B	1.709				
	(6.91)***	1.802			
	(6.89)***	0.158			
	(5.50)***	1.065			
	(4.07)***	1.721			
(6.97)***					
GDP_L	–1.42				
	(–4.85)***	–1.531			
	(–4.80)**	–0.367			
	(3.50)***	–0.932			
	(–3.13)***	–0.283			
(1.34)					
INT_diff	0.017				
	(2.98)***	0.007			
	(1.03)	0.022			
	(3.07)***	0.013			
	(1.94)**	0.024			
(3.65)***					
GR_diff	0.009				
	(0.92)	–0.010			
	(–1.07)	0.007			
	(0.65)	0.003			
	(0.28)	0.020			
(1.80)*					
ER	–0.028				
	(–4.11)***	–0.015			
	(–2.27)**	–0.029			
	(–3.81)***	–0.029			
	(–4.24)***	–0.008			
(–0.99)					
VIX	–0.029				
(–2.78)***					
RISK_AVERS		–0.002			
(–1.63)*					
CLE _US			–0.004		
(–0.21)					
CLE_AS			–0.024		
(–1.20)					
CLE_MX			–0.477		
(–2.23)**					
BK_HLTH_L			0.002		
(1.93)**					
GVT_BAL				0.086	
(4.05)***					
BK_HLTH_B				0.0056	
(2.72)***					
FIN_OPEN					0.001
(0.01)					
ER_REGIME					–0.255
(–4.10)***					
R^2	0.03	0.03	0.04	0.02	0.03
N	7,616	7,616	7,616	7,616	7,616

Note: Standard errors in parentheses. *** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level. PCSE = panel-corrected standard errors.

Due to near-singular matrix the following country fixed effects had to be eliminated from the regression:

Basic model: US/VE; Global model: US/VE; Lender model: GR/NO/SE/US/VE; Risk model: US/VE; Linkages model: GR/NO/US/VE.

Table A4 Determinants of cross-border bank flows from advanced to emerging markets

Random effects estimator for **central and eastern Europe** with country fixed effects and PCSE

Dependent variable: log of quarterly, exchange-rate adjusted change in external position (in millions USD) of banks in country *i* vis-à-vis all sectors in country *j*

	BASIC Model	GLOBAL Model	LENDER Model	RISK Model	LINKAGE Model
DIST	–0.880				
	(–7.83)***	–0.880			
	(–7.85)***	–0.963			
	(–7.77)***	–0.967			
	(–7.86)***	–0.395			
	(–3.83)***				
GDP_B	0.919				
	(7.56)***	1.095			
	(8.75)***	0.774			
	(4.43)***	0.965			
	(5.97)***	0.793			
	(5.00)***				
GDP_L	–0.306				
	(–1.40)	–0.660			
	(–2.93)**	–0.027			
	(–0.08)	–0.563			
	(–2.02)**	–0.262			
	(–0.95)				
INT_diff		0.002			
	(0.51)	–0.001			
	(–0.49)	–0.000			
	(–0.01)	–0.013			
	(–1.57)	0.005			
	(1.35)				
GR_diff	0.048				
	(5.86)***	0.040			
	(4.85)***	0.053			
	(5.60)***	0.061			
	(5.89)***	0.040			
	(3.91)***				
ER	–0.005				
	(–1.89)**	–0.003			
	(–1.32)	–0.003			
	(–1.08)	–0.031			
	(–3.62)***	–0.007			
	(–2.23)**				
VIX		–0.016			
	(–2.39)**				
RISK_AVERS			–0.002		
	(–2.39)**				
CLE _US			–0.024		
	(–1.67)*				
CLE_AS			–0.035		
	(–2.87)***				
CLE_MX			–0.183		
	(–2.04)**				
BK_HLTH_L			0.001		
	(1.37)				
GVT_BAL				–0.015	
	(–0.78)				
BK_HLTH_B				0.002	
	(1.82)**				
FIN_OPEN					0.185
	(14.40)***				
ER_REGIME					–0.302
	(–4.40)***				
R^2	0.06	0.06	0.06	0.04	0.10
N	13,056	13,056	13,056	13,056	13,056

Note: Standard errors in parentheses. *** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level. PCSE = panel-corrected standard errors.

Due to near-singular matrix the following country fixed effects had to be eliminated from the regression:

Basic model: US/TR; Global model: US/TR; Lender model: GR/NO/SE/US/TR; Risk model: US/TR; Linkages model: NO/US/TR.

Table A5 Determinants of cross-border bank flows from advanced to emerging markets

Random effects model for the **Mexican crisis (1994–95)** with country fixed effects and PCSE

Dependent variable: log of quarterly, exchange-rate adjusted change in external position (in millions USD) of banks in country *i* vis-à-vis all sectors in country *j*

	BASIC Model	GLOBAL Model	LENDER Model	RISK Model	LINKAGE Model
DIST	–0.459				
	(–2.63)***	–0.461			
	(–2.65)***	–0.546			
	(–2.68)***	–0.694			
	(–1.70)*	–0.321			
	(–1.52)				
GDP_B	–0.028				
	(–0.04)	0.304			
	(–0.44)	–0.844			
	(–0.84)***	0.298			
	(0.26)	–0.070			
	(–0.09)				
GDP_L	2.461				
	(2.26)**	1.547			
	(1.33)	3.660			
	(2.11)**	2.807			
	(1.52)	2.429			
	(1.98)**				
INT_diff	–0.014				
	(–0.87)	–0.010			
	(–0.64)	–0.011			
	(–0.47)	–0.115			
	(–2.09)**	–0.015			
	(–0.85)				
GR_diff	0.031				
	(1.91)*	0.025			
	(1.50)	0.035			
	(1.72)*	0.059			
	(1.95)**	0.040			
	(2.21)**				
ER	–0.013				
	(–1.36)	–0.016			
	(–1.70)*	–0.002			
	(–0.09)	0.009			
	(0.38)	–0.015			
	(–1.43)				
VIX	–0.019				
	(–0.27)				
RISK_AVERS	0.039				
	(2.53)				
CLE_MX		–2.542			
		(–2.12)**			
BK_HLTH_L		–0.004			
		(–0.79)**			
GVT_BAL		0.161			
		(0.81)			
BK_HLTH_B		0.0003			
		(0.03)			
FIN_OPEN			0.070		
			(0.76)		
ER_REGIME			–0.311		
			(–1.74)*		
R^2	0.1	0.1	0.1	0.1	0.1
N	3,808	3,808	3,808	3,808	3,808

Note: Standard errors in parentheses. *** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level. PCSE = panel-corrected standard errors.

Due to near-singular matrix the following country fixed effects had to be eliminated from the regression:

Basic model: FR/GR/NL/PT/US/AR/BR/HR/HU/IN/LT/MX/MY/RO/VE/VN;

Global model: FR/GR/NL/PT/US/AR /BR/HR/HU/IN/LT/MX/MY/RO/VE/VN;

Lender model: FR/GR/ NL/NO/PT/SE/US/AR/BR/HR/HU/IN /LT/MX/MY/RO/VE/VN;

Risk model: FR/GR/NL/PT/US/AR/BG/BR/EE/HR/HU/IN/LT/LV/MX/MY/RO/SI/SK/VE/VN;

Linkages model: FR/GR/NL/NO/PT/US/AR/BR/HR/HU/IN/LT/MX/MY/RO/VE/VN.

Table A6 Determinants of cross-border bank flows from advanced to emerging markets

Random effects model for the **Asian crisis (1997–98)** with country fixed effects and PCSE

Dependent variable: log of quarterly, exchange-rate adjusted change in external position (in millions USD) of banks in country *i* vis-à-vis all sectors in country *j*

	BASIC Model	GLOBAL Model	LENDER Model	RISK Model	LINKAGE Model
DIST	–0.254				
	(–1.69)*	–0.253			
	(–1.70)*	–0.245			
	(–1.43)	–0.371			
	(–2.22)**	0.864			
	(0.89)				
GDP_B	1.478				
	(3.02)***	2.022			
	(4.04)***	1.786			
	(3.18)***	0.300			
	(0.46)	1.476			
	(2.63)***				
GDP_L	–5.352				
	(–4.24)***	–0.887			
	(–0.586)	–5.319			
	(3.86)***	–3.975			
	(–2.68)***	–6.192			
	(–4.81)***				
INT_diff	0.027				
	(3.39)***	0.024			
	(3.00)***	0.029			
	(3.27)***	0.009			
	(0.64)	0.027			
	(3.19)***				
GR_diff	0.066				
	(3.58)***	0.029			
	(1.55)	0.056			
	(2.71)***	0.044			
	(1.95)**	0.084			
	(4.24)***				
ER	–0.012				
	(–3.24)***	–0.012			
	(–3.20)***	–0.014			
	(–3.12)***	–0.022			
	(–3.78)***	–0.012			
	(–2.98)***				
VIX	–0.080				
	(–3.07)***				
RISK_AVERS		–0.009			
	(–2.40)***				
CLE_AS			–0.012		
	(–0.15)				
BK_HLTH_L			0.001		
	(0.461)				
GVT_BAL				0.129	
	(1.91)**				
BK_HLTH_B				0.006	
	(2.20)**				
FIN_OPEN					0.608
	(3.91)***				
ER_REGIME					–0.256
	(–2.03)**				
R^2	0.1	0.1	0.1	0.1	0.1
N	3,808	3,808	3,808	3,808	3,808

Note: Standard errors in parentheses. *** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level. PCSE = panel-corrected standard errors.

Due to near-singular matrix the following country fixed effects had to be eliminated from the regression:

Basic model: FR/NL/US/AR/LT/MX/MY/RO/VE/VN;

Global model: FR/NL/US/AR/LT/MX/MY/RO/VE/VN;

Lender model: FR/GR/NL/NO/SE/US/AR/LT/MX/MY/RO/VE/VN;

Risk model: FR/NL/US/AR/BG/LT/MX/MY/RO/SI/SK/VE/VN;

Linkages model: FR/GR/NL/US/AR/LT/MX/MY/NO/RO/VE/VN.

Table A7 Determinants of cross-border bank flows from advanced to emerging markets

Random effects model for the **global financial crisis of 2007–08** with country fixed effects and PCSE

Dependent variable: log of quarterly, exchange-rate adjusted change in external position (in millions USD) of banks in country *i* vis-à-vis all sectors in country *j*

	BASIC Model	GLOBAL Model	LENDER Model	RISK Model	LINKAGE Model
DIST	–1.306				
	(–8.69)***	–1.301			
	(–8.71)***	–1.374			
	(–8.17)***	–0.332			
	(–8.87)***	–0.144			
	(–5.60)***				
GDP_B		0.942			
	(1.26)	0.010			
	(–0.01)	–0.635			
	(–0.76)	–0.294			
	(–0.58)***	1.826			
	(1.51)				
GDP_L	2.482				
	(2.31)**	2.558			
	(1.90)**	3.414			
	(2.48)***	0.236			
	(2.09)**	–2.354			
	(–1.07)				
IR_diff	–0.258				
	(–4.85)***	–0.016			
	(–0.26)	–0.146			
	(–2.44)***	–0.242			
	(–5.12)***	0.607			
	(2.20)*				
GR_diff		0.169			
	(6.61)***	0.085			
	(3.18)***	0.150			
	(4.88)***	0.162			
	(5.81)***	0.082			
	(0.92)				
ER	–0.105				
	(–7.26)***	–0.084			
	(–5.87)***	–0.099			
	(–6.19)***	–0.105			
	(–7.45)***	–0.086			
	(–1.64)*				
VIX		–0.038			
	(–2.08)**				
RISK_AVERS			–0.002		
	(–0.82)				
CLE_US			0.089		
	(0.79)				
BK_HLTH_L			0.015		
	(4.87)***				
GOV_BAL				0.053	
	(0.60)				
BK_HLTH_B				–0.010	
	(–1.91)*				
FIN_OPEN					0.156
	(6.89)***				
ER_REGIME					–0.420
	(–2.64)***				
R^2	0.1	0.1	0.1	0.1	0.2
N	3,808	3,808	3,808	3,808	3,808

Note: Standard errors in parentheses. *** Significant at the 1% level. ** Significant at the 5% level. * Significant at the 10% level. PCSE = panel-corrected standard errors.

Due to near-singular matrix the following country fixed effects had to be eliminated from the regression:

Basic model: US/VN; Global model: US/VN; Lender model: GR/NO/SE/US/VN; Risk model: US/VN; Linkages model: NO/US/VE/VN.

List of variables

Mnemonic	Data sources*	Variable description
LOANS	BIS-LBS	External positions (assets) of BIS reporting banks in country *i* vis-à-vis all sectors in emerging market country *j*, in millions of US dollars. Changes in external positions are exchange-rate adjusted by converting the relevant stocks into their original currencies using end-of-period exchange rates and subsequently converting the changes in stocks into dollar amounts using period-average exchange rates.
DIST	www.timeanddate.com	Distance between the capital of country *i* and country *j*, in kilometres.
GDP (_L, _B)	CEIC, Datastream, Eurostat, IFS, CEIC, National data	Nominal GDP (of lender and borrower countries), in millions of US dollars.
INT_diff	IFS	Money market interest rate differential between country *j* and country *i*, in percentage points (for HU and CN three-month interbank rates, for TW three-month money market rates).
GR_diff	Datastream, IFS	Real GDP growth differential between country *j* and country *i*, in percentage points.
ER	Datastream, IFS	Bilateral nominal exchange rate index.
VIX	Bloomberg	VIX Chicago Board Options Exchange S&P 100 Volatility Index, quarterly average.
RISK_AVERS	Moody's	Spread of corporate bonds (AAA, AA, A and BAA) over 10-year US Treasury bonds, quarterly average.
CLE (_MX, _AS, _US)	BIS, LBS	Common lender effect, measuring exposure of banks in a lender country to the primary crisis country (MX, five Asian crisis countries, or the US); external assets of country *i* vis-à-vis the primary crisis country, as a percentage of the total amount outstanding of external assets of country *i*.
BK_HLTH (_L, _B)	Datastream, IFS	Bank health indicator (of lender and borrower countries); deviation of the banking industry subindex from the main equity price index; in percent.
GVT_BAL	WEO	General government balance, linearly interpolated, as a percentage of country *j*'s GDP.
FIN_OPEN	BIS-LBS, WEO	Bilateral financial openness: sum of the external assets and liabilities of all sectors in country *j* vis-à-vis banks in BIS reporting country *i*, as a percentage of country *j*'s GDP.
ER_REGIME	RRI	Exchange rate regime, coarse classification codes from Reinhart and Rogoff (2004).
SPREAD_L_D	IFS	Spread between the main lending and deposit rates of interest, in basis points.
SHT_DBT	BIS, CBS, IDS, WEO	Debt with a maturity up to and including one year, plus international debt securities outstanding with a maturity of up to one year, of all BIS reporting countries vis-à-vis country *j*; as a percentage of country *j*'s GDP.
FOR_RES	IFS, National Data	Foreign exchange reserves, outstanding positions as a percentage of M2.
CUR_ACT	BOP, National Data	Current account balance as a percentage of annual GDP. For China, annual BOP data before 2001; semi-annual data after 2001 used to interpolate quarterly figures.
CRED_GR	IFS, National data	Real credit to the domestic private sector, annual growth rate in percent.

* Sources of data

BIS-LBS: BIS locational banking statistics

BIS-CBS: BIS consolidated banking statistics

DIST: http://www.timeanddate.com/worldclock/distance.html?p1=48

IFS: International Monetary Fund, International Financial Statistics

DOT: International Monetary Fund, Direction of Trade Statistics

WEO: International Monetary Fund, World Economic Outlook

BOP: International Monetary Fund, Balance of Payments Statistics

IDS: International Debt Statistics

CEIC: Economic databases for emerging and developed markets, http://www.ceicdata.com/about_ceic.html

RRI: Reinhart-Rogoff exchange rate regime classification index, http://terpconnect.umd.edu/~creinhar/Data/ERA-Monthly%20coarse%20class.xls, http://intl.econ.cuhk.edu.hk/exchange_rate_regime/index.php?cid=11

Advanced economies (BIS reporting countries): Austria (AT), Belgium (BE), Switzerland (CH), Germany (DE), Denmark (DK), Spain (ES), Finland (FI), France (FR), United Kingdom (GB), Greece (GR), Italy (IT), Japan (JP), Netherlands (NL), Norway (NO), Portugal (PT), Sweden (SE), United States (US).

Emerging Asian economies: China (CN), Indonesia (ID), India (IN), Korea (KR), Malaysia (MY), Philippines (PH), Taiwan (TW), Thailand (TH), Vietnam (VN).

Central and eastern European economies: Bulgaria (BG), Croatia (HR), Czech Republic (CZ), Estonia (EE), Hungary (HU), Latvia (LV), Lithuania (LT), Poland (PL), Romania (RO), Slovak Republic (SK), Slovenia (SI), Turkey (TR).

Latin American economies: Argentina (AR), Brazil (BR), Chile (CL), Colombia (CO), Mexico (MX), Peru (PE), Venezuela (VE).

The two endogenous variables – external positions and external loans of BIS reporting countries vis-à-vis emerging market economies – are taken from the BIS locational banking statistics. The locational statistics comprise data on gross international financial claims and liabilities of banks resident in a given country. The main goal of the locational statistics is to provide information on the role of banks and financial centres in the intermediation of international capital flows. The statistics includes stocks ("amounts outstanding") and flows ("changes"): the flows are exchange-rate adjusted (unadjusted flows are simply calculated as the difference between amounts outstanding). We use the locational statistics, because it is more relevant for countries receiving external loans, while the consolidated statistics is more relevant for countries giving such loans. The locational statistics also has longer data series (exchange-rate adjusted flows are available for 41 reporting countries since 1977 on a quarterly basis).

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Cross-border flows and foreign banks in the global financial crisis – has Eastern Europe been different?

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ABSTRACT

Following a series of financial crises in the 1990s foreign banks have become dominant players in banking sectors of many emerging markets. This holds in particular for countries in Eastern Europe. Against this background, we examine whether a strong presence of foreign banks has mitigated the sudden stop phenomenon in the respective countries in the global financial crisis. We find that foreign banks did not stabilize cross-border bank flows. However, Eastern Europe has been different. Eastern European countries with a higher foreign bank asset share recorded significantly more stable cross-border flows during the crisis than their emerging market peers. This is in particular due to cross-border bank-to-bank lending. Our results suggest that the special conditions of the European integration process have blurred the boundaries between home and host countries and thus led to additional efforts by parent banks to stabilize cross-border flows in the global financial crisis.

Keywords: Foreign banks, cross-border flows, financial crisis, Eastern Europe

JEL classification: E44, F36, G21

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1. INTRODUCTION[68]

Europe is different – the phrase coined by Abiad et al. (2007) has become a popular heading for characterizing developments in emerging Europe compared to its emerging market peers (e.g. IMF 2010a). Originally, the term was chosen to highlight the fact that in the European Union (EU) net capital has been flowing 'downhill' as predicted by the standard textbook model (Obstfeld and Rogoff 1996). By contrast, the convergence process in most other countries has been a prime example of the *Lucas Paradox* (Lucas 1990), with net capital flowing 'uphill'. A high degree of *de jure* and *de facto* financial integration between mature and converging countries within Europe has been identified as a key factor driving this result, with financial integration in Europe itself being a function of the broader political and economic integration process taking place for more than fifty years.

Since the mid- to late 1990s European financial integration has been characterized by a new form of financial integration, namely the widespread and dominant presence of EU-15 banks in Central and Southeastern Europe (CESEE), i.e. the New Member States in Central and Southeastern Europe and the Baltics and the countries of South-eastern Europe with an EU accession perspective. Herrmann and Winkler (2009) present evidence suggesting that the strong presence of foreign banks in CESEE is a significant factor in explaining the divergent pattern of net capital flows in Europe compared to net capital flows in the convergence club consisting of the United States and the countries in emerging Asia. In a similar vein, Friedrich et al. (2010) identify parent banking as an important factor for positive growth effects of financial integration which emerge in CESEE countries but not in other emerging markets.

The entry of foreign banks into CESEE banking sectors often followed episodes of financial crisis as authorities recognized that neither financial development nor financial integration can be smoothly organized based on state-owned banks and private domestic institutions with poor governance ('pocket banks') (EBRD 1998). Thus, authorities in CESEE, like in several countries in Latin America, have followed the argument that the entry of foreign banks is an important measure to strengthen the resilience of their banking sectors against external shocks (Mishkin 2001). The global financial crisis provides the first opportunity to test this proposition.

Based on a sample of 56 emerging markets (EMEs) and estimating a cross-sectional OLS model we do not find evidence that foreign banks significantly mitigated sudden stop phenomena in the global financial crisis when controlling for the size of the boom in capital flows in the pre-crisis period and several other potential determinants. However, our results suggest that Eastern Europe has been different. This difference is conditional on the share of assets held by foreign banks. Beyond the threshold of an asset share of about 37 percent, the impact of foreign banks has been significantly different compared to the emerging market peers, mitigating the sudden stop in cross-border flows. Moreover the stabilizing effect can mainly be traced to flows from banks in BIS reporting countries to banks in EMEs. Finally, while not completely conclusive, our results suggest that the conditional impact of foreign banks can only be observed for CESEE and not for other EMEs.

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Overall our results suggest that in general emerging markets did not benefit from a strong presence of foreign banks in the global crisis. This is in line with the pre-crisis literature on the stability-enhancing effects of foreign banks in EMEs arguing that these effects depend on the relative strength of parent banks compared to domestic banks. As the global crisis originated in mature economies it substantially weakened the ability of parent banks to provide liquidity support to their subsidiaries.

For the CESEE countries our results indicate that the region has been different. Our preferred explanation for this evidence refers to the European integration process. The common market has blurred the boundary between home and host countries and thereby reinforced the special lending relationship between parent banks and their subsidiaries. A similar effect has been absent in other emerging market regions. Parent banks of CESEE subsidiaries have been keen to protect the equity and reputation investments they have made in the past as they perceive host countries as an extension of their home markets.

The paper is organized as follows: after a review of the literature and the empirical evidence on foreign banks and financial stability in EMEs (section 2), we illustrate the patterns of foreign entry and presence, comparing developments in the CESEE with those in other emerging markets (section 3). Section 4 describes our data and the model specification. Sections 5 and 6 present the results and robustness checks and section 7 concludes.

2. FOREIGN BANKS AND CROSS-BORDER BANK FLOWS: LITERATURE REVIEW AND EMPIRICAL EVIDENCE

Boom-bust cycles in capital flows characterized financial liberalization in emerging markets and developing countries in the 1990s triggering substantial fluctuations of domestic credit and economic activity (Tornell and Westermann 2002, Mendoza and Terrones 2008). Against this background, two policy responses to stabilize capital flows have been discussed. The first response has been a cautious approach toward capital account liberalization (Rodrik and Subramanian 2009, Ostry et al. 2010), employing capital controls and regulatory measures to limit capital inflows, in particular highly reversible flows, like cross-border bank lending (Becker et al. 2007). The second response relied on measures to strengthen domestic banking sectors in EMEs, as sudden stops and capital flow reversals are a feature of banking sectors characterized by poor governance and a weak supervisory and regulatory framework (Krugman 1998, Llewellyn 2002, Hernández and Landerretche 2002).

Foreign institutions are expected to strengthen financial stability in EMEs by improving solvency and liquidity of host country banking systems. Banking sector solvency improves because foreign banks are better capitalized than their domestic peers. Moreover, they provide 'reputational capital' (Hellman and Murdock 1998) due to their long presence in the financial markets of mature economies. Finally, foreign banks are said to have superior credit technologies, better management expertise and governance structures and are less open to government and political interference than domestic banks (Detragiache et al. 2008). Banking sector liquidity is enhanced because depositors' trust in the stability of foreign institutions makes bank runs less likely. Thus, inviting foreign banks to enter domestic banking sectors has been identified as a major element of a strategy to mitigate boom-bust cycles in EMEs without restricting capital flows and financial integration (Mishkin 2001).

Most studies on the stability aspect of foreign bank entry into emerging markets focus on credit activities of foreign banks in previous EME crisis episodes (De Haas and van Lelyveld 2006/2010, Arena et al. 2007, Aydin 2008, Dages et al. 2000). Overall the results suggest that foreign banks have stabilized credit growth in EMEs and

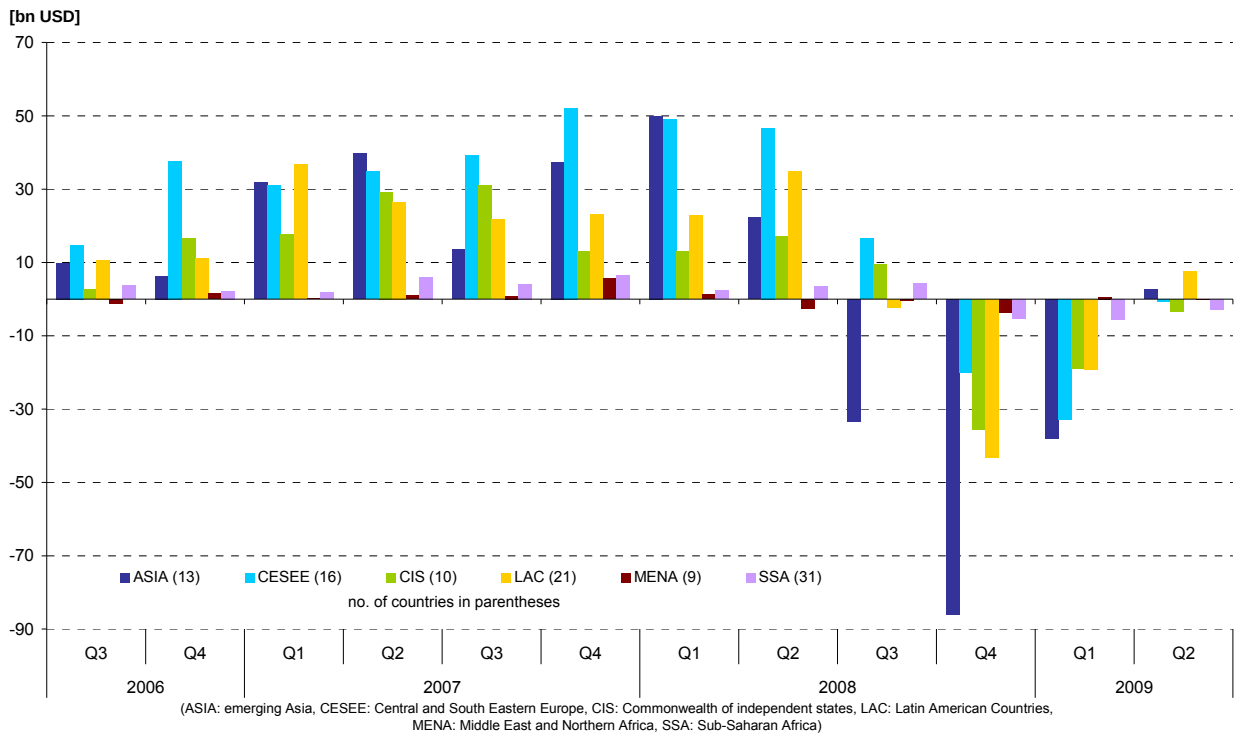
developing countries (DCs). However, the stability enhancing effect of foreign banks relies on the strength of the respective parent banks. Thus, in a crisis originating in parent banks' home countries this strength is not for granted and foreign banks may have a destabilizing effect on domestic credit.

Several studies have looked at the transmission effects of financial stress in mature economies on cross-border bank flows. For example World Bank (2008) provides evidence that rising risk aversion and tighter lending conditions in mature economies have a negative impact on international bank lending. Geršl (2007) argues that in a mature economy crisis scenario the risk of contagion might rise for emerging markets with a substantial involvement of foreign institutions, like in CESEE, as parent banks confronted may reduce their cross-border claims to bolster liquidity at home (Cetorelli and Goldberg 2008). This may lead to a drop in the supply of credit in the host country. Galindo et al. (2010) present evidence suggesting that in Latin America credit supply by foreign-owned banks shows a larger response to external shocks than credit supply by domestic banks. However, foreign banks are not alike. Spanish institutions seem to behave more like domestic ones and do not transmit rising rates and stricter lending criteria from global markets to host countries.

Overall, the evidence suggests that cross-border bank flows to EMEs respond to rising risk aversion, tighter monetary policy and crisis episodes in mature economies. However, whether a higher share of foreign banks in EMEs is aggravating or mitigating this response has been an open question. This is also because in the period of great moderation crises episodes have been rare (Laeven and Valencia 2008, Reinhart and Rogoff 2009) providing little testing ground to assess the stabilizing or destabilizing impact of foreign bank entry into emerging markets.

The global financial crisis has changed this. After the collapse of *Lehman Brothers*, cross-border flows to EMEs dropped substantially and with quite some heterogeneity among regions and countries (Figure 1). Have EMEs with a larger presence of foreign presence exhibited stronger or smaller reversal of capital flows than countries where foreign-owned banks account for only a small share of total banking sector assets?

Figure 1: Aggregated cross-border bank flows per region (USD bn)



(ASIA: emerging Asia, CESEE: Central and South Eastern Europe, CIS: Commonwealth of independent states, LAC: Latin American Countries, MENA: Middle East and Northern Africa, SSA: Sub-Saharan Africa)

Source: BIS International locational banking statistics, own calculations

As the crisis had its origin in mature economies, we would expect an aggravating effect if the loss of access to global financial markets made parent banks unable or unwilling to support their subsidiaries. Additionally, it may be argued that the positive impact of foreign banks on host banking sector solvency may have been less strong than originally envisaged, as the quality of loan portfolios held by foreign-owned institutions in EMEs, for example in CESEE, deteriorated markedly after the crisis (Mihaljek 2008). However, the sudden stop of capital flows might have been less pronounced for countries with a strong presence of foreign banks for three reasons:

a) First, lending between parent banks and subsidiaries is less prone to problems of asymmetric information compared to lending on international capital markets (De Haas and Lelyveld 2010).

b) Second, parent banks attach a high value to their investments in terms of capital and reputation, i.e. parent banks will only withdraw funds from subsidiaries if this does not jeopardize the viability of their subsidiaries.

c) Third, parent banks have access to lender of last resort facilities (Broda and Levy Yeyati 2002) as well as support mechanisms by home country governments[69] and international financial institutions, like the *Vienna Initiative* (Andersen 2009), which explicitly aimed at stabilizing cross-border exposures of foreign banks to CESEE countries, and the *Joint IFI Action Plan In Support of Banking Systems and Lending to the Real Economy in Central and Eastern Europe* (EIB 2009). As a result, even with weak parent banks the likelihood of a sudden stop or a strong reversal of capital flows will be lower than in the case of cross-border flows intermediated via international capital markets (Moreno and Villar 2005).

Several studies, using different data and methodologies, look at the link between foreign bank presence and cross-border lending in the global financial crisis from various perspectives. Cetorelli and Goldberg (2010) and Kamil and Rai (2010) focus on the role of foreign banks as shock transmitters. Exploiting bilateral data from the BIS' Consolidated banking statistics they find that flows from banking sectors highly depending on gross short term US dollar funding were affected more than flows from banking sectors showing a higher degree of stability. Kamil and Rai (2010) present evidence that after the *Lehman* collapse US banks showed a stronger reaction in terms of lending to Latin American countries than Spanish banks. Thus, both papers provide evidence that – as expected, given the origin of the crisis in mature economies – weak parent banks were less able or willing to fund their subsidiaries than stronger parent banks. For cross-border flows Cetorelli and Goldberg 2010 find that this result also holds when controlling for the *Vienna Initiative*. However, the results of Cetorelli and Goldberg (2010) also suggest that domestic banks in EMEs relying on cross-border flows from the same mature economies reacted in a similar way as foreign banks' subsidiaries. Hence, foreign ownership as such did not aggravate the credit contraction in host countries. This is in line with the finding of Kamil and Rai (2010) that local lending by foreign banks with a strong funding base in the respective host countries is more resilient to global shocks and may even compensate for a decline in the cross-border component of foreign claims. This pattern is also observable in the immediate post-*Lehman* period.

EBRD (2009) and Vogel and Winkler (2010) focus on the role of foreign banks as potential stabilizers in the global financial crisis. Using data from the BIS' Locational banking statistics both papers present evidence that foreign banks had a stabilizing impact. In EBRD (2009) the cross-country regression relates the sudden stop in cross-border

[69] However, home country government support to parent banks may be limited to home country activities and thus have no bearing on the stability of subsidiaries in host countries. Attempts in this direction have been observed at the peak of the global crisis, including in the EU (Hope and Wagstyl 2009).

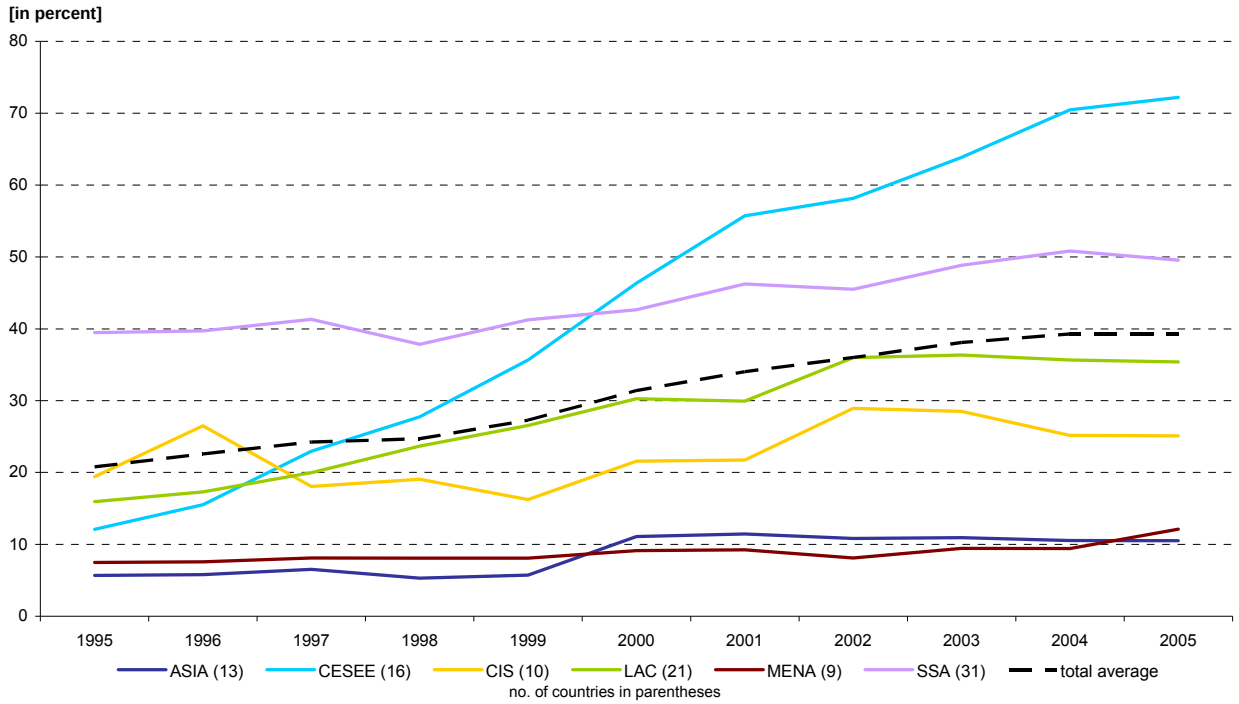
bank flows, measured as the share of outstanding claims that was pulled out of the respective host countries in 2008Q4, to the share of assets held by foreign banks in total banking sector assets. In addition the regression controls for sovereign credit rating, GDP per capita and more than 90 macroeconomic, financial and institutional variables which are sequentially added to the baseline regression. The results suggest a mitigating impact of foreign banks and hold for a narrow sample involving 25 transition countries and for a broad sample of 64 emerging markets. In Vogel and Winkler (2010) we take a larger sample of countries, also including developing countries, and measure the size of the post-*Lehman* sudden stop as the difference between average cross-border bank flows in the four quarters preceding the *Lehman* collapse and average cross-border bank flows in the two post-shock quarters. Moreover, while the number of control variables is significantly smaller than in EBRD (2009), we control for the surge in lending to EMEs and DCs in the three years before the crisis. The results suggest that a higher share of foreign bank assets significantly mitigated the sudden stop phenomenon.[70] However, a closer analysis reveals that the result seems to be driven by two regions: Eastern Europe and Central Asia (ECA) and Sub-Saharan Africa (SSA). In other regions, Latin America (LAC), the Middle East and Northern Africa (MENA) as well as emerging Asia (ASIA) the share of foreign banks in total banking sector assets is unrelated to the fall in cross-border bank flows in the two quarters following the *Lehman* bankruptcy. This regional split largely reflects differences in the patterns of foreign banks' entry and presence in EMEs and DCs recorded over the past fifteen years.

3. FOREIGN BANKS' ENTRY AND PRESENCE IN EMERGING MARKETS AND DEVELOPING COUNTRIES

The dataset on the presence of foreign banks provided by Claessens et al. (2008) reveals that the average share of assets held by foreign banks in total EME and DC banking sector assets has increased substantially, from 21 percent in 1995 to 39 percent in 2005 (Figure 2). This increase is not only reflecting investments by banks form high-income countries ('northern banks'), but also from banks from developing countries ('southern banks'), especially in low income and small developing countries. Foreign banks are defined as banks with direct foreign ownership of more than 50 percent of capital.

[70] By contrast, Vogel and Winkler (2010) find no evidence that a higher share of foreign banks in total banking sector assets mitigated the decline in domestic credit growth after *Lehman*.

Figure 2: Foreign bank asset share per region



no. of countries in parentheses
(ASIA: emerging Asia, CESEE: Central and South Eastern Europe, CIS: Commonwealth of independent states, LAC: Latin American Countries, MENA: Middle East and Northern Africa, SSA: Sub-Saharan Africa)
Source: Claessens et al. (2008), own calculations

The rising trend in foreign bank presence has been far from uniform and exhibits substantial regional differences. CESEE and LAC have been the main drivers of the global rise of foreign bank presence in EME and DC banking sectors. In CESEE, on average, foreign banks became dominant players in host countries' banking sectors, accounting for 72 percent of total assets in 2005, up from 13 percent in 1995. In LAC, the share of assets controlled by foreign-owned institutions rose from 15 percent in 1995 to 40 percent in 2005. By contrast, Sub-Saharan Africa, MENA, ASIA and the CIS recorded rather stable shares of foreign banks in total banking sector assets.

In CESEE the rising importance of foreign banks almost only reflects the entry of banks from mature economies, i.e. the EU-15. Moreover, in many countries foreign ownership increased rapidly in the aftermath of financial crises episodes. This is in stark contrast to the CIS where banks from other emerging markets, mainly from within the region, account for almost half of the assets held by foreign banks. Moreover, like in ASIA, periods of financial turmoil, for example in Russia and Ukraine in the late 1990s, were not followed by a wave of foreign entry.

Table 1: Foreign bank asset share in EMEs and DCs – a regional perspective

	Foreign bank asset share (2005)	**Trend** (1995 – 2005)	**Share of northern / southern banks in total assets** (2005)
CESEE	Very high (72.2)	Steep rise	67.7 / 4.5
CIS	Low (25.1)	Stable	13.5 / 11.6
LAC	High (35.6)	Rise	24.2 / 11.4
MENA	Low (10.9)	Stable	10.6 / 0.3
ASIA	Low (10.5)	Stable	7.2 / 3.3
SSA	High (49.5)	Moderately growing	27.3 / 22.3

Source: Claessens et al. (2008), own calculations

In Latin America the share of foreign banks in total assets rose substantially until 2002, largely driven by the entry of northern banks, i.e. banks from the United States and Spain (World Bank 2008). Like in CESEE, the timing of

entry suggests that these developments reflected post-crisis policies that aimed at putting financial development and financial integration on a more stable institutional footing (Committee on the Global Financial System (CGFS) 2004, Cull and Martinez Peria 2007). With the exception of Mexico and Peru, however, the share of foreign banks in total banking sector assets has not reached the levels seen in CESEE. After 2002 a decline in the share of northern banks, partly driven by their experience during and after the financial crisis in Argentina (World Bank 2008), has been compensated by rising investment from EME and DC peers. As a result, southern banks have become important players in the region, in particular in smaller banking markets.

In MENA and ASIA the share of foreign bank assets has remained stable at comparatively low levels. This holds for basically all countries in both regions, as cross-country differences within MENA and ASIA have been low. Moreover, with two exceptions, banks from mature economies have been the major investors in the banking sectors of both regions (Table 2).

SSA is characterized by a comparatively high share of assets held by foreign banks in total banking sector assets. However, in contrast to CESEE and LAC the presence of foreign banks has risen only moderately since 1995, mainly driven by south-south banking sector FDI. Indeed, SSA has become the region with the highest share of banks from EME and DC peers in total banking sector assets (Table 1). By contrast, the presence of northern banks largely reflects the legacy of the colonial past in those countries that refrained from a nationalization of the banking industry after independence (Daumont et al. 2004).

Cross-regional differences in levels and developments of foreign bank presence may reflect demand and supply factors. Host country authorities and policymakers constitute the demand side as they decide whether and to what degree they would like to open domestic banking sectors for foreign-owned institutions. Many countries still employ explicit restrictions on foreign ownership in domestic banking sectors (World Bank 2008). On average, these restrictions are most pronounced in ASIA followed by SSA and MENA. Restrictions are the lowest in CESEE and LAC. This pattern largely corresponds with attitudes towards financial liberalization and openness in general. The Chinn-Ito Index (Chinn and Ito 2008) reveals that SSA, Asia, the CIS and MENA have been characterized by a low level of de jure financial openness and by little progress in opening up since 1995. By contrast LAC and CESEE have significantly opened up their financial systems and achieved comparatively high levels of financial openness (Table 2).

Table 2: Foreign banks – demand factors

	Financial liberalization (Chinn-Ito Index**) 2005 (1995)	**Financial development** (private sector credit to GDP 2005 (1995))	**Financial stability** (no. of banking crises per country, 1990 - 2000)	**Foreign bank asset share** 2005 (1995)
CESEE	1.22 (-0.04*)	42.5 (23.5)	0.94	72.2 (12.9)
CIS	-0.16 (-0.20*)	19.2 (6.4)	0.70	25.1 (19.5)
LAC	1.58 (0.32)	26.1 (25.4)	0.70	35.6 (14.5)
SSA	-0.47 (-0.63)	19.1 (15.0)	0.39	49.5 (39.5)
ASIA	-0.28 (0.94)	50.4 (44.4)	0.57	10.5 (5.6)
MENA	0.49 (-0.29)	40.3 (30.6)	0.44	10.9 (6.7)

* Data from 1998
** The Chinn-Ito index is based on IMF data on exchange rate restrictions and accounts for the existence of multiple exchange rates, restrictions on current and capital account transactions as well as requirements on the surrender of export proceeds. The higher the Index value, the more open a country is to cross-border capital transactions.

Source: Chinn and Ito (2008), Claessens et al. (2008), Laeven and Valencia (2008), IMF, own calculations

A key motivation for opening up to foreign banks is to foster economic growth by financial development (King and Levine 1993). In the mid 1990s many countries, in particular in LAC, CESEE and the CIS, had underdeveloped banking sectors, measured by the ratio of private sector credit to GDP or the ratio of broad money to GDP (Table 2). Against this background, the entry of foreign banks was identified as one instrument to expand finance and thereby spurring growth in EME and DC host countries (Levine 1996, EBRD 1998). By contrast, the need to develop domestic banking sectors via foreign-owned banks was much less pressing in ASIA and MENA. SSA constitutes a special case as financial development was low even though the region was characterized by a comparatively strong involvement of foreign banks.

Finally, authorities opened up domestic banking sectors to foreign banks for stabilization purposes, i.e. for putting domestic financial development as well as financial liberalization and financial integration on a sounder footing. Most countries in CESEE as well as in LAC opened up their banking sectors after episodes of financial turmoil. As ASIA and MENA recorded fewer incidences of financial turmoil (Table 2), they saw less of a need for foreign bank entry as a means to import financial stability. Indeed, in ASIA policymakers became more skeptical towards financial liberalization in general and foreign banks in particular after the 1997 crisis (Rajan and Gopolan 2009).

The supply side of foreign banking refers to the motivation of banks to enter the respective host countries' banking sectors. While profit maximization is the overriding motivation for entry, it does not explain why some banks from certain home countries choose to open subsidiaries and branches in specific host countries. Moreover, traditional arguments, like the 'follow the client' motive (Wezel 2004), do not explain that foreign banks engage in retail banking with host country customers on a large scale. The latter, however, is a prerequisite for foreign banks to gain sizable market shares like in CESEE and LAC. Moreover, an analysis of the origin of foreign banks operating in EMEs and DCs suggests that entry decisions are influenced by geographical proximity, common language and economic integration (van Horen 2007).

Against this background, Claessens et al. (2008) provide evidence indicating that the location decisions of foreign banks reflect institutional competitive advantages. Concretely, these advantages are based on the relative similarity of home and host country institutional environments compared to the relative similarity of the environment of a particular bank's home country and the environment of the countries the bank's potential competitors come from. Accordingly, 'northern banks' have been mainly entering banking sectors in middle-income countries, while 'southern banks' have become more active in middle- to low-income countries. Prominent examples are the entries of EU-15 banks in the CESEE and of US and Spanish banks in LAC, as well as the entries of Russian and Kazakh banks in selected CIS countries and of South African banks in Southern Africa. Claessens et al. (2008) also find that the competitive advantage argument is more important for entries via merger and acquisitions than for entries in the form of greenfield investments. As the authors themselves suggest this may reflect the fact that mergers and acquisitions are the preferred form of entry for retail banking, because it involves the transfer of staff and branches, whereas a greenfield investment is the entry form that – at least initially – is more conducive to small-scale operations.

Combining demand and supply factors leads to the conclusion that SSA and CESEE are the extremes when interpreting the 2005 share of assets held by foreign banks in domestic banking sectors.

- In Sub-Saharan Africa the high share of assets held by foreign banks reflects either a colonial past or entry by southern banks exploiting their competitive advantages.[71] In neither case the share is linked to significant efforts to invite foreign banks as part of a strategy to liberalize, develop or stabilize domestic banking sectors.
- Latin America stands out as the region where financial liberalization has been pursued most vigorously and foreign bank entry has been an important part of efforts to develop and stabilize banking sectors in a liberalized environment. Moreover, US and Spanish banks constituted a potential for market entry, in particular for the more institutionally advanced and larger banking markets. The Argentine crisis marked a reversal of the trend as it demonstrated to the demand as well as the supply side that entry by northern banks is neither a panacea to stabilize and develop banking sectors nor a riskless way to exploit competitive advantages. Thus, since the turn of the century advances of foreign banks in the region have been mainly linked to southern FDI.
- MENA, CIS and ASIA are regions where – on average – countries refrained from policies strongly supporting financial liberalization. Moreover, with several countries in MENA and ASIA showing a comparatively high degree of financial development, demand for foreign entry has been subdued. Stability concerns have been either low, as episodes of financial turmoil had been rare or reinforced the skeptical attitude towards foreign entry. As a result, banking sectors have remained a domestic institutions stronghold.
- In CESEE the high share of assets held by foreign banks reflects a consistent strategy of financial opening, development and stabilization pursued by the respective authorities. Moreover, the region benefitted from a ready supply in form of EU-15 banks, given institutional convergence related to EU accession.[72] Indeed, for the CESEE the approach by Claessens et al. (2008) even suggests an explanation for the timing and pattern of entry observed. Given that in the early and mid-1990s most countries in south-eastern Europe were still characterized by a comparatively low level of institutional development compared to the CEE countries, the first entries of EU-15 banks in the region were observed in central Europe and the Baltics. Over time the quality gap declined and countries in south-eastern Europe recorded a rapid catching-up process in terms of foreign bank presence.

Overall, the analysis suggests that CESEE stands out in an emerging market context, as pursuing the agenda of opening up, developing and stabilizing domestic financial sectors the most vigorously. This strategy included the opening up to foreign banks. Other emerging markets, with the exception of LAC, have been much more cautious, including the entry of foreign banks. On the latter, SSA represents a clear exception, as the strong presence of foreign banks is largely a result of factors unrelated to financial globalization and development.

Against this background, our econometric analysis focuses on emerging markets and does not include developing countries because they have not started a process of financial integration yet (Mody 2004). Our selection of EMEs follows IMF (2010b) which contains an in-depth analysis on how emerging markets coped with the financial crisis.

[71] As the analysis by Claessens et al. (2008) is based on entries between 1996 and 2005, it does not account for the long-standing presence of northern banks in SSA. Indeed, if the presence of these banks had been the result of entry decisions in the recent past, the SSA evidence would run counter to the general conclusion that institutional competitive advantages matter.

[72] Pre-crisis statements by CEOs of foreign banks active in the region explicitly referred to CESEE host countries as an extension of the domestic market (Wiedner 2005, Wimmer 2005, Profumo 2006).

4. DATA AND MODEL SPECIFICATION

We analyze whether foreign bank presence had a stabilizing impact on cross-border bank flows from BIS reporting banks to emerging markets in the recent financial crisis. We do this by taking a macro perspective. Thus, our approach does not allow for a clear separation between foreign and domestic banks in host countries. However, with macro data being available on a quarterly frequency, we can explicitly study short term fluctuations in cross-border flows which is of crucial relevance for assessing factors influencing sudden stop phenomena. The *Lehman* collapse, marking the beginning of the global crisis for EMEs, occurred in September 2008. Annual data, used in studies based on micro data, would not catch the sudden stop in a meaningful way. Concretely, 2008 data would reflect both, the pre-crisis boom until mid of the year and the post-Lehman contraction, while 2009 data would reflect the carryover from the crisis as well as first signs of recovery.

BOX: INTERNATIONAL BANKING STATISTICS OF THE BIS - LOCATIONAL VS. CONSOLIDATED

The BIS publishes two different sets of international banking statistics, the locational and the consolidated banking statistics.

The locational banking statistics provide data on international banking business conducted in industrial countries and financial centers. Banks report their international claims and liabilities vis-à-vis non-residents and vis-à-vis residents in foreign currency. This happens quarterly and on a gross and unconsolidated basis, i.e. including claims and liabilities vis-à-vis their own affiliates. As the locational data are split by currency (and by counterparty, with the non-bank sector as an 'of which' item), the BIS is able to estimate the quarterly exchange rate adjusted changes between the quarterly reported stocks.

Currently banking institutions in 42 countries are reporting to the BIS locational statistics. As these countries include all major economies and the largest centers of financial activity the coverage of international banking activity is virtually complete (Wooldridge 2002).

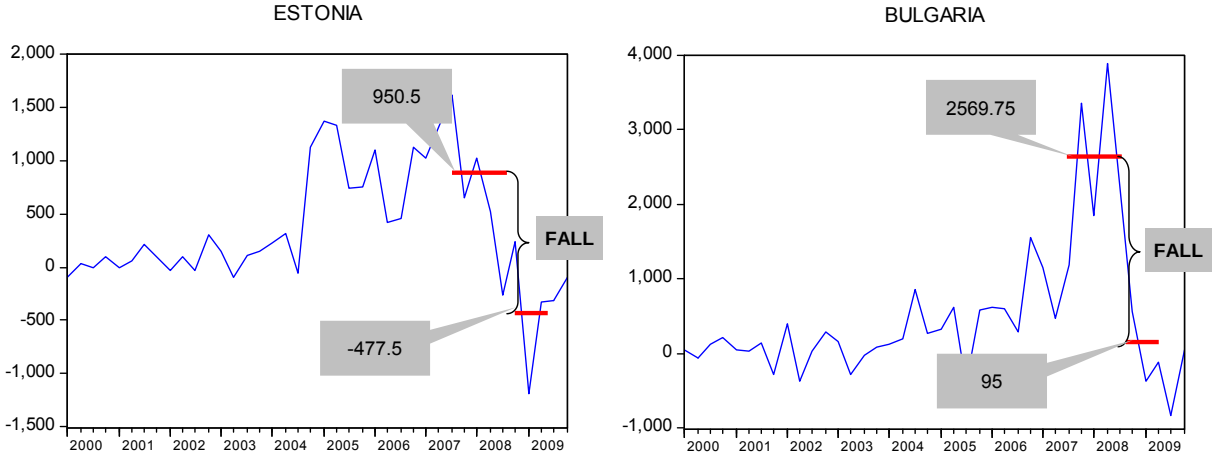
The consolidated banking statistics provide information on banks` financial claims on other countries. They measure the risk transfer and assess the credit risk exposure of national banking sectors. Data are collected on a group worldwide-consolidated basis, including the exposures of foreign offices with inter-office positions being netted out. Foreign claims are split in international claims (cross-border claims and local claims of foreign affiliates in foreign currency) and local claims of foreign affiliates in local currency.

Cross-border bank flows are from the BIS International locational banking statistics and are the exchange-rate-adjusted changes from the quarterly reports of outstanding claims of all BIS reporting banks vis-à-vis non-residents and vis-à-vis residents in foreign currency. We use data from the locational statistics as its primary purpose is the measurement of international capital flows (Bank of England 2001) (see Box).

Our variable measuring the instability of bank flows during the crisis is the difference between the average pre-shock capital inflows (2007Q3-2008Q2) and the average post-shock in- or outflows (2008Q4-2009Q1). We call this variable *FALL* and it depicts the sudden drop from the (in most cases) higher pre-*Lehman* level of bank flows to the post-*Lehman* level, disregarding the crisis quarter itself. Figure 3 illustrates the idea taking Estonia and Bulgaria as examples. Estonia experienced on average quarterly inflows of USD 950.5 million in the four quarters preceding the shock and average quarterly outflows of USD 477.5 million in the two quarters after the *Lehman* collapse. We take the difference, i.e. USD 1.42 billion, as our measure of the magnitude of the external shock Estonia had to deal with. For Bulgaria, the external shock amounts to USD 2.47 billion (i.e. USD 2.57 billion minus USD 0.09 billion).

Accordingly, the shock has been larger for Bulgaria, even though Bulgaria, unlike Estonia, has not been recording capital outflows in the two quarters after *Lehman* on average. Thus, our measure is different from the one employed in EBRD (2009), where the flows in the post-Lehman quarter (2008Q4) are expressed as a share of the outstanding stock in 2008Q3. Most importantly, the EBRD variable – if applied to the two post-crisis quarters – would show a negative sign for Estonia, but a positive one for Bulgaria.

Figure 3: Construction of the *FALL* measure [in mio USD]



Source: BIS Locational Banking Statistics, own calculations

In the econometric analysis *FALL* is expressed in logs, i.e. it is the log of the difference between the average cross-border bank flows to country *i* in the four quarters preceding the *Lehman* collapse (2007Q3 - 2008Q2) and the average cross-border bank flows in the two post-shock quarters (2008Q4 - 2009Q1) in US dollar. A higher *FALL* value indicates a greater financial shock in the respective country. As *FALL* has a negative value in some countries we follow Papaioannou (2009) and Herrmann and Mihaljek (2010) by taking the logarithm of the absolute value and assign it a negative sign.

The explanatory variable of our main interest is the asset share of foreign banks in total banking sector assets in the respective host countries. We use 2005 data provided by Claessens et al. (2008), even though we are aware that these shares may not accurately reflect the respective shares at the eve of the global financial crisis. However, a comparison with more recent data reported in EBRD (2009), Galindo et al. (2010) and Rajan and Gopalan (2009) for CESEE and the CIS as well as selected LAC and ASIA countries reveals that the share of foreign banks in total banking sectors has changed substantially in a few countries only. As we lack more recent data for most countries in SSA and MENA, we base our analysis on the Claessens et al. (2008) data for consistency reasons. We expect foreign bank presence (*FBAS*) to have a mitigating impact on our *FALL* variable (i.e. negative coefficient estimates).

The boom-bust literature suggests that the pre-crisis boom is a major determinant of the sudden stop (Sula 2006). Thus, we construct a measure for the *SURGE* in cross-border bank flows prior to the shock as an additional explanatory variable. *SURGE* is the log of the aggregated quarterly cross-border bank flows over the three years prior to the *Lehman* bankruptcy (i.e. 2005Q3-2008Q2). We expect the *SURGE* to aggravate the *FALL*, i.e. positive coefficient estimates. We will test the robustness of our results by changing the calculation of both variables in terms of periods covered and by modifying the calculation method for *SURGE*.

We estimate the following cross-sectional OLS model applying heteroscedasticity robust standard errors and using Stata:

$$FALL_i = \alpha * FBAS_i + \beta * SURGE_i + \gamma_k * X_{ik} + \varepsilon_i$$

FALL is the previously described measure for instability and *SURGE* the measure that catches the lending boom prior to the crisis in country *i*. *FBAS* is the foreign bank asset share in total banking assets in country *i*. *X* is a matrix of the following structural and macroeconomic variables as well as external and internal vulnerability indicators:

Structural and macroeconomic variables:

- **Institutional quality** (Kaufmann et al. 2009). Better creditor protection and information sharing among institutions provide comfort to foreign and domestic investors (Papaioannou 2009). Thus, we expect a higher level of institutional quality to mitigate the magnitude of our *FALL* measure. Following Kose et al. (2009) we use the simple 2008 average of the six individual World Governance Indicators as well the change from 2007 to 2008 as proxies for institutional quality.

- **De jure financial openness** (Chinn and Ito 2008). An open capital account facilitates capital inflows. Thus, countries with a higher index value should be more vulnerable to external shocks. Accordingly, we expect a positive coefficient.

- **De facto financial openness** (Lane and Milesi-Feretti 2007). The more a country is financially integrated with the rest of the world, the more likely it will be affected by global financial turmoil. De facto financial openness is measured as the ratio of the sum of total foreign assets and total foreign liabilities to GDP in 2007 and is taken from the updated and extended version of the dataset constructed by Lane and Milesi-Ferretti. We again expect a positive coefficient.

- **GDP growth in 2009** (IMF WEO). We expect a negative coefficient as stronger growth in the post-shock period should encourage capital inflows.

- **Export partners' GDP growth in 2009** (IMF DOTS). Real GDP growth of the 30 main export partners in 2009 weighted by their share in total exports of a given EME in 2008. Following Aisen and Franken (2010) we construct this variable to account for economic activity after the crisis avoiding possible endogeneity problems, as GDP growth in a given country might reflect the fall in capital flows after *Lehman*.[73] We expect a negative coefficient as higher GDP growth in the main trading partners indicates higher demand for that country's exports and hence stronger domestic economic activity. This should positively influence capital inflows.

- **Current account to GDP in 2007** (IMF WEO). The current account balance provides information about countries' positions as net providers or recipients of external finance. Countries with a positive (less negative balance) are less prone to capital flow reversals as they do not depend on external finance in net terms. Thus, a higher current account surplus should be associated with a smaller *FALL*, i.e. we expect a negative coefficient.

External and internal vulnerabilities:

- **External debt to GNI** (WDI). Net debtor countries face a higher risk of sudden stops and thus a decline in capital as the indebtedness of a country depicts vulnerability regarding the risk of default (positive coefficient expected).

- **Exchange rate regime**. A floating exchange rate provides a certain buffer against external shocks. Thus, we expect the sign of the coefficient to be negative as - making use of the IMF exchange rate classification with a scale from one to eight - a higher value indicates a more flexible exchange rate (Appendix 2).

- **International reserves to total external debt in 2007** (WDI). A higher ratio indicates that the country is in a better position to deal with liquidity shocks, comforting foreign investors. Thus, a higher ratio should stabilize capital inflows (negative coefficient expected)

[73] Takáts (2010) provides evidence that supply factors are the dominant determinants of the drop in cross-border lending in 2008Q4, suggesting that 2009 growth is also a result of *FALL* and not only a factor determining the size of *FALL*.

- **Foreign liability dollarization** (Lane and Shambaugh 2010). A higher share of external liabilities denominated in foreign currency ('original sin') in total external liabilities indicates a higher exposure to exchange rate risk, making countries more vulnerable to sudden stops (positive coefficient expected).

- **Credit deposit ratio in 2007** (Beck and Demirgüç-Kunt 2009). Banking sectors with a higher credit to deposit ratio rely on other funding sources, including foreign funding, to finance credit expansion. Given this dependency on foreign funds, in a crisis situation, foreign investors are inclined to withdraw from these countries as early as possible, forcing banks to adjust private sector credit respectively, suggesting a positive coefficient. However, as already mentioned in section 2, the opposite reasoning might apply with regard to capital flows for countries with a strong foreign bank presence (Cetorelli and Goldberg 2008, 2010). Parent banks might initially withdraw funds from countries with a low credit deposit ratio because headquarters want to make use of the excess liquidity held by their subsidiaries abroad. This argument suggests a negative coefficient.

5. RESULTS

5.1 FOREIGN BANKS

We start with a basic model containing only foreign bank presence and the booms prior to the *Lehman* shock as explanatory variables. For the whole sample of 56 emerging market countries we do not find the expected stabilizing impact of foreign bank presence regarding cross-border bank flows during the global financial crisis as the coefficient estimates of *FBAS* are insignificant (columns 1 and 2 in Table 3). However, we further ask, whether Eastern Europe is different regarding the impact of foreign banks compared to their emerging market peers due to their special integration model with Western European economies. Testing for this we find that the interaction of *FBAS* with a CESEE dummy has a significant and negative coefficient (columns 3 and 4). This indicates a significantly different impact of foreign banks in the CESEE region on the stability of bank flows compared to the other EMEs in our sample.

Table 3: The basic model with foreign banks

Dependent variable: *FALL* measure				
	(1)	**(2)**	**(3)**	**(4)**
FBAS	0.0011	0.0025	0.0318	0.0353
	(0.0152)	(0.0133)	(0.0220)	(0.0217)
FBAS*CESEE			-0.0657**	-0.0519**
			(0.0285)	(0.0248)
SURGE	0.3663**	0.1209	0.3800**	0.1436
	(0.1403)	(0.2122)	(0.1438)	(0.2058)
SURGE^2		0.0531***		0.0544***
		(0.0186)		(0.0178)
CESEE			2.7840**	1.2619
			(1.2189)	(0.8827)
constant	3.8040***	1.4637	3.0628*	0.6264
	(1.4227)	(1.1951)	(1.5981)	(1.4423)
R-sqr	0.256	0.415	0.314	0.472
adj.R-sqr	0.228	0.381	0.260	0.420
N	56	56	56	56

Stars indicate statistical significance at * 10 percent, **5 percent and *** 1 percent level. Standard errors in parentheses below. Estimation method is OLS. Robust standard errors applied.
FALL is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country. *SURGE* is the (log of the) aggregated capital inflows in the three years preceding the *Lehman* bankruptcy (2005Q3-2008Q2).

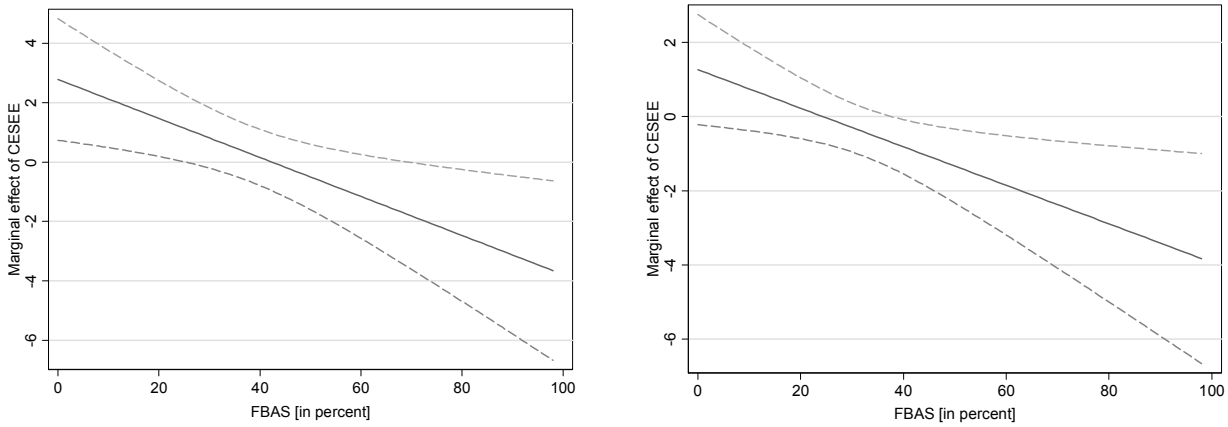
Further we find strong evidence for the expected boom-bust relationship. The pre-crisis boom in capital flows has a significant aggravating impact of the magnitude of *FALL*. The coefficient of the squared surge variable (*SURGE^2*)

is highly significant and *SURGE* becomes insignificant when we add the squared term (columns 2 and 4)[74]. This indicates that the more the *SURGE* varies upward or downward from the turning point the more aggravating is its marginal impact on *FALL*. For those countries experiencing aggregate outflows in the three years prior to the *Lehman* collapse destabilizing factors like institutional underdevelopment and political risk might have become more important in an environment of increasing financial stress and risk aversion. Overall, the higher the absolute *SURGE* in flows prior to the crisis (no matter if inflows or outflows) the more destabilizing was its impact after the financial shock. The basic model explains about 42 percent of the variation in *FALL*.

CESEE countries are - on average - significantly different from the other EME's regarding the impact of foreign banks on the stability of cross-border flows during the crisis. However, the marginal effect of the CESEE dummy on *FALL* might not be constant for all possible values of FBAS (see Brambor et al. 2006). In particular, the effect may be only significant for a certain range of *FBAS* values. Therefore we calculate the marginal impact of the CESEE dummy for the whole range of potential values of *FBAS* (i.e. from zero to one hundred). Figure 4 shows for which foreign bank asset share the CESEE dummy has a statistically significant impact on the stability of cross-border flows. The effect is significant whenever the upper and lower bounds of the confidence interval are both above (or below) the zero line.

Figure 4: Marginal effect of CESEE

4a. 4b.



The solid line depicts the marginal effect of CESEE on our dependent variable *FALL*. *FALL* is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country. The dashed lines are the upper and lower bounds of the 90 % confidence interval. In the underlying regression in 4a. we control for *SURGE* and in 4b. we control for *SURGE* and *SURGE^2*.

Controlling for a linear relationship between *SURGE* and *FALL* we observe, that being a CESEE country significantly aggravates the instability of cross-border flows for low values of *FBAS* (below 25 percent) while it significantly mitigates the instability in cross-border flows when in a country the asset share held by foreign banks is larger than 69 percent (Figure 4a). For CESEE countries with *FBAS* values between 25 and 69 there is no significant difference in the impact of foreign bank presence on cross-border flows compared to other EMEs.

[74] However, a closer look at the data reveals that this is due to only very few observations. Therefore we will keep both models for our analysis.

Adding the squared *SURGE^2* variable to the model shifts the line depicting the marginal effect a bit downwards (Figure 4b). In this case the marginal effect of CESEE is significantly mitigating the *FALL* for the range of countries with a foreign bank asset share higher than 37 percent. 14 of the 16 CESEE countries have a higher value of *FBAS* than 37 percent. This suggests that for CESEE countries it paid of to have a high level of foreign bank presence compared to countries from other regions.

The results for the foreign bank variable contradict EBRD (2009) and our previous work (Vogel and Winkler 2010). Both papers find a significantly mitigating impact of *FBAS* on cross-border flows in the immediate post-crisis period. The difference to EBRD (2009) can be explained by the different sudden stop measure and by the explanatory power of the surge EBRD (2009) does not control for. In comparison to Vogel and Winkler (2010), the results of this paper confirm that the mitigating impact of foreign banks on cross-border flows in the large sample of countries, also including developing countries, is substantially driven by countries from Sub-Saharan Africa.

Instability in cross-border flows during the financial crisis might be influenced by further determinants. To test whether the results are sensitive to the inclusion of other factors we add the variables referred to in section 4 one by one to the basic models. The results show that the CESEE interaction variable remains significant in all estimations (Table 5) while foreign banks do not mitigate the sudden stop in cross-border flows to other EMEs (Table 4). While some of the controls show a significant impact on the magnitude of *FALL* they do not change our main finding, that Eastern Europe is different regarding the impact of foreign banks on the stability of cross-border flows during the financial crisis.[75]

[75] We also test an expanded basic model including as additional explanatory variables de jure financial openness and GDP growth. The results are very similar to the ones reported in Table 5. In particular *FBAS* is always insignificant while *FBAS**CESEE is always significant with a negative sign with one exception: when controlling for foreign liability dollarization (FLD). Results are available from the authors on request.

Table 4: Controlling for potential determinants – all EMEs

Dependent variable: *FALL* measure												
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
FBAS	0.0090	0.0104	0.0051	0.0009	0.0041	0.0074	0.0062	-0.0109	0.0036	-0.0009	-0.0122	0.0029
	(0.0139)	(0.0188)	(0.0131)	(0.0195)	(0.0156)	(0.0152)	(0.0172)	(0.0156)	(0.0141)	(0.0122)	(0.0139)	(0.0141)
SURGE	0.1322	0.1498	0.1418	0.1146	0.1275	0.1302	0.1160	0.1592	0.0946	0.1243	0.1554	0.1248
	(0.2098)	(0.2067)	(0.2264)	(0.2088)	(0.2127)	(0.2138)	(0.2090)	(0.2180)	(0.2009)	(0.2045)	(0.2087)	(0.2166)
SURGE^2	0.0549***	0.0579***	0.0511**	0.0543***	0.0535***	0.0549***	0.0552***	0.0454**	0.0622***	0.0582***	0.0472***	0.0532***
	(0.0186)	(0.0183)	(0.0204)	(0.0186)	(0.0188)	(0.0190)	(0.0176)	(0.0178)	(0.0194)	(0.0188)	(0.0171)	(0.0186)
Structural and macroeconomic variables												
INST.QUALITY *change*	-12.8484*											
	(6.4591)											
INST.QUALITY		-1.2204										
		(1.0382)										
CA/GDP			0.0268									
			(0.0326)									
FIN.OPENNESS *de jure*				0.0968								
				(0.4337)								
FIN.OPENNESS *de facto*					-0.3405							
					(0.5533)							
ExpP GDP GROWTH						0.1636*						
						(0.0937)						
GDP GROWTH							0.0468					
							(0.0547)					
External and internal vulnerabilities												
DEBT/GNI								0.0066				
								(0.0115)				
FLD									0.0396			
									(0.0242)			
ERR										-0.2673		
										(0.1768)		
RESERVES/DEBT											-0.0045	
											(0.0051)	
CDR												-0.2416
												(0.6129)
constant	1.2779	0.4953	1.4714	1.3953	1.8592*	1.4514	1.2886	2.1816**	-1.3618	2.6106***	2.7168***	1.6698
	(1.2404)	(1.8071)	(1.2016)	(1.1647)	(1.0111)	(1.2084)	(1.2698)	(0.9527)	(2.6243)	(0.8035)	(0.8067)	(1.3477)
R-sqr	0.449	0.444	0.418	0.416	0.421	0.423	0.419	0.516	0.429	0.447	0.520	0.416
adj.R-sqr	0.406	0.401	0.372	0.369	0.375	0.378	0.373	0.471	0.377	0.403	0.475	0.370
N	56	56	56	55	56	56	56	48	49	56	48	56

Stars indicate statistical significance at * 10 percent, **5 percent and *** 1 percent level. Standard errors in parentheses below. Estimation method is OLS. Robust standard errors applied.
FALL is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country. *SURGE* is the (log of the) aggregated capital inflows in the three years preceding the *Lehman* bankruptcy (2005Q3-2008Q2).

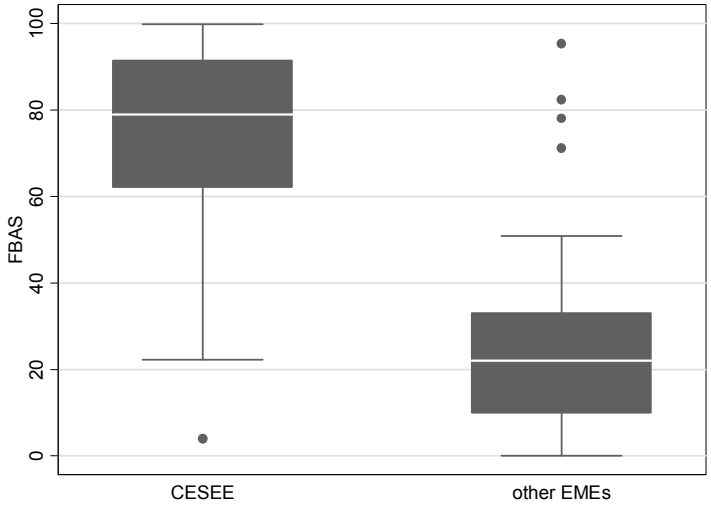
Table 5: Controlling for potential determinants – is Eastern Europe different?

Dependent variable: *FALL* measure												
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
FBAS	0.0356	0.0379	0.0352	0.0351	0.0355	0.0354	0.0368	0.0182	0.0357	0.0358*	0.0175	0.0353
	(0.0216)	(0.0239)	(0.0216)	(0.0281)	(0.0221)	(0.0218)	(0.0235)	(0.0138)	(0.0220)	(0.0205)	(0.0134)	(0.0219)
FBAS*CESEE	-0.0484**	-0.0514*	-0.0519**	-0.0513*	-0.0508**	-0.0527**	-0.0532**	-0.0583**	-0.0387*	-0.0649**	-0.0594*	-0.0520**
	(0.0232)	(0.0261)	(0.0248)	(0.0272)	(0.0248)	(0.0253)	(0.0257)	(0.0282)	(0.0225)	(0.0290)	(0.0309)	(0.0257)
SURGE	0.1484	0.1632	0.1420	0.1427	0.1471	0.1426	0.1400	0.1773	0.1182	0.1504	0.1805	0.1434
	(0.2065)	(0.2024)	(0.2191)	(0.2040)	(0.2073)	(0.2064)	(0.2039)	(0.2125)	(0.1948)	(0.1982)	(0.2055)	(0.2095)
SURGE^2	0.0550***	0.0573***	0.0546**	0.0546***	0.0545***	0.0542***	0.0552***	0.0467**	0.0655***	0.0603***	0.0466***	0.0544***
	(0.0180)	(0.0177)	(0.0205)	(0.0179)	(0.0179)	(0.0181)	(0.0171)	(0.0175)	(0.0186)	(0.0170)	(0.0166)	(0.0179)
CESEE	1.4218	1.6024	1.2400	1.1788	1.2401	1.1994	1.4513	1.3098	0.0305	1.9564	1.6132	1.2616
	(0.9721)	(1.2247)	(0.8276)	(1.1009)	(0.8916)	(0.9147)	(1.0611)	(1.3206)	(0.8991)	(1.1718)	(1.6385)	(0.8875)
Structural and macroeconomic variables												
INST.QUALITY *change*	-9.5497*											
	(5.5275)											
INST.QUALITY		-0.9585										
		(1.0447)										
CA/GDP			-0.0023									
			(0.0418)									
FIN.OPENNESS *de jure*				0.0061								
				(0.4217)								
FIN.OPENNESS *de facto*					-0.2122							
					(0.5089)							
ExpP GDP GROWTH						-0.0348						
						(0.1069)						
GDP GROWTH							0.0274					
							(0.0593)					
External and internal vulnerabilities												
DEBT/GNI								0.0132				
								(0.0121)				
FLD									0.0379			
									(0.0250)			
ERR										-0.3358*		
										(0.1924)		
RESERVES/DEBT											-0.0029	
											(0.0046)	
CDR												0.0166
												(0.5961)
constant	0.6227	-0.0156	0.6198	0.6139	0.8939	0.5923	0.5530	1.2035	-2.1696	1.9756**	1.9461*	0.6110
	(1.4361)	(1.9137)	(1.5191)	(1.4096)	(1.3066)	(1.4529)	(1.4919)	(1.1894)	(2.7474)	(0.8777)	(0.9691)	(1.6763)
R-sqr	0.490	0.489	0.472	0.473	0.475	0.473	0.474	0.602	0.487	0.521	0.598	0.472
adj.R-sqr	0.427	0.427	0.408	0.407	0.410	0.408	0.409	0.544	0.414	0.462	0.540	0.408
N	56	56	56	55	56	56	56	48	49	56	48	56

Stars indicate statistical significance at * 10 percent, **5 percent and *** 1 percent level. Standard errors in parentheses below. Estimation method is OLS. Robust standard errors applied.
FALL is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country. *SURGE* is the (log of the) aggregated capital inflows in the three years preceding the *Lehman* bankruptcy (2005Q3-2008Q2).

CESEE is the region with the by far highest share of foreign banks in total banking sector assets of EME host countries (Figure 5). Among CESEE countries Turkey is below the 5th percentile, while among the other EMEs four countries represent outliers: Mexico, Peru, Paraguay and El Salvador have foreign bank asset shares lying outside the 95th percentile.

Figure 5: Foreign bank asset share (in percent, 2005)



The line in the box indicates the median, the bottom and the top of the box are the 25th and the 75th percentiles and the ends of the whiskers mark the 5th and 95th percentiles. Dots represent outliers.

Source: Claessens et al. 2008, own calculations

This raises the question whether CESEE is different due to its regional characteristics or whether the high share of foreign banks as such is driving the CESEE result. To answer this question we run a piecewise regression. We split our sample countries into two groups according to their foreign bank asset share. Those countries with a foreign bank asset share below the sample median (i.e. 28.4 percent) are the reference group, while countries with above median foreign bank presence form a separate group. Two CESEE countries (Slovenia and Turkey) belong to the group with the below median foreign bank asset share and 15 countries from the 'other EMEs' group join the remaining CESEE countries in the group with the above median *FBAS*. Thus, in the above median group there are about as many CESEE countries (14) as non-CESEE countries (15).

We test whether the impact of foreign bank presence on the stability of cross-border bank flows differs significantly between the two groups. Results show that the impact of foreign banks is not significantly different for countries with a foreign bank asset share above the median of our sample (Table 6).

Table 6: Grouping of countries by foreign bank presence

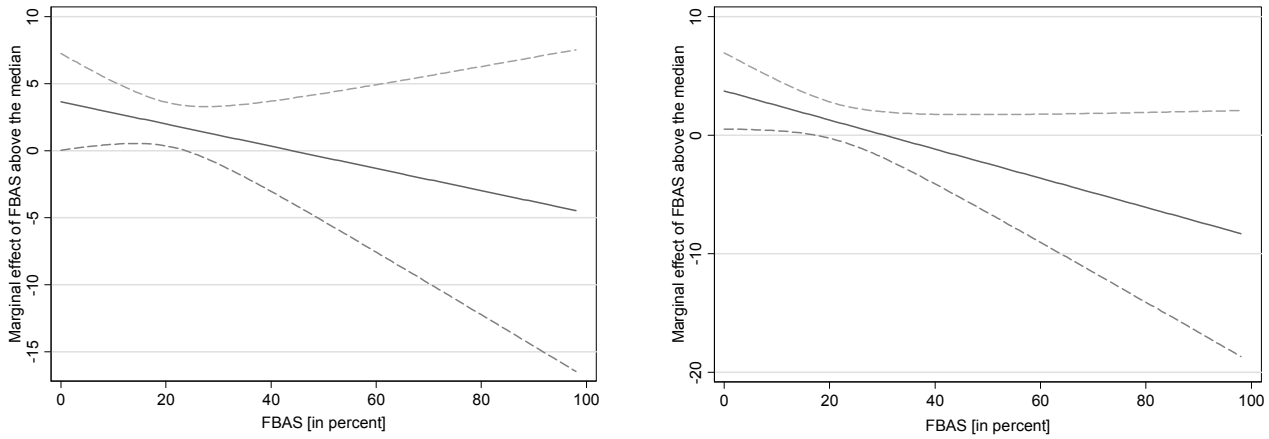
Dependent variable: *FALL* measure		
	(1)	**(2)**
FBAS	0.0576	0.0919
	(0.0838)	(0.0776)
FBAS*above median dummy	-0.0927	-0.1229
	(0.0871)	(0.0796)
SURGE	0.3790***	0.1137
	(0.1349)	(0.2111)
SURGE^2		0.0555***
		(0.0187)
above median dummy	3.6636	3.7457*
	(2.2094)	(1.9147)
constant	2.7046	-0.0138
	(1.9744)	(1.9855)
R-sqr	0.307	0.476
adj.R-sqr	0.253	0.423
N	56	56

Stars indicate statistical significance at * 10 percent, **5 percent and *** 1 percent level. Standard errors in parentheses below. Estimation method is OLS. Robust standard errors applied.
FALL is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country. *SURGE* is the (log of the) aggregated capital inflows in the three years preceding the *Lehman* bankruptcy (2005Q3-2008Q2).

Having a look at the marginal effect of the CESEE dummy on the stability of cross-border flows conditional on the level of foreign bank presence we observe that for the range of values that are included in the group of countries with above sample median foreign bank presence (i.e. above 28.4 percent) the zero line lies within the confidence interval (Figure 6). Only for a range of *FBAS* values which are not applicable to the above median group (i.e. lower than 28.4 percent) the 90 percent conference interval does not include the zero line. For the countries with above the median foreign bank presence the impact of FBAS is never significantly different compared to those countries with below median foreign bank presence. Therefore we conclude that it is not the high average foreign bank presence per se causing the difference in the impact of foreign bank presence of the CESEE countries.

Figure 6: Marginal effect of above median *FBAS*

6a. 6b.



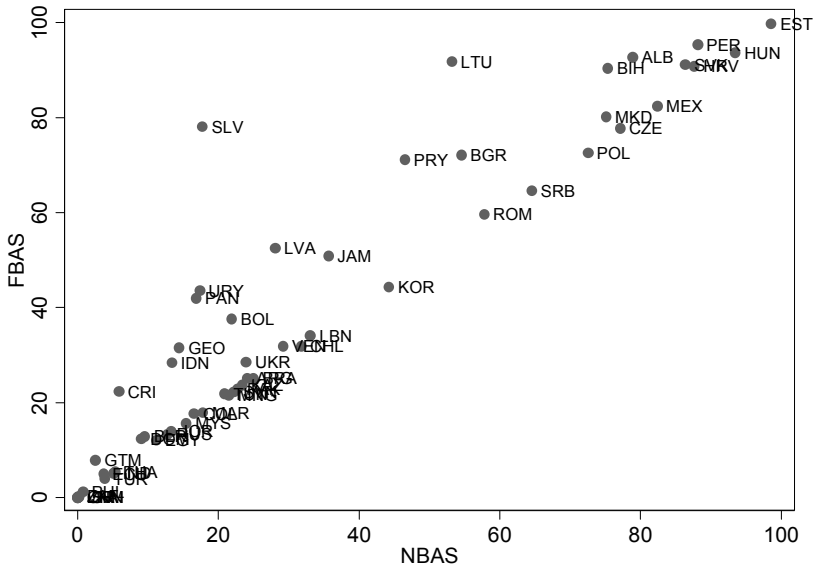
The solid line depicts the marginal effect of CESEE on our dependent variable *FALL*. *FALL* is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country. The dashed lines are the upper and lower bounds of the 90% confidence interval. In the underlying regression in 6a. we control for *SURGE* and in 6b. we control for *SURGE* and *SURGE^2*.

When dividing our sample countries into two groups below and above the *FBAS* mean (i.e. 39.1 percent) and estimating the respective piecewise regression we do not find a significant difference for the above mean group compared to the countries with a foreign bank asset share below the mean when controlling for *SURGE* but we do, when adding *SURGE^2*. However, this result might be driven by the dominance of CESEE countries in the 'above mean' group as they represent 14 of the 22 included. Thus, while not completely conclusive, our results suggest that the conditional impact of a higher share of foreign banks for CESEE countries is a regional phenomenon.

5.2 NORTHERN BANKS

In most countries of our EME sample foreign banks are owned by institutions from mature economies, i.e. northern banks. Significant southern bank FDI (*NBAS*) is limited to 14 countries (Figure 7), of which five are in CESEE (Albania, Bulgaria, Bosnia and Herzegovina, Latvia and Lithuania). Closer analysis reveals that - like in other regions - southern FDI in CESEE mainly originates from within the region, i.e. from Turkey, Bulgaria and Hungary. This raises the question whether an analysis focusing on northern banks yields different results on the impact of foreign banks on post-crisis capital flows than an analysis including foreign banks from all countries. Conceptually arguments can be found for both propositions: on the one hand, northern banks should have been in a better position to stabilize post-crisis capital flows because their parent banks are deemed to be better capitalized with better access to global financial markets. Moreover, in the crisis they had access to facilities of the relevant international lenders of last resort, the Federal Reserve and the European Central Bank, and received generous support from government rescue operations. On the other hand it can be argued that the need to raise liquidity from central banks and resort to government support schemes demonstrates that parent banks in mature economies were weak and hence had no comparative advantage compared to parent banks in southern economies in supporting their subsidiaries. In addition, government support - implicitly or explicitly - might have been provided under the condition that funds will be used in home countries only (Hope and Wagstyl 2008).

Figure 7: Foreign bank and northern bank presence (in percent, 2005)



Source: Claessens et al. (2008)

Our results suggest that these conflicting arguments have neutralized each other. Table 7 shows that the coefficients of *NBAS* are insignificant in all four estimations of our basic model, excluding (columns 1 and 2) and including (columns 3 and 4) the CESEE interaction variable. Thus, for all emerging markets northern banks do not make a difference in explaining the *FALL* of cross-border flows after *Lehman*, as also the CESEE interaction variable loses

explanatory power. While it remains significant when controlling for *SURGE* (column 3) it becomes insignificant when allowing for a non-linear relationship between the pre-crisis surge and the sudden stop (column 4). Thus, the relationship is less robust than that for foreign banks irrespective of origin.

Table 7: The basic model with northern banks

Dependent variable: *FALL* measure				
	(1)	**(2)**	**(3)**	**(4)**
NBAS	-0.0003	-0.0020	0.0319	0.0286
	(0.0156)	(0.0131)	(0.0238)	(0.0222)
NBAS*CESEE			-0.0554*	-0.0395
			(0.0287)	(0.0238)
SURGE	0.3676**	0.1256	0.3624**	0.1302
	(0.1442)	(0.2148)	(0.1452)	(0.2122)
SURGE^2		0.0531***		0.0531***
		(0.0188)		(0.0184)
CESEE			1.6981	0.4703
			(1.0615)	(0.7629)
constant	3.8490***	1.5932	3.3754**	1.1561
	(1.3185)	(1.0965)	(1.3878)	(1.2244)
R-sqr	0.256	0.415	0.293	0.446
adj.R-sqr	0.228	0.381	0.237	0.391
N	56	56	56	56

Stars indicate statistical significance at * 10 percent, **5 percent and *** 1 percent level. Standard errors in parentheses below. Estimation method is OLS. Robust standard errors applied.
FALL is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country. *SURGE* is the (log of the) aggregated capital inflows in the three years preceding the *Lehman* bankruptcy (2005Q3-2008Q2).

Again we test whether the results hold when adding other potential determinants of sudden stops to our model. Results show that the statistical significance of the marginal effect of northern banks in CESEE countries depends on the control variable added (Table 8).[76] Overall, however, we do not find convincing evidence for a mitigating impact of northern banks in CESEE countries.

[76] However, when we do not control for *SURGE^2* the coefficients of the interaction *NBAS**CESEE are negative and significant in each estimation except one. Estimation results are available on request.

Table 8: *NBAS* and the *FALL* of bank flows - controlling for further determinants

Dependent variable: *FALL* measure												
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
NBAS	0.0268	0.0285	0.0287	0.0267	0.0287	0.0292	0.0297	0.0107	0.0304	0.0326	0.0089	0.0286
	(0.0212)	(0.0217)	(0.0227)	(0.0263)	(0.0227)	(0.0224)	(0.0239)	(0.0098)	(0.0233)	(0.0227)	(0.0095)	(0.0225)
NBAS*CESEE	-0.0317	-0.0369	-0.0393*	-0.0375	-0.0381	-0.0405	-0.0415	-0.0487*	-0.0234	-0.0488*	-0.0421*	-0.0395
	(0.0204)	(0.0226)	(0.0234)	(0.0267)	(0.0232)	(0.0244)	(0.0258)	(0.0261)	(0.0221)	(0.0272)	(0.0216)	(0.0241)
SURGE	0.1351	0.1464	0.1236	0.1225	0.1338	0.1287	0.1275	0.1726	0.1038	0.1338	0.1708	0.1304
	(0.2134)	(0.2109)	(0.2272)	(0.2067)	(0.2135)	(0.2124)	(0.2112)	(0.2158)	(0.1976)	(0.2020)	(0.2066)	(0.2167)
SURGE^2	0.0539***	0.0554***	0.0541**	0.0550***	0.0533***	0.0529***	0.0536***	0.0460**	0.0644***	0.0594***	0.0481***	0.0531***
	(0.0186)	(0.0183)	(0.0213)	(0.0182)	(0.0186)	(0.0186)	(0.0179)	(0.0187)	(0.0185)	(0.0177)	(0.0174)	(0.0186)
CESEE	0.4486	0.7194	0.3582	0.2799	0.4454	0.3691	0.6683	0.5320	-0.9246	0.6678	0.4301	0.4725
	(0.7470)	(1.0761)	(0.6805)	(1.1065)	(0.7468)	(0.8507)	(1.1662)	(0.9527)	(0.9226)	(0.9059)	(0.8130)	(0.7831)
Structural and macroeconomic variables												
INST.QUALITY change	-8.9090*											
	(5.1764)											
INST.QUALITY		-0.7870										
		(1.0007)										
CA/GDP			-0.0092									
			(0.0459)									
FIN.OPENNESS de jure				0.1170								
				(0.3741)								
FIN.OPENNESS de facto					-0.2105							
					(0.5101)							
ExpP GDP GROWTH						-0.0426						
						(0.0932)						
GDP GROWTH							0.0187					
							(0.0546)					
External and internal vulnerabilities												
DEBT/GNI								0.0113				
								(0.0114)				
FLD									0.0480*			
									(0.0278)			
ERR										-0.3213		
										(0.1934)		
RESERVES/DEBT											-0.0044	
											(0.0051)	
CDR												-0.0080
												(0.5871)
constant	1.1859	0.6979	1.1192	1.0282	1.4264	1.1059	1.1232	1.6246	-2.2267	2.3507***	2.2985***	1.1637
	(1.2115)	(1.6218)	(1.3475)	(1.2245)	(1.1602)	(1.2495)	(1.2467)	(1.0779)	(2.8183)	(0.7407)	(0.8136)	(1.4992)
R-sqr	0.461	0.458	0.447	0.449	0.449	0.447	0.447	0.582	0.467	0.492	0.578	0.446
adj.R-sqr	0.395	0.392	0.379	0.380	0.381	0.379	0.379	0.521	0.391	0.430	0.517	0.379
N	56	56	56	55	56	56	56	48	49	56	48	56

Stars indicate statistical significance at * 10 percent, **5 percent and *** 1 percent level. Standard errors in parentheses below. Estimation method is OLS. Robust standard errors applied.
FALL is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country.
SURGE is the (log of the) aggregated capital inflows in the three years preceding the *Lehman* bankruptcy (2005Q3-2008Q2).

Regrouping the sample countries according to their northern bank asset share does not change the result. The sample median of *NBAS* is 22.1 percent, with Turkey being the only CESEE country belonging to the group of countries with a northern bank asset share below the sample median. Estimation results do not show a statistically significant effect of *NBAS* between the two groups (Table 9). We conclude that neither in the CESEE nor in the sample as a whole northern bank presence has a statistically significant impact on the stability of cross-border flows during the financial crisis.

Table 9: Grouping of countries by northern bank presence

Dependent variable: *FALL* measure		
	(1)	**(2)**
NBAS	0.0688	0.1380
	(0.1086)	(0.1041)
NBAS*above median dummy	-0.0929	-0.1586
	(0.1106)	(0.1064)
SURGE	0.3716**	0.1173
	(0.1446)	(0.2071)
SURGE^2		0.0589***
		(0.0196)
above median dummy	2.5093	2.5524
	(1.7973)	(1.5866)
constant	2.8740	-0.2558
	(2.0958)	(2.1468)
R-sqr	0.290	0.469
adj.R-sqr	0.234	0.416
N	56	56

Stars indicate statistical significance at * 10 percent, **5 percent and *** 1 percent level. Standard errors in parentheses below. Estimation method is OLS. Robust standard errors applied.
FALL is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country. *SURGE* is the (log of the) aggregated capital inflows in the three years preceding the *Lehman* bankruptcy (2005Q3-2008Q2).

5.3 DISAGGREGATION OF CROSS-BORDER FLOWS

The locational banking statistics provide information on BIS reporting banks' total international positions and on international positions vis-à-vis non-banks. This breakdown allows us to analyze whether the impact of foreign banks and northern banks on cross-border flows to EMEs has been significantly different for flows to EME banking sectors compared to flows to EME non-bank sectors. We expect that in countries with a high share of banking sector assets held by foreign banks the stabilizing impact is stronger for bank-to-bank flows assuming that a substantial part of these positions reflect lending from parent banks to their subsidiaries. Parent banks are likely to protect the value of their pre-crisis investments in form of equity and reputation and refrain from sudden withdrawals. These arguments do not hold for lending to non-affiliates, especially in the non-bank sector. Therefore we hypothesize that the stability benefits of foreign bank presence will be more pronounced for cross-border flows to banks than for cross-border flows to the non-bank sector. We test this proposition by regressing the *FALL* for the respective kind of flows on the FBAS variable and the interaction of the CESEE region dummy with foreign bank presence controlling for the pre-crisis boom. Results are presented in Table 10.

For the EME sample as a whole we do not find evidence supporting our hypothesis.[77] Countries with a higher share of assets held by foreign banks do not exhibit more stable cross-border flows in the post-crisis period than countries with a lower share. Again we find that CESEE countries are different regarding the impact of foreign banks

[77] This result also holds when the regression is run without the CESEE interaction variable.

compared to their emerging market peers.[78] This, however, only holds for bank-to-bank flows. For flows to the non-bank sector we get ambiguous results.

Table 10: Disaggregation of cross-border flows and *FBAS*

Dependent variable: respective *FALL* measure						
	bank to bank flows			**bank to non-bank flows**		
	(1)	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**
FBAS	0.0229	0.0295	0.0352	0.0172	0.0477*	0.0213
	(0.0232)	(0.0235)	(0.0234)	(0.0391)	(0.0266)	(0.0228)
FBAS*CESEE	-0.0825**	-0.0801**	-0.0757**	-0.0578	-0.0729**	-0.0213
	(0.0346)	(0.0338)	(0.0334)	(0.0489)	(0.0347)	(0.0273)
CESEE	5.0930***	3.2641**	2.4363*	4.4525**	3.0072*	0.2878
	(1.6233)	(1.5240)	(1.4343)	(2.1454)	(1.7443)	(1.2071)
SURGE		0.4808***	0.2931		0.6011**	0.1207
		(0.1530)	(0.2202)		(0.2655)	(0.2143)
SURGE^2			0.0460**			0.0860***
			(0.0194)			(0.0224)
Constant	4.8183***	1.8055	-0.1121	3.9818***	-0.7609	-2.1405
	(1.1427)	(1.5735)	(1.3684)	(1.3076)	(2.5729)	(1.7328)
R-sqr	0.050	0.311	0.376	0.035	0.256	0.408
N	56	56	56	55	55	55

Stars indicate statistical significance at * 10 percent, **5 percent and *** 1 percent level. Standard errors in parentheses below. Estimation method is OLS. Robust standard errors applied.
FALL is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country. *SURGE* is the (log of the) aggregated capital inflows in the three years preceding the *Lehman* bankruptcy (2005Q3-2008Q2).

However, international bank lending to the banking sector and to the non-banking sector are closely linked. General economic developments and other country characteristics might simultaneously affect inflows to the banking and the non-banking sector. Therefore the equation errors might correlate. To control for this we further test the relationships with a seemingly unrelated regression system proposed by Zellner (1962).

The SUR-estimation results show that for cross-border flows to the banking sector the impact of foreign bank presence is significantly different for CESEE countries while this does not hold for cross-border flows to the non-bank sector.

[78] We again find that this result does not hold for northern banks, as the interaction term becomes insignificant when controlling for *SURGE^2*. Estimation results are available on request.

Table 11: Seemingly unrelated regression estimation

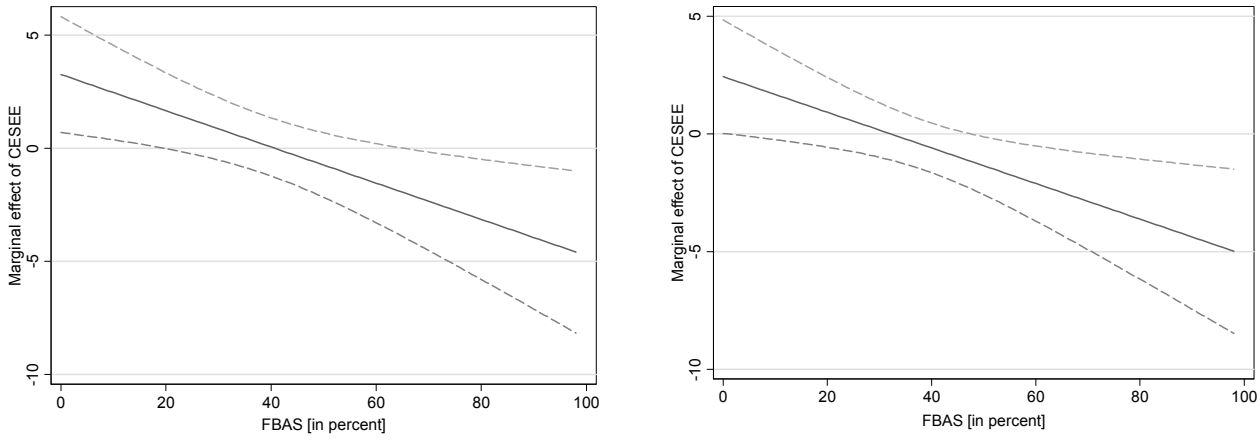
Dependent variable: respective *FALL* measure				
	bank to bank flows		bank to non-bank flows	
	(1)	(2)	(1)	(2)
FBAS	0.0300	0.0355	0.0486*	0.0223
	(0.0244)	(0.0233)	(0.0271)	(0.0252)
FBAS*CESEE	-0.0805*	-0.0757*	-0.0733	-0.0223
	(0.0418)	(0.0399)	(0.0449)	(0.0423)
SURGE	0.4870***	0.2983**	0.6182***	0.1399
	(0.1042)	(0.1275)	(0.1476)	(0.1837)
SURGE^2		0.0465**		0.0848**
		(0.0194)		(0.0228)
CESEE	3.2114	2.3970	2.9661	0.2941
	(2.7724)	(2.6647)	(2.9602)	(2.7365)
constant	1.7961*	-0.1678	-0.8959	-2.2222
	(1.0677)	(1.3091)	(1.4749)	(1.3712)
R-sqr	0.3121	0.3750	0.2556	0.4082
N	55	55	55	55

Stars indicate statistical significance at * 10 percent, **5 percent and *** 1 percent level. Standard errors in parentheses below. Seemingly unrelated regression estimation method is applied. Robust standard errors applied.
FALL is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country. *SURGE* is the (log of the) aggregated capital inflows in the three years preceding the *Lehman* bankruptcy (2005Q3-2008Q2).

The analysis of the marginal impact of the CESEE dummy on the *FALL* of bank-to-bank flows yields similar results as the analysis focused on the *FALL* of all cross-border flows. In particular, we find that the marginal effect of CESEE is significantly mitigating the *FALL* for the range of countries with a foreign bank asset share higher than about 47 percent when controlling for *SURGE^2*. This suggests that for CESEE countries it paid of to have a high level of foreign bank presence compared to countries from other regions due to its stabilizing effect on bank-to-bank flows.

Figure 8: Marginal effect of CESEE on the stability of bank-to-bank flows

8a. 8b.



The solid line depicts the marginal effect of CESEE on our dependent variable *FALL*. *FALL* is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country. The dashed lines are the upper and lower bounds of the 90% confidence interval. In the underlying regression in 8a. we control for *SURGE* and in 8b. we control for *SURGE* and *SURGE^2*.

6. ROBUSTNESS CHECKS

To check for the robustness of our results we conduct some sensitivity tests. We vary those two of our variables that are not predetermined, i.e. *FALL* and *SURGE*. The tests reveal that the specification of *FALL* is of more relevance for the robustness of our results than the specification of the *SURGE* variable. Generally our findings are robust as the coefficients remain significant for the different specifications.

The global financial crisis started with the turmoil in mature economy money markets in August 2007. Some EMEs, like Kazakhstan and Russia were already affected by this event. Thus, we change the definition of the pre-crisis period to 2006Q3-2007Q2, while sticking to 2008Q4-2009Q1 as the post-crisis period after the *Lehman* default. We find that the stabilizing impact of foreign bank presence is insignificant, for the EME sample as a whole and CESEE, whether we control for a squared surge or not (Table 12, columns 1 and 2). As a second variation of our main *FALL* variable we extend the period after the *Lehman* shock to nine months (columns 3 and 4), including 2009Q2 when average regional outflows were already on a declining trend or even turned into inflows. Further we extend the pre-crisis period to two years, i.e. 2006Q3-2008Q2 (columns 5 and 6). For both specifications, the results confirm our previous findings that foreign banks did not stabilize cross-border flows, but CESEE has been different.

Table 12: Robustness checks – *FALL* measures

Dependent variable: respective *FALL* measure covering different time windows

	FALL from 2006Q3-2007Q2 to 2008Q4-2009Q1		*FALL* from 2007Q3-2008Q2 to 2008Q4-2009Q2		*FALL* from 2006Q3-2008Q2 to 2008Q4-2009Q1	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
FBAS	0.0033	0.0083	0.0322	0.0356	0.0099	0.0136
	(0.0131)	(0.0094)	(0.0221)	(0.0218)	(0.0121)	(0.0110)
FBAS*CESEE	-0.0417	-0.0223	-0.0660**	-0.0524**	-0.0521**	-0.0377*
	(0.0250)	(0.0177)	(0.0289)	(0.0254)	(0.0251)	(0.0208)
SURGE	0.2034**	-0.1315**	0.3844***	0.1505	0.3373***	0.0894
	(0.0833)	(0.0641)	(0.1402)	(0.2015)	(0.1186)	(0.1621)
SURGE^2		0.0770***		0.0538***		0.0570***
		(0.0110)		(0.0176)		(0.0136)
CESEE	2.2833*	0.1270	2.9553**	1.4494	2.1296**	0.5334
	(1.1955)	(0.6789)	(1.2195)	(0.9194)	(1.0450)	(0.7695)
constant	5.1287***	1.6772	2.7916*	0.3811	4.2807***	1.7257*
	(0.9715)	(1.0060)	(1.5827)	(1.4608)	(1.1797)	(0.8844)
R-sqr	0.118	0.476	0.319	0.472	0.346	0.593
adj.R-sqr	0.048	0.423	0.266	0.419	0.295	0.552
N	56	56	56	56	56	56

Stars indicate statistical significance at * 10 percent, **5 percent and *** 1 percent level. Standard errors in parentheses below. Estimation method is OLS. Robust standard errors applied.
SURGE is the (log of the) aggregated capital inflows in the three years preceding the *Lehman* bankruptcy (2005Q3-2008Q2).

We change the *SURGE* variable by altering the time periods covered and by changing the method of calculation of *SURGE*. We define *SURGE* periods for three additional time windows prior to the *Lehman* collapse. The estimations confirm our previous results (Table 13). The impact of the *SURGE* remains aggravating and highly significant in all estimations. As before the stabilizing effect of foreign bank presence is significantly different for the CESEE region.

Table 13: Robustness checks – *SURGE* measures: variation of *SURGE* period

Dependent variable: *FALL* measure						
	variation of *SURGE* period					
	[2 years]		[4 years]		[5 years]	
FBAS	-0.0024	0.0268	0.0018	0.0311	0.0003	0.0303
	(0.0115)	(0.0176)	(0.0133)	(0.0198)	(0.0129)	(0.0193)
FBAS*CESEE		-0.0447**		-0.0453**		-0.0449**
		(0.0202)		(0.0210)		(0.0205)
SURGE	0.3792	0.3833	-0.1049*	-0.0703	-0.0830*	-0.0557
	(0.3110)	(0.2991)	(0.0555)	(0.0436)	(0.0452)	(0.0379)
SURGE^2	0.0426*	0.0449**	0.0719***	0.0723***	0.0703***	0.0716***
	(0.0224)	(0.0218)	(0.0120)	(0.0114)	(0.0117)	(0.0114)
CESEE		0.9857		1.0272		0.8913
		(0.6391)		(0.8342)		(0.7576)
constant	0.5974	-0.1057	1.7341	0.9172	1.7227	0.9043
	(1.5971)	(1.6916)	(1.1534)	(1.4099)	(1.2354)	(1.4720)
R-sqr	0.534	0.580	0.431	0.477	0.467	0.516
adj.R-sqr	0.507	0.539	0.399	0.425	0.436	0.467
N	56	56	56	56	56	56

Stars indicate statistical significance at * 10 percent, **5 percent and *** 1 percent level. Standard errors in parentheses below. Estimation method is OLS. Robust standard errors applied. *FALL* is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country.

Finally, we change the calculation method of *SURGE*. Instead of using absolute values of cross-border flows, we use an alternative *SURGE* variable that is based on deviations of pre-shock developments from the mean. *SURGEalt* is the difference between the average quarterly cross-border bank flows in the three years prior to the *Lehman* bankruptcy (i.e. 2005Q3-2008Q2) and the average quarterly flows in the whole period from 2002Q1 to 2008Q2 per country. Again we take the logs of these values. In addition to the deviation of the three year pre-shock average from the pre-shock period mean (Table 14, columns 1 and 2), we also run an estimation with the deviation of the three year pre-shock average from the whole period mean covering 2002 to mid-2009 (columns 3 and 4). Again these tests are in line with our previous results.

Table 14: Robustness checks – SURGE measures: variation of SURGE calculation method

Dependent variable: *FALL* measure				
	***SURGE* – pre-shock mean**		***SURGE* – period mean**	
	(1)	**(2)**	**(3)**	**(4)**
FBAS	0.0133	0.0431*	0.0102	0.0254
	(0.0171)	(0.0255)	(0.0176)	(0.0227)
FBAS*CESEE		-0.0788**		-0.0695**
		(0.0326)		(0.0311)
SURGE*alt*	-0.0251	-0.0469	0.0110	0.0413
	(0.0571)	(0.0746)	(0.0613)	(0.0807)
SURGE*alt*^2	0.0000***	0.0000***	0.0000**	0.0000**
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
CESEE		4.0614***		5.0574***
		(1.4334)		(1.7414)
constant	5.5291***	4.7599***	5.8771***	5.2721***
	(0.9454)	(1.1373)	(0.9624)	(1.1040)
R-sqr	0.155	0.225	0.097	0.161
adj.R-sqr	0.106	0.147	0.045	0.077
N	56	56	56	56

Stars indicate statistical significance at * 10 percent, **5 percent and *** 1 percent level. Standard errors in parentheses below. Estimation method is OLS. Robust standard errors applied.
FALL is the logarithm of the difference between average pre-shock inflows in 2007Q3-2008Q2 and average post-shock inflows in 2008Q4-2009Q1 per country.

7. CONCLUSIONS

After the financial and currency crises of the 1990s many EMEs, in particular in Central and Southeastern Europe and in Latin America, opened up their banking sectors for foreign-owned banks. This paper analyzes the role of foreign banks in EMEs after the collapse of *Lehman Brothers* by looking at their impact on mitigating the fall in cross-border bank flows in the immediate post-*Lehman* period compared to pre-crisis levels.

We find robust evidence indicating that foreign banks did not stabilize cross-border bank flows to emerging markets during the global financial crisis. However, our analysis also suggests that Central and Southeastern Europe has been different. This difference is conditional on the share of assets held by foreign banks. Beyond the threshold of an asset share of about 37 percent, the impact of foreign banks has been significantly different compared to other emerging markets, mitigating the sudden stop in cross-border flows. Moreover we find that this difference can be mainly traced to bank-to-bank flows. Finally, while not completely conclusive, our results suggest that the conditional impact of a higher share of foreign banks for CESEE countries is a regional phenomenon.

Our results are open to various interpretations. For the EME sample as a whole our interpretation is that two opposing forces – weakened parent banks and strong interest to protect the value of previous investments in the respective host countries – have offset each other. Thus, from a financial stability perspective our results neither provide support for the proponents of foreign bank entry – stressing the benefits of foreign banks for financial stability – nor for the critics – stressing the risk of large contagion effects. Given the character of the crisis as a global one triggered in mature economies, this result is not too surprising as the main advantage of foreign banks in mitigating sudden stop phenomena – the alleged strength of the parent banks – has been absent.

For CESEE, however, the evidence indicates that the impact of foreign bank presence in different. This result is open to different interpretations. Following Cetorelli and Goldberg (2010) it could indicate that the EU-15 banks active in the region were less affected by the crisis than other banks engaged in cross-border lending. This stabilized cross-border flows significantly more in CESEE where EU-15 banks were most active. An alternative interpretation for the difference between CESEE and other EMEs is the overall European integration process. According to this interpretation, the common market has reinforced the special lending relationship between parent banks and their subsidiaries. Parent banks perceive their subsidiaries operating in countries that constitute an extension of parent their home markets.[79] This concept is absent for any other relationship between parent banks and subsidiaries in emerging markets and might explain why parent banks of CESEE subsidiaries were more active than parent banks of subsidiaries in other regions in providing support in times of crises. In line with this argument, we find the most pronounced difference between the CESEE and other EMEs for the comparatively stabilizing impact of foreign banks for bank-to-bank flows. Further research is warranted to shed more light on the difference

[79] In this respect it is interesting to note that in an analysis of cross-border syndicated bank lending in the post-crisis period De Haas et al. (2010) find that bank-to-bank lending took the hardest hit, while lending to non-banks was less affected if the lending banks had a subsidiary in the recipient country. In contrast to the BIS data used in our analysis, inter-bank cross-border syndicated bank lending does not include lending from parent banks to their subsidiaries. Thus, despite conflicting results with regard to bank-to-bank lending, De Haas et al. (2010) suggest that the same mechanism, local presence of international banks in emerging markets, mitigate sudden stop phenomena.

between CESEE and other EMEs with regard to cross-border flows in the global financial crisis and the role of foreign banks.

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APPENDIX

Appendix 1: List of sample countries

	CESEE	other EMEs
1	Albania	Argentina
2	Bosnia and Herzegovina	Belarus
3	Bulgaria	Bolivia
4	Croatia	Brazil
5	Czech Republic	Chile
6	Estonia	China
7	Hungary	Colombia
8	Latvia	Costa Rica
9	Lithuania	Dominican Republic
10	Macedonia, FYR	Ecuador
11	Poland	Egypt
12	Romania	El Salvador
13	Serbia	Georgia
14	Slovakia	Guatemala
15	Slovenia	India
16	Turkey	Indonesia
17		Israel
18		Jamaica
19		Jordan
20		Kazakhstan
21		Lebanon
22		Malaysia
23		Mexico
24		Mongolia
25		Morocco
26		Pakistan
27		Panama
28		Paraguay
29		Peru
30		Philippines
31		Russia
32		South Africa
33		South Korea
34		Sri Lanka
35		Thailand
36		Tunisia
37		Ukraine
38		Uruguay
39		Venezuela
40		Vietnam

Appendix 2: IMF exchange rate classification scheme

1	Exchange arrangement with no separate legal tender
2	Currency board arrangement
3	Conventional pegged arrangement
3.5	Conventional peg to a composite
4	Pegged exchange rate within horizontal bands
5	Crawling peg
6	Crawling band
7	Managed floating with no predetermined path for the exchange rate
8	Independently floating

The information is based on the de facto methodology introduced in 1997 and was retroactively updated by A. Bubula and İ. Ötker-Robe, "The Evolution of Exchange Rate Regimes Since 1990: Evidence from De Facto Policies," WP/02/155. These data are published annually in the Annual Report on Exchange Arrangements and Exchange Restrictions; updates are published semi-annually at http://www.imf.org/external/np/mfd/er/index.asp. The official definitions of the categories are available at: http://www.imf.org/external/np/mfd/er/index.asp. Data are accurate as of January 2008, but future retroactive reclassifications may be made.

Appendix 3: Descriptive statistics

Variable	Sample	Obs	Mean	Std. Dev.	Min	Max
FALL	CESEE	16	6.973	3.195	-3.248	9.753
	other EMEs	40	6.436	3.509	-6.722	10.791
	all	56	6.589	3.403	-6.722	10.791
SURGE	CESEE	16	9.407	1.591	5.663	11.276
	other EMEs	40	6.716	5.288	-8.091	11.806
	all	56	7.485	4.693	-8.091	11.806
FBAS	CESEE	16	72.216	26.975	3.945	99.760
	other EMEs	40	25.837	23.400	0	95.346
	all	56	39.089	32.151	0	99.760
NBAS	CESEE	16	64.359	26.766	3.863	98.602
	other EMEs	40	19.602	19.384	0	88.150
	all	56	32.390	29.633	0	98.602
FIN.OPENNESS de jure	CESEE	15	1.378	1.311	-1.129	2.541
	other EMEs	40	0.699	1.441	-1.129	2.541
	all	55	0.884	1.427	-1.129	2.541
FIN.OPENNESS de facto	CESEE	16	1.861	0.807	0.811	3.871
	other EMEs	40	1.460	0.766	0.549	4.514
	all	56	1.575	0.792	0.549	4.514
INST.QUALITY	all	56	-0.056	0.573	-1.145	1.153
INST.QUALITY change	all	56	0.023	0.052	-0.084	0.157
CA/GDP	all	56	-4.038	8.428	-25.185	15.405
ExpP GDP GROWTH	all	56	-2.408	2.249	-7.698	4.197
GDP GROWTH	all	56	-2.017	5.485	-18.500	8.504
DEBT/GNI	all	48	44.163	25.775	10.968	141.444
ERR	all	56	5.384	2.401	1	8
RESERVES/DEBT	all	48	69.498	63.034	14.643	413.870
FLD	all	49	55.077	14.350	24.576	81.032
CDR	all	56	1.084	0.455	0.308	2.390

Appendix 4: Pairwise correlations

	FALL	SURGE	FBAS	NBAS	INST.QUALITY change	INST.QUALITY	CA/GDP	FIN.OPENNESS *de jure*	FIN.OPENNESS *de facto*	ExpP GDP GROWTH	GDP GROWTH	DEBT/GNI	FLD	ERR	RESERVES/DEBT	CDR
FALL	1															
SURGE	0.5063	1														
	(-0.0001)															
FBAS	0.0648	0.1073	1													
	(0.6354)	(0.4311)														
NBAS	0.1065	0.2158	0.9338	1												
	(0.4348)	(0.1102)	(0.0000)													
INST.QUALITYchange	-0.0567	0.1694	0.3236	0.3403	1											
	(0.6783)	(0.2121)	(0.015)	(0.0103)												
INST.QUALITY	0.1242	0.3821	0.3949	0.3897	0.0956	1										
	(0.3618)	(0.0037)	(0.0026)	(0.003)	(0.4835)											
CA/GDP	-0.0071	-0.2805	-0.3986	-0.3242	-0.2844	-0.2817	1									
	(0.9588)	(0.0363)	(0.0023)	(0.0148)	(0.0336)	(0.0355)										
FIN.OPENNESS *de jure*	-0.0160	0.0669	0.3774	0.2493	0.0884	0.4054	-0.3075	1								
	(0.9076)	(0.6273)	(0.0045)	(0.0664)	(0.5208)	(0.0021)	(0.0224)									
FIN.OPENNESS *de facto*	0.0255	0.1652	0.2045	0.2295	-0.0260	0.4339	-0.2716	0.3328	1							
	(0.8521)	(0.2236)	(0.1306)	(0.0889)	(0.8492)	(0.0008)	(0.0428)	(0.013)								
ExpP GDP GROWTH	-0.1148	-0.2726	-0.4530	-0.4213	-0.4810	-0.3334	0.5243	-0.1735	-0.1025	1						
	(0.3996)	(0.0421)	(0.0005)	(0.0012)	(0.0002)	(0.012)	(0.0000)	(0.2053)	(0.4522)							
GDP GROWTH	-0.1008	-0.1359	-0.4630	-0.3990	0.0187	-0.4192	0.4226	-0.2630	-0.1683	0.6036	1					
	(0.4597)	(0.3181)	(0.0003)	(0.0023)	(0.8914)	(0.0013)	(0.0012)	(0.0524)	(0.2151)	(0.0000)						
DEBT/GNI	0.0277	0.0955	0.3022	0.2134	-0.0326	0.2654	-0.5458	0.3018	0.6276	-0.3613	-0.4190	1				
	(0.8515)	(0.5186)	(0.0369)	(0.1452)	(0.8258)	(0.0683)	(0.0001)	(0.0393)	(0.0000)	(0.0116)	(0.003)					
FLD	-0.0044	-0.1068	0.0272	-0.1129	-0.0323	-0.2465	-0.1073	0.0987	-0.2360	-0.0918	-0.0829	0.2452	1			
	(-0.976)	(0.4651)	(0.8528)	(0.4399)	(0.8256)	(0.0877)	(0.4632)	(0.50)	(0.1026)	(0.5303)	(0.5712)	(0.1223)				
ERR	0.0014	0.1793	-0.1548	-0.0339	0.0856	0.2169	0.2040	-0.1786	-0.2135	0.0523	0.1041	-0.2847	-0.2221	1		
	(0.9916)	(0.186)	(0.2546)	(0.8044)	(0.5303)	(0.1084)	(0.1315)	(0.192)	(0.1141)	(0.7019)	(0.4453)	(0.0499)	(0.1251)			
RESERVES/DEBT	0.0720	0.0295	-0.2675	-0.1973	-0.0343	-0.1746	0.4527	-0.3086	-0.0306	0.1935	0.3670	-0.3684	-0.4241	-0.0012	1	
	(0.6268)	(0.842)	(0.066)	(0.1789)	(0.8169)	(0.2352)	(0.0012)	(0.0348)	(0.8364)	(0.1876)	(0.0103)	(0.0108)	(0.0057)	(0.9935)		
CDR	0.0840	0.2028	0.1524	0.1019	-0.0503	0.3231	-0.3979	0.1120	0.1108	-0.4438	-0.5351	0.3443	-0.0413	-0.1342	-0.1911	1
	(0.5382)	(0.1338)	(0.2621)	(0.4551)	(0.713)	(0.0152)	(0.0024)	(0.4154)	(0.4162)	(0.0006)	(0.0000)	(0.0166)	(0.7783)	(0.3241)	(0.1932)	

p-values in parentheses below.

Appendix 5: List of variables

Name	Description	Source
FALL	difference between the average cross-border bank flows in 2007Q3 - 2008Q2 and the average bank flows in 2008Q4 - 2009Q1 (logs)	BIS International locational banking statistics, Table 6A
SURGE	aggregated cross-border bank flows over the three years prior to the *Lehman* bankruptcy (i.e. 2005Q3-2008Q2) (logs)	
FBAS	percentage of assets of foreign banks among total banks in 2005	Claessens et al. (2008)
NBAS	percentage of assets of northern banks among total banks in 2005	
FIN.OPENNESS de jure	Chinn-Ito-Index value for de-jure financial openness in 2007	Chinn and Ito (2008)
FIN.OPENNESS de facto	foreign assets and liabilities to GDP in 2007	Lane and Milesi-Feretti (2007)
INST.QUALITY	average of the six individual WGI governance indicators in 2008	Kaufmann et al. (2009)
INST.QUALITY change	change of INST. QUALITY from 2007 to 2008	
ExpP GDP GROWTH	real GDP growth of the 30 main export partners weighted by their participation in the total exports to them in 2009	IMF DOTS, WEO
GDP GROWTH	real GDP growth in 2009	IMF WEO
CA/GDP	current account balance in percent of GDP in 2007	IMF WEO
DEBT/GNI	total external debt stocks to gross national income in 2007	WDI, World Bank
ERR	classification of exchange rate regime as of end of 2007	Bubula and Ötker-Robe (2002)
RESERVES/DEBT	total reserves (% of total external debt) in 2007	WDI, World Bank
FLD	share of total foreign liabilities denominated in foreign currency in 2004	Lane and Shambaugh (2010)
CDR	private credit by deposit money banks as a share of demand, time and saving deposits in deposit money banks in 2007	Beck and Demirgüç-Kunt (2009)

The refinancing structure of banks in selected CESEE countries

Mathias Lahnsteiner[80]

ABSTRACT

In this paper, we present systematic regional and cross-country information about the refinancing structure of the banking sector in selected Central, Eastern and Southeastern European (CESEE) countries. We use the most recent data available (from mid-2008 until end-2009) to focus on the situation of CESEE banking sectors following the intensification of the financial crisis triggered by the collapse of Lehman Brothers. At that time, there were fears of spillover effects, given the strong reliance of most of these countries' banking sectors on foreign funding. Our analysis shows that in the second half of 2008, most banking sectors received additional funds from abroad, while in the course of 2009, net capital flows to banks turned at least temporarily negative in all countries under review except Poland. However, the size of net outflows on the liability side of banks' balance sheets differed substantially across countries. Looking at the whole period from mid-2008 until end-2009, our findings suggest that the outflows affected above all banking sectors that had very high net foreign liabilities at the onset of the crisis (i.e. in the Baltic countries, particularly Latvia and Estonia) and banking sectors with comparatively low levels of foreign ownership (Slovenia, Ukraine and Russia).

JEL classification: G15, G21, G32, O16, O52
Keywords: financial stability, banking sector, Central and Eastern Europe, refinancing, capital flows, financial crisis

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1. INTRODUCTION

The refinancing structure of the banking sector is a key aspect of overall macrofinancial stability in any country. The financial crisis has highlighted the importance of this issue even further. Earlier work on this topic, in particular Walko (2008), presented systematic regional and cross-country information on the refinancing structure of the banking sectors in selected CESEE countries up to end-2007 and mid-2008, respectively. His study focused on the banks' situation before external funding conditions deteriorated significantly in the fall of 2008 after the collapse of Lehman Brothers. At that time, there were fears of spillover effects, given the strong reliance of most of these countries' banking sectors on foreign financial resources (including foreign parent banks), which had played a major role in financing the rapid expansion of domestic credit during the precrisis years.

Have these spillover effects indeed materialized or was the integration of CESEE banks in European banking networks an asset when the financial crisis deepened? This is the core issue we address in this study by examining the funding structure of selected CESEE banking sectors. In updating and broadening the analysis by Walko (2008), the study examines the impact of the crisis on CESEE banks' refinancing structure with a focus on the period from mid-2008 to end-2009 (in the following referred to as the review period).

While Walko (2008) was based on the country sample Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania, Slovakia and Slovenia, this paper also includes the Baltic countries as well as Ukraine and Russia. The inclusion of these countries is of particular relevance, as the crisis affected them more strongly and, in the case of the Baltics, sooner than most other countries in the sample. Moreover, the banking sectors of Ukraine and Russia are structurally different from those of the other countries in that the presence of foreign banks is smaller (Ukraine) or much smaller (Russia). Looking at the Baltic states, Estonia and Lithuania rank among the countries with the highest share of foreign-owned banks (almost 100% in Estonia and more than 90% in Lithuania), while in Latvia about 65% of assets are in the hands of foreign owners. While statistical information on parent bank financing is scarce (no centralized dataset, insufficient information from national sources), this study puts together all available information to provide comprehensive evidence on foreign funding of CESEE banks during the crisis in a comparative cross-country perspective. Moreover, the paper presents a new proxy for parent bank funding derived from BIS banking statistics.

The paper is structured as follows: Section 2 summarizes the main findings of recent empirical studies on cross-border bank flows during the crisis. Section 3 presents the main features of the refinancing structure of CESEE banking sectors, which is, in most countries, characterized by high net foreign liabilities. Sections 4 and 5 focus on changes in net foreign liabilities since the collapse of Lehman Brothers. Following a detailed discussion of flows on the liability side of balance sheets in section 4, the subsequent section also takes into account asset-side flows that helped accommodate for external financing constraints in many countries under review. The two sections are based on flow data (balance of payments), as stock data is subject to valuation effects and thus more difficult to interpret. Section 6 analyzes developments in gross liabilities with a focus on external liabilities, private sector deposits, capitalization levels and central bank funds. Section 7 examines developments in the structure of external liabilities with a special focus on maturity. Section 8 sheds light on the important role of parent bank funding, and section 9 summarizes the main findings and suggests policy conclusions.

2. LITERATURE OVERVIEW

Several recent papers examine cross-border bank flows to emerging economies' banking sectors during the crisis, some of which have a special focus on the role of parent bank funding. Berglöf et al. (2009) as well as EBRD (2009) argue that the integration of most CESEE countries' banking sectors in European banking networks was a crisis-mitigating factor, as parent bank financing remained stable, thus attenuating negative capital flow dynamics. Similarly, Vogel and Winkler (2010) conclude that a higher share of foreign bank assets has stabilized cross-border flows in CESEE, in particular bank-to-bank lending, during the crisis. However, the authors argue that foreign banks did not stabilize cross-border bank flows to emerging economies in general during the global crisis. CESEE might have been different in this respect due to the special context of the European integration. They also find that higher capital inflows prior to the crisis were followed by more pronounced outflows during the crisis. Hermann and Mihaljek (2010) study the nature of spillover effects in bank lending flows from advanced to emerging market economies. They conclude that the decrease in cross-border loans to CESEE was more limited than in Asia and Latin America, largely because of the high degree of financial integration in Europe and comparatively sound banking systems. Hoggarth et al. (2010) look at international bank flows on a global level and show that the reversal of inflows during the crisis was selective.

One of the main conclusions, which is particularly relevant for our paper as well, is that interbank lending has fallen especially sharply, whereas cross-border intra-group lending has held up better.

3. FUNDING GAPS AND NET FOREIGN LIABILITIES IN CESEE BANKING SECTORS…

3.1 …BEFORE THE COLLAPSE OF LEHMAN BROTHERS

Most CESEE countries entered the crisis with a funding gap, i.e. domestic deposits did not fully cover the stock of domestic credit to the private nonbank sector. In general, the more banks are able or willing to refinance rapid credit growth through other refinancing instruments than retail deposits, the wider the domestic credit and deposit stocks can drift apart from each other. Nondeposit funding sources include equity, domestic debt issuances and external liabilities. It is therefore likely that the deepness of the domestic debt security market and its usage by banks as well as the ability of banks to tap foreign sources of funding (e.g. parent banks, access to international capital markets) play an important role in this regard. Shin and Shin (2010) argue that the size of noncore[81] funding sources on banks' balance sheets provides information on the willingness of banks to increase exposure and therefore can be regarded as a measure for the stage of the financial cycle. A detailed assessment of factors, that explain differences of funding gaps in CESEE, goes beyond the scope of this paper.

As illustrated in Walko (2008), in the majority of countries, funding gaps had led to large or very large net external liabilities by mid-2008 (Croatia: around 8% of GDP; Bulgaria, Hungary, Romania and Slovenia: 13% to 21% of GDP). In Ukraine, net external liabilities were roughly as high as in the latter group in mid-2008 (around 16% of GDP), after having expanded particularly fast in the preceding years (from 2005 until mid-2008, net external liabilities more than quintupled as a percentage of GDP). In Russia, the banking sector also recorded a funding gap and net external liabilities amounted to about 5% of GDP in mid-2008. As a percentage of assets, the net external liability position of the Russian banking sector was comparable to that in Croatia, but still markedly lower than those observed in Bulgaria, Hungary, Romania, Slovenia and Ukraine. In the Baltic countries, net external liabilities as a percentage of GDP reached the highest levels within the country sample in mid-2008, and the funding gap was even higher in these countries. In Latvia, net external liabilities amounted to 50% of GDP, in Estonia to 35% of GDP and in Lithuania to about 25% of GDP. In fact, only the Czech banking sector recorded net external assets in mid-2008.

In most countries, net external liabilities were approximately the same size or smaller than funding gaps, suggesting that net external liabilities were used predominantly to refinance private sector credit growth. However, there were some exceptions, e.g. Romania, where the net external liability position was substantially larger than the funding gap and where part of external liabilities was channeled into central bank instruments. The situation was similar in Slovakia (for more details, see Walko 2008).

In the framework of the international investment position methodology, external liabilities comprise foreign direct investments (FDI), portfolio investments (equity and debt) and other investments (loans as well as currency and deposits). Excluding liabilities related to FDI (which are part of capital and reserves in the banks' balance sheets and which are not available on a sectoral basis for the country sample), foreign liabilities were dominated by currency and deposits and/or loans in all CESEE countries before the collapse of Lehman Brothers. This was also true for the Baltic counties, Russia and Ukraine. In Ukraine and Estonia, portfolio debt securities played a more important role as a percentage of GDP than in the other countries under review. Given the comparably low level of foreign ownership in the banking sectors of Russia, Slovenia and Ukraine, it is likely that a considerable, but (due to a lack of data) not exactly specifiable share of external financing came from nonparent sources (e.g. syndicated loans).

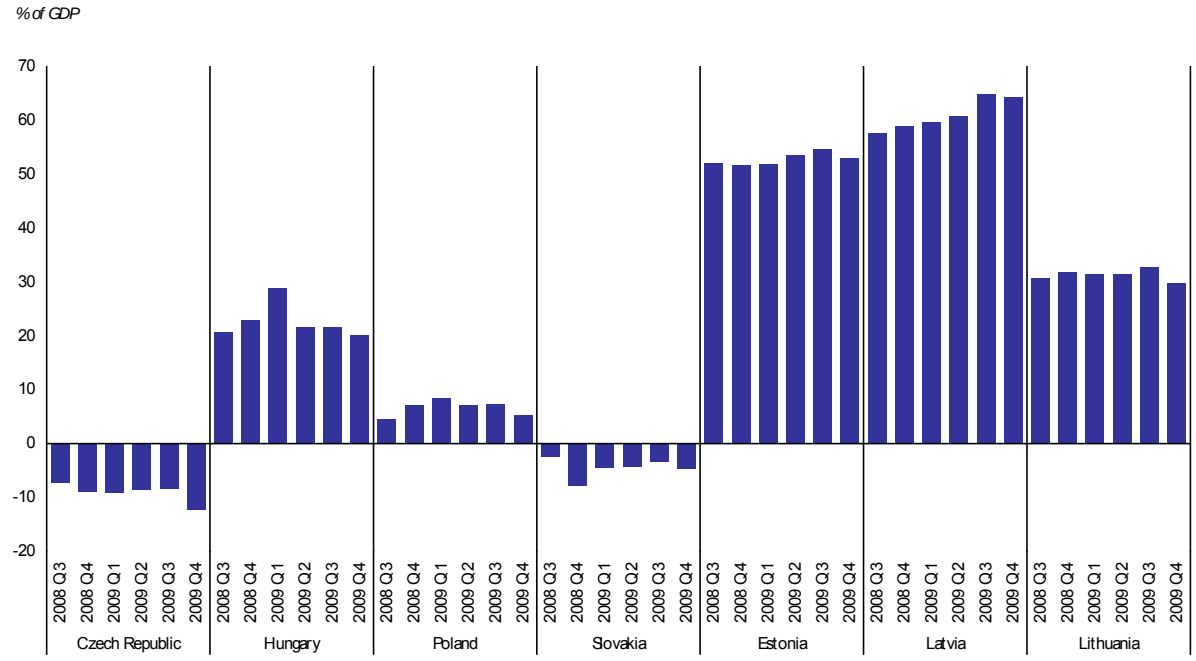
3.2 FUNDING GAPS REMAINED ELAVATED IN MOST COUNTRIES

Over the review period, the funding gap remained elevated in most countries. In late 2008 and early 2009, the gap even increased, partly due to an exchange rate effect. In countries where the amount of foreign currency loans is larger than the amount of foreign currency deposits, depreciating domestic currencies caused the domestic credit stock to increase more than domestic deposits (Hungary, Poland, Romania, Russia and Ukraine). Moreover, in some cases, temporary deposit outflows contributed to the widening of the funding gap (in particular in Russia, Ukraine, Bulgaria, Romania, Croatia, Lithuania and Latvia). Subsequently, however, the funding gaps started to narrow in most countries in the course of 2009, as domestic credit growth declined or even turned negative, CESEE currencies recovered and deposits stabilized or even increased. In the Baltic

[81] The precise definition of core liabilities appeals to the principle that core liabilities are the claims of the ultimate creditors (the household sector) on the intermediary sector (Shin, 2010).

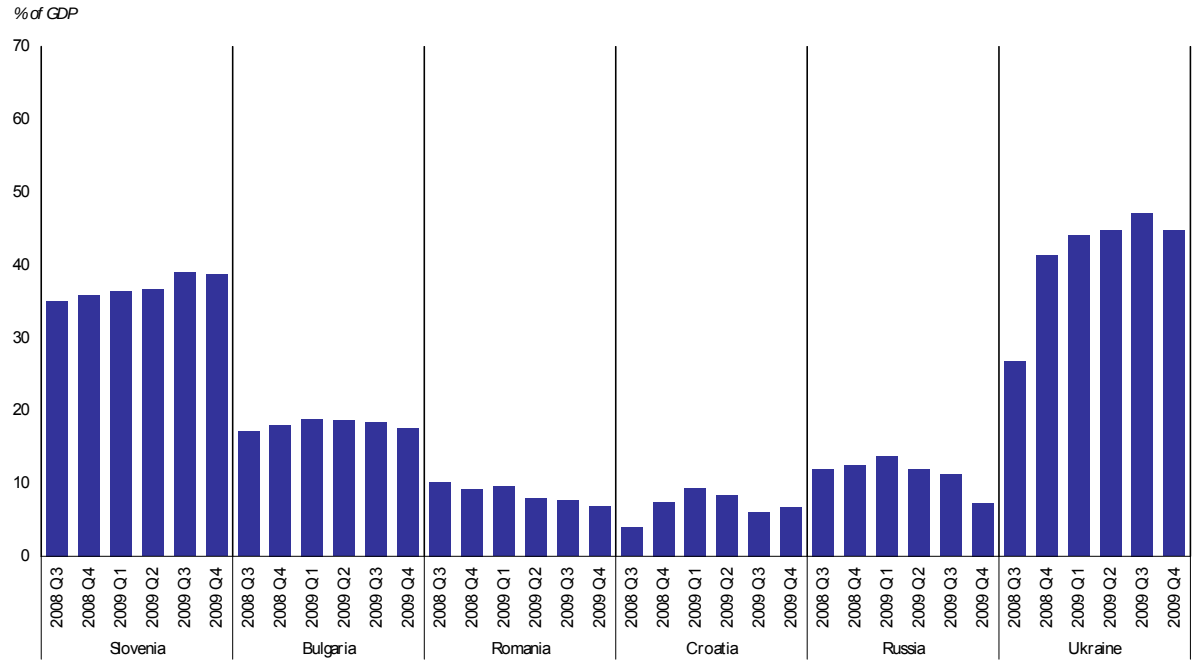
countries, Slovenia and Ukraine, though, the funding gap rose until the third quarter 2009 before retreating slightly in the final quarter.

Graph 1.a: Funding gaps



Source: National central banks

Graph 1.b: Funding gaps



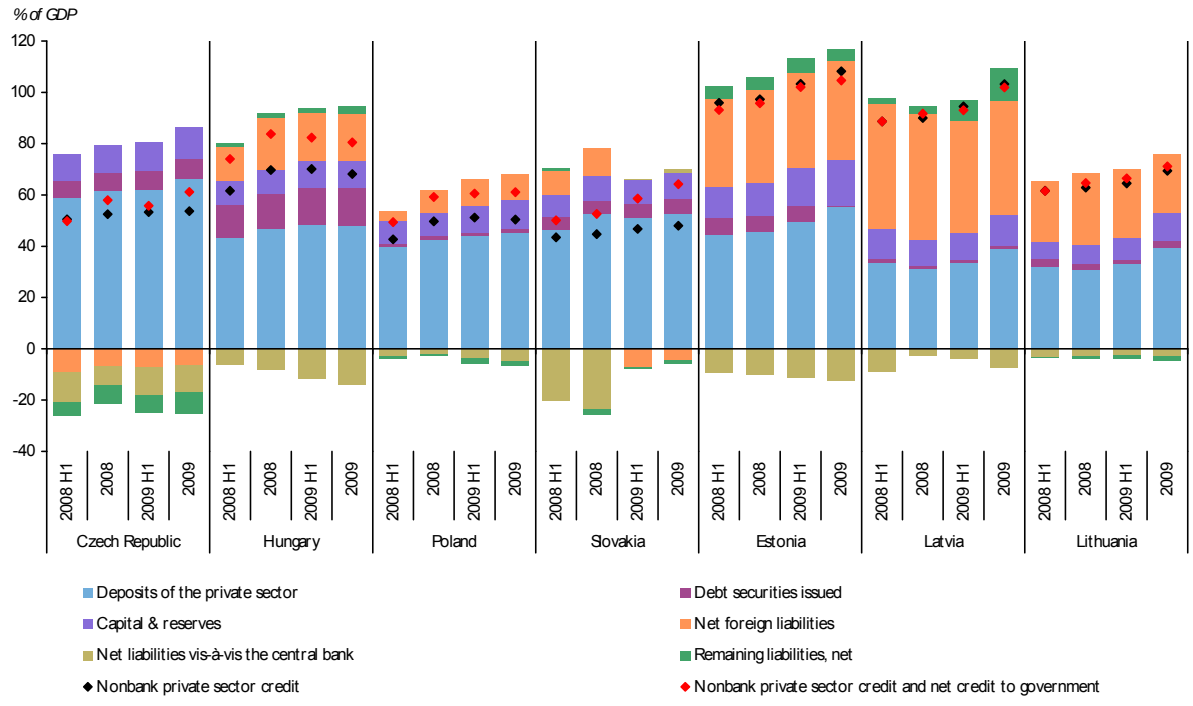
Source: National central banks.

Source: National central banks

Net foreign liabilities continued to be an important refinancing source in most countries during the review period, except for the Czech banking sector, which sustained its net external asset position. More specifically, several major Czech banks were net creditors of the European banking groups to which they are affiliated (CNB, 2009). After net foreign liabilities had continued to increase in the second half of 2008 in most countries, a downward trend was seen in 2009, both in absolute terms and also relative to GDP (which declined in all countries but Poland that year). As a percentage of GDP, the decrease in net external liabilities was most pronounced in Latvia, Lithuania, Slovenia and Ukraine, but was also noticeable in Hungary, Romania and Bulgaria. In Poland and Croatia, net foreign liabilities expanded until mid-2009 before declining only slightly until year-end. In Croatia, this increase came after a gradual decline from 2007 until the third quarter 2008 that was related to the central bank's measures to contain bank lending based on foreign borrowing, which were lifted in 2008 and 2009. In Estonia, net external liabilities increased slightly during 2009.

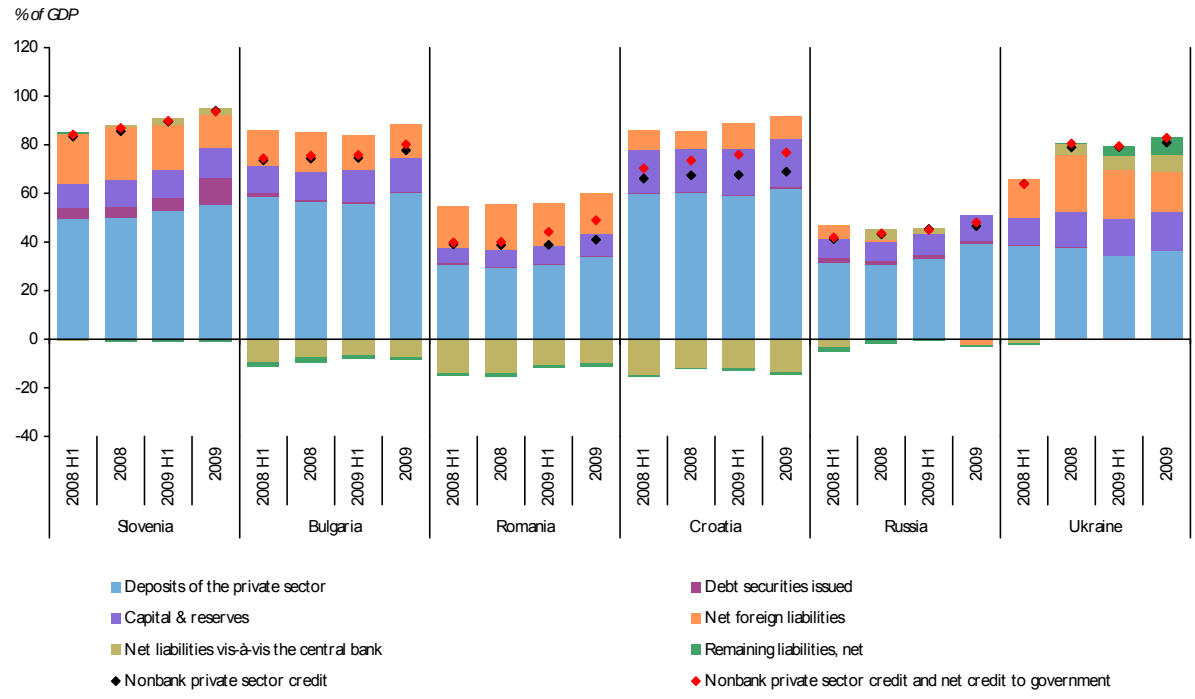
By contrast, in Slovakia and Russia, the net foreign liability position turned into a net foreign asset position. In Slovakia, this was mainly due to a reduction of funds held in sterilization instruments of Národná banka Slovenska (NBS) following the country's entry into the euro area. Since the money that banks had deposited with the NBS comprised mainly surplus funds received from foreign banks, the decrease in sterilization operations with the NBS in 2009 was reflected on the liability side in a decline in deposits and loans received from foreign banks (NBS, 2009). In Russia, the banking sector became a net external creditor due to external financing constraints after the collapse of Lehman Brothers and an accumulation of external assets during the crisis.

Graph 2.a: Domestic credit and its financing



Source: National central banks

Graph 2.b: Domestic credit and its financing



Source: National central banks.

To better understand to what extent the developments of the banking sectors' net external position were driven by liability- and asset-side flows on the one hand and valuation effects (including exchange rate effects and other adjustments) on the other hand, we will analyze balance of payments data (i.e. flows) first before turning to changes in the structure of external liabilities.

4. EXTERNAL FUNDING DECLINED, DISRUPTINOS ON FOREIGN EXCHNAGE SWAP MARKETS

4.1 TYPICALLY (STILL) NET INFLOWS SHORTLY AFTER LEHMAN, TURNAROUND IN 2009

First, we take a closer look at capital flows to CESEE banking sectors' liability side during the post-Lehman crisis (charts 3a and 3b). The balance of inflows and outflows on the liability side of most CESEE banking sectors was positive in the third and fourth quarters of 2008, with other investments being the dominant source of inflows. Summing up the last two quarters of 2008, net outflows on the liability side were seen only in Slovenia and Russia, i.e. the two countries with the lowest level of foreign ownership, as well as in Latvia and the Czech Republic. In Ukraine, liability-side net flows turned negative in the final quarter of 2008. In 2009, capital flows on the liability side turned or remained negative in all countries with the exception of Poland. From the third quarter of 2008 until the fourth quarter of 2009, average other investment and portfolio outflows on the liability side as a percentage of quarterly GDP were particularly large in Latvia (11%), Slovenia, Estonia and Ukraine (4% to 5%). Without government-guaranteed bond issuances, average outflows in Slovenia would have amounted to 8% of GDP in the third quarter of 2009. After Russia and the Czech Republic had experienced continued outflows in the first quarter of 2009, the negative dynamics lost momentum in the course of 2009. In the final quarter of 2009, the refinancing situation showed signs of improvement, as the Czech Republic, Hungary, Poland, Bulgaria and Croatia reported either a positive balance of portfolio and other investment liability flows or only marginal net outflows.

4.2 WHY DID THE LATVIAN BANKING SECTOR EXPERIENCE VERY LARGE OUTFLOWS?

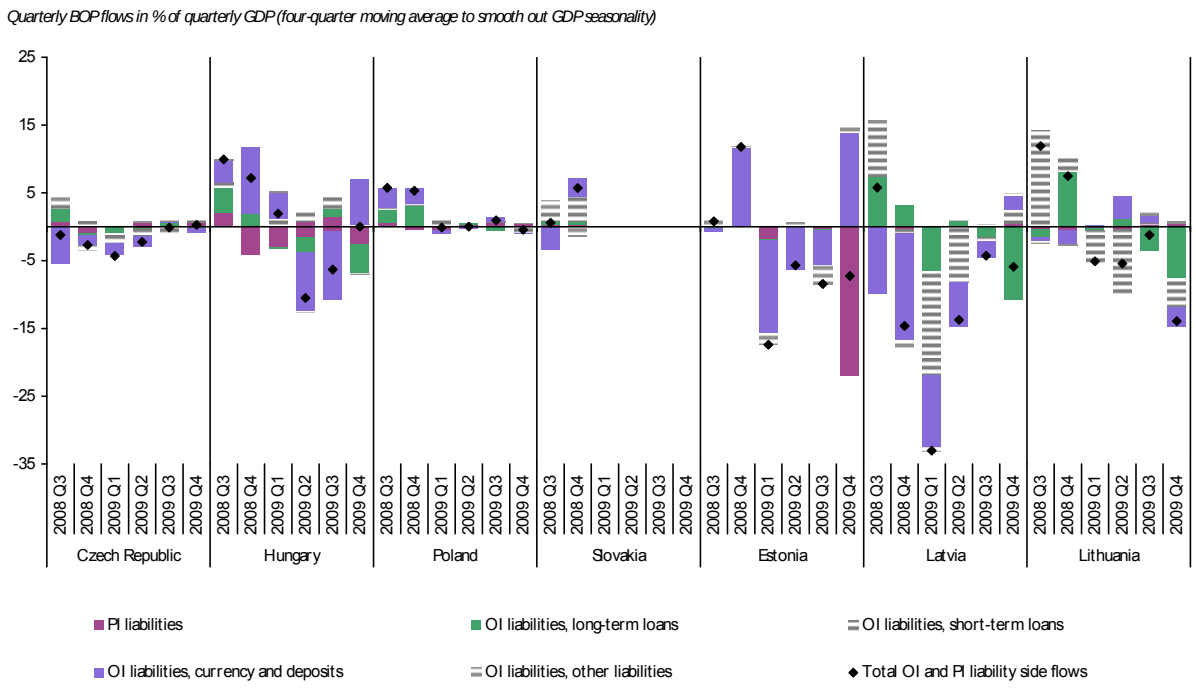
In Latvia, the large capital outflows from the banking system were due to multiple factors (IMF, 2009a): Domestically owned banks were largely not in position to roll over maturing syndicated loans. In addition, nonresident deposits (a major funding source of domestically owned banks) were withdrawn on a large scale. Moreover, writedowns on euro-denominated loans were worsening banks' net open foreign exchange positions, which banks had to offset by buying foreign exchange assets or by decreasing foreign exchange liabilities

(including repaying loans to parent banks). Furthermore, shrinking loan portfolios enabled foreign-owned banks to repay liabilities to their parents. This was however almost fully compensated by recapitalization measures (IMF, 2010a), so that altogether, parent banks honored their commitment to maintain their exposure, as agreed in the context of the IMF-EU support package that was granted to Latvia in late 2008 (inflows related to recapitalization are not included in charts 3a and 3b, as they are recorded as foreign direct investment flows).

4.3 ROLL-OVER OF SHORT-TERM LOANS HELD UP WELL IN A NUMBER OF COUNTRIES

A more detailed analysis reveals that short-term loans contributed relatively strongly to total outflows only in Latvia, Lithuania, Slovenia, Russia and Ukraine, suggesting that banks in these countries were less able to roll over maturing short-term loans than banks in the other CESEE countries under review here. For example, in Bulgaria a large part of short-term debt is from Bulgarian subsidiaries to their parent banks, which in the event reduced the rollover risk (IMF, 2010b). Also, the mainly foreign-owned Hungarian, Polish and Estonian banking sectors were able to roll over maturing short-term loans to a large extent. In Hungary, Estonia, Latvia, Romania and the Czech Republic, currency and deposits was a major source of outflows. The (net) redemption of long-term loans caused substantial outflows in Hungary, Latvia, Lithuania, Slovenia, Bulgaria, Russia, and – from the second quarter 2009 – also in Ukraine. Given the low reliance on portfolio investments in most countries, this component also played a less important role in the crisis period, but still caused noticeable outflows in Hungary, Ukraine and Estonia.

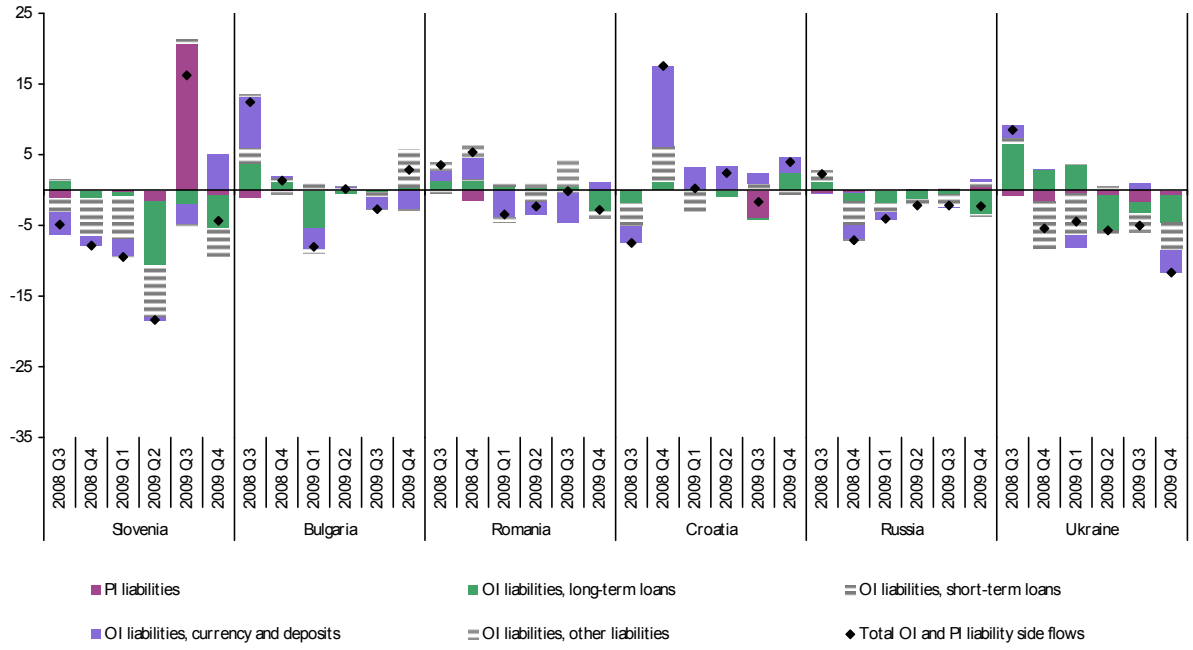
Graph 3.a: Liability side – portfolio and other investment flows to the banking sectors



Source: IMF.
Note: PI = portfolio investments comprising equity and debt, OI = other investments. FDI-related flows are not included due to lack of data.

Graph 3.b: Liability side – portfolio and other investment flows to the banking sectors

Quarterly BOP flows in % of quarterly GDP (four-quarter moving average to smooth out GDP seasonality)



Source: IMF.
Note: PI = portfolio investments comprising equity and debt, OI = other investments. FDI-related flows are not included due to lack of data

4.4 FOREIGN EXCHANGE SWAP MARKETS PARTIALLY DRIED UP

In addition to tightening external funding conditions, negative spillovers of financial market turbulences to international foreign exchange swap markets put the funding strategies of the banking sectors in Hungary and Poland to a test, as highlighted in Mák and Páles (2009) as well as in NBP (2009a and 2009b). In recent years, part of the lending in foreign currency was funded by liabilities in domestic currency. Banks often hedged the resulting on-balance sheet open foreign exchange position by using foreign exchange swap transactions, which implied a rollover risk, as the maturity of foreign exchange swap transactions was usually shorter than that of the loans. The international financial market turbulence and in particular strains in the U.S. dollar funding markets following the collapse of Lehman Brothers spread around the globe and resulted in a partial drying-up of foreign exchange swap markets. This made it more difficult for banks in CESEE countries to hedge their foreign exchange positions.

In the case of Hungarian and Polish foreign-owned banks, risks were mitigated by the parent banks' provision of further foreign exchange swap transactions. Thus, it was not such a surprise that the first commercial banks facing serious foreign exchange swap roll-over problems were majority-owned by residents. In response to this situation, in mid-October 2008, the MNB and later on the NBP stepped into the market as counterparties for foreign exchange swaps, by introducing several foreign exchange swap instruments to reduce functional disorders of the market. Their operations received support from the ECB, which concluded repo agreements with the MNB and the NBP in mid-October and early November 2008, respectively. These agreements on repurchase transactions provided for the possibility to borrow up to EUR 5 billion for the MNB and up to EUR 10 billion for the NBP.

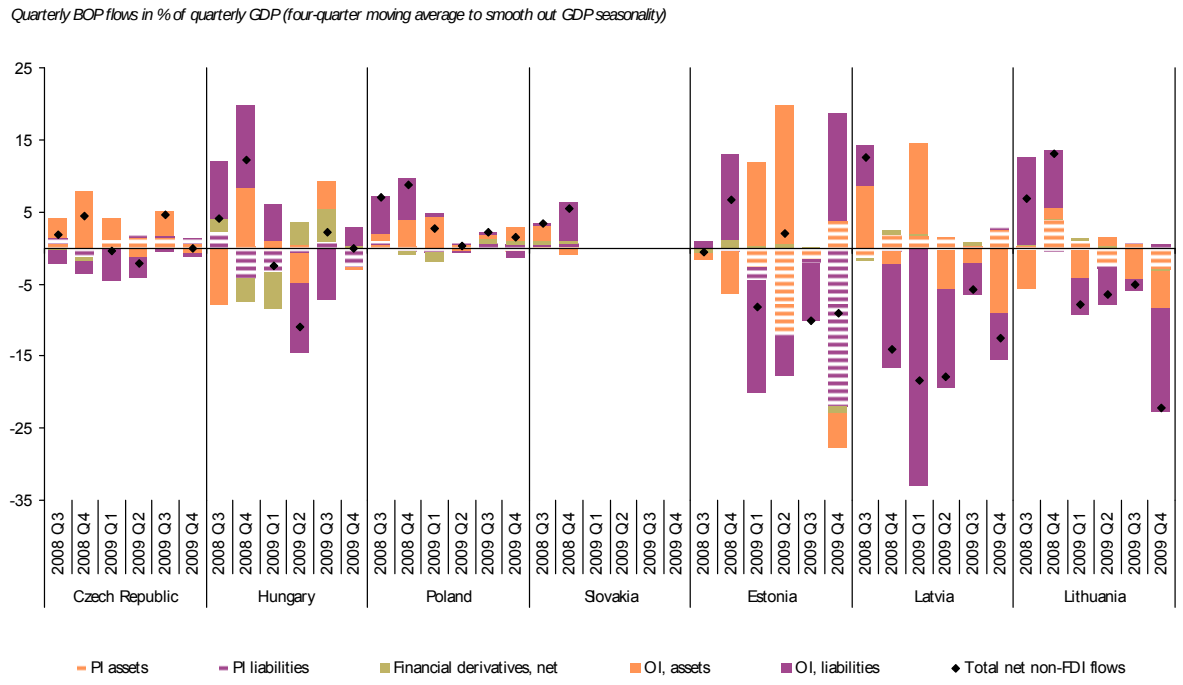
In addition to these bilateral provisions of euro liquidity, the Swiss National Bank established temporary EUR/CHF swap arrangements with the MNB and the NBP, by which the SNB provided Swiss francs against euro for a term of seven days or occasionally for a longer term. The availability of central bank facilities and the support by parent banks widely prevented rollover risks from materializing. An inability to roll over foreign exchange swap transactions could have resulted in an even more pronounced devaluation of CESEE currencies (and/or a reduction in central bank foreign currency reserves), as banks would have been forced to buy foreign currencies in the spot market. Alternatively, a widening of banks' open foreign exchange positions would have resulted in additional capital requirements for foreign exchange risk.

5. SOME BANKING SECTORS USED EXTERNAL ASSETS TO ACCOMMODATE DECREASING EXTERNAL FUNDING

Reducing external assets is one way for banks to accommodate decreasing external funding. In the countries under review, including the Baltics, Russia and (to a lesser extent) Ukraine, but with the notable exception of Romania, banks possessed large volumes of external assets, both as a percentage of GDP and relative to external liabilities as of mid-2008. In particular in the Czech Republic and Slovenia, banks responded to the reduction of external liabilities by selling external assets after having accumulated external assets in the first half of 2008. In the third and the fourth quarters of 2008, both countries' banking sectors were able to more than compensate for liability-side outflows and even recorded positive net capital inflows. The Polish banking sector reduced external assets, even though it received additional funds from abroad. The Hungarian, Estonian, Latvian and Lithuanian banking sectors also ran down external assets in the final quarter 2008 and/or the first quarter 2009. This was often followed by a renewed accumulation of external assets in the remainder of 2009. In Croatia, external assets were sold particularly in the first quarter of 2009, but were then gradually built up again in subsequent quarters. It is important to note, however, that the relaxation of the HNB's foreign currency liquidity regulations in February 2009 (to help cover the government's financing needs) led to a temporary recourse to foreign assets at that time (IRC Expert Group, 2010).

Looking at aggregated data, the banking sectors of Russia and Ukraine did not reduce external assets at times of restricted external financing conditions. In Russia and Ukraine, the banking sectors even accumulated external assets, while at the same time experiencing capital outflows on the liability side. This resulted in sizeable (asset- and liability-side induced) outflows from the banking sector. To stem the outflow of capital in late 2008 and early 2009, the Bank of Russia placed temporary restrictions on the balance-sheet currency position and the value of foreign assets held by credit institutions that received unsecured loans from the the Bank of Russia (Bank of Russia, 2010). External financing constraints together with an accumulation of external assets resulted in the Russian banking sector becoming a net external creditor in the course of 2009.

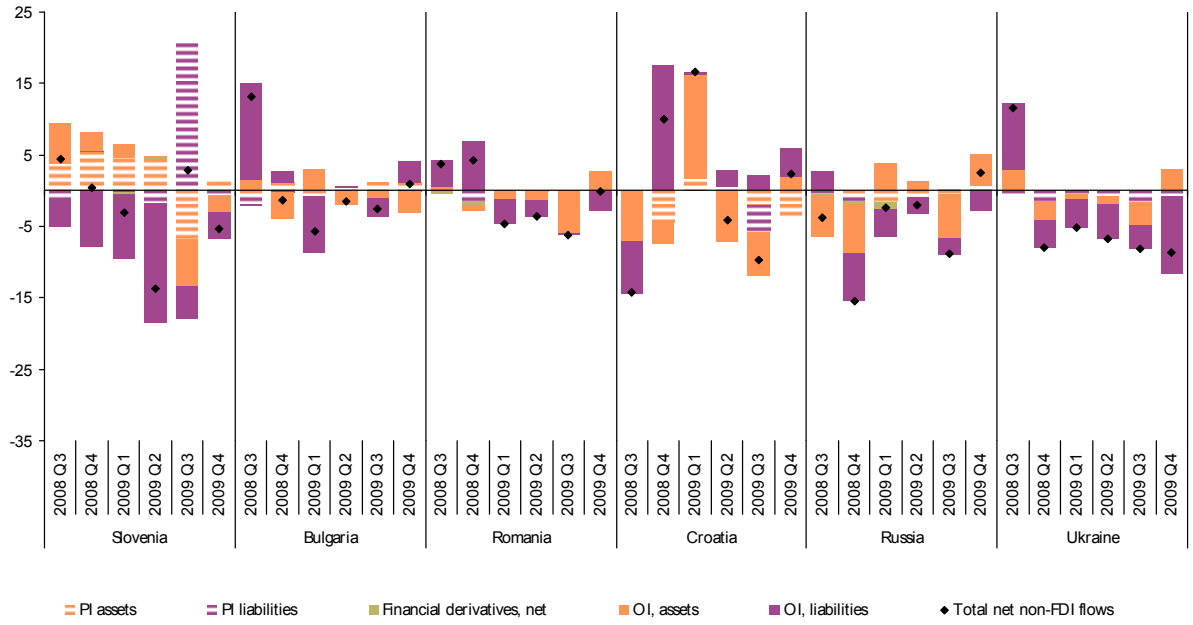
Graph 4.a: Asset- and liability side flows to the banking sectors



Source: IMF.
Note: PI = portfolio investments comprising equity and debt, OI = other investments. FDI-related flows are not included due to lack of data

Graph 4.b: Asset- and liability side flows to the banking sectors

Quarterly BOP flows in % of quarterly GDP (four-quarter moving average to smooth out GDP seasonality)



Source: IMF.
Note: PI = portfolio investments comprising equity and debt, OI = other investments. FDI-related flows are not included due to lack of data

6. DEPENDENCE ON EXTERNAL FUNDING REMAINS COMPARATIVELY HIGH, CAPITAL AND RESERVES ARE BEING INCREASED

In the second half of 2008, the share of external liabilities to total liabilities rose or at least remained unchanged in all banking sectors under review except the Slovenian and the Croatian (see charts A-1a and A-1b in the appendix). This rise (together with central bank liquidity) seems to have offset the declining share of private sector deposits in some cases.

Developments were more heterogeneous in the course of 2009: The ratio of external liabilities to total liabilities declined in the Czech Republic, Slovakia, Latvia, Lithuania, Slovenia, Romania, Russia and Ukraine. The reductions were most pronounced in Slovakia (for the specific reasons already mentioned), in Latvia and Lithuania (albeit from extraordinarily high levels), and in Slovenia and Russia. While the Czech and the Slovak banking sectors were able to compensate the decreasing share of external liabilities by private sector deposits, the banking sectors in other countries had to rely more on government deposits and central bank liquidity as well as, in the case of Slovenia, on government-supported bond issuances.

It is also noteworthy that in Hungary, Poland, Croatia, the banking sectors' external liabilities have increased relative to total liabilities since mid-2008. In Estonia and Bulgaria, the share of external liabilities in total liabilities stayed more or less unchanged over the review period.

As pointed out in Walko (2008), financing by capital and reserves has played a much more important role in several CESEE countries than in the euro area. Since mid-2008, capital and reserves as a percentage of total liabilities has in fact increased, and alongside capital adequacy ratios (capital to risk weighted assets) have also risen. Foreign banks recapitalized their subsidiaries either through capital injections or through retained earnings and thereby directly supported financial sector stability. Moreover, some governments supported their banking sectors via the recapitalization of state-owned banks and, in Latvia and Ukraine, also by taking control of and recapitalizing domestically owned private banks (for more information on Ukraine, see Barisitz and Lahnsteiner, 2009).

In many CESEE countries, central banks provided additional liquidity to ease banks' liquidity pressures and in some countries (in particular Croatia and Romania) also to facilitate the refinancing of government debt. Liquidity support measures included lowering minimum reserve requirements, broadening eligible collateral and increasing the frequency of auctions. Hungary, Poland and Romania took measures to support foreign exchange

markets, including foreign exchange liquidity injections and currency swap arrangements (Gardó and Martin, 2010). In Slovakia, Russia and Ukraine, the position of the banking sector vis-à-vis the central bank changed from that of a net creditor to a net debtor. In Slovakia, banks' sterilization positions at the NBS were substantially reduced when Slovakia entered the euro area. In 2009, banks increasingly deposited their remaining surplus liquidity with foreign (parent) banks and made greater use of funding from the NBS (NBS, 2009), which resulted in a net debtor position of about 1% of GDP vis-à-vis the central bank.

In Ukraine and Russia, the national authorities stepped in with large-scale liquidity injections (Barisitz et al., 2009, Barisitz and Lahnsteiner, 2009) in response to external financing constraints and private sector deposit withdrawals. The net debtor position vis-à-vis the central bank reached about 7% of GDP in Ukraine (peaking in the third quarter 2009) and 5% in Russia (maximum value in the first quarter 2009). In Ukraine, the net debtor position remained at elevated levels until the end of 2009, while in Russia, the banking sector became a net creditor vis-à-vis the central bank again in the final quarter of 2009.

7. THE STRUCTURE OF EXTERNAL LIABILITIES HAS NOT CHANGED SUBSTANTIALLY FOR MOST BANKING SECTORS

7.1 MATURITY STRUCTURE LARGELY UNCHANGED IN THE MAJORITY OF BANKING SECTORS

Some CESEE banking sectors entered the crisis with a large stock of short-term debt (see Walko, 2008). As at mid-2008, short-term instruments had a very high share in banks' total external debt in Slovakia, Bulgaria and the Czech Republic. The share was elevated also in Poland, Estonia and Latvia, but lower in Hungary, Lithuania, Slovenia, Croatia, Romania, Ukraine and Russia.[82] High levels of short-term indebtedness as a percentage of GDP were recorded in Latvia, Estonia, Bulgaria and Slovakia, followed by Slovenia, the Czech Republic and Hungary. The share was rather low in the other countries.[83]

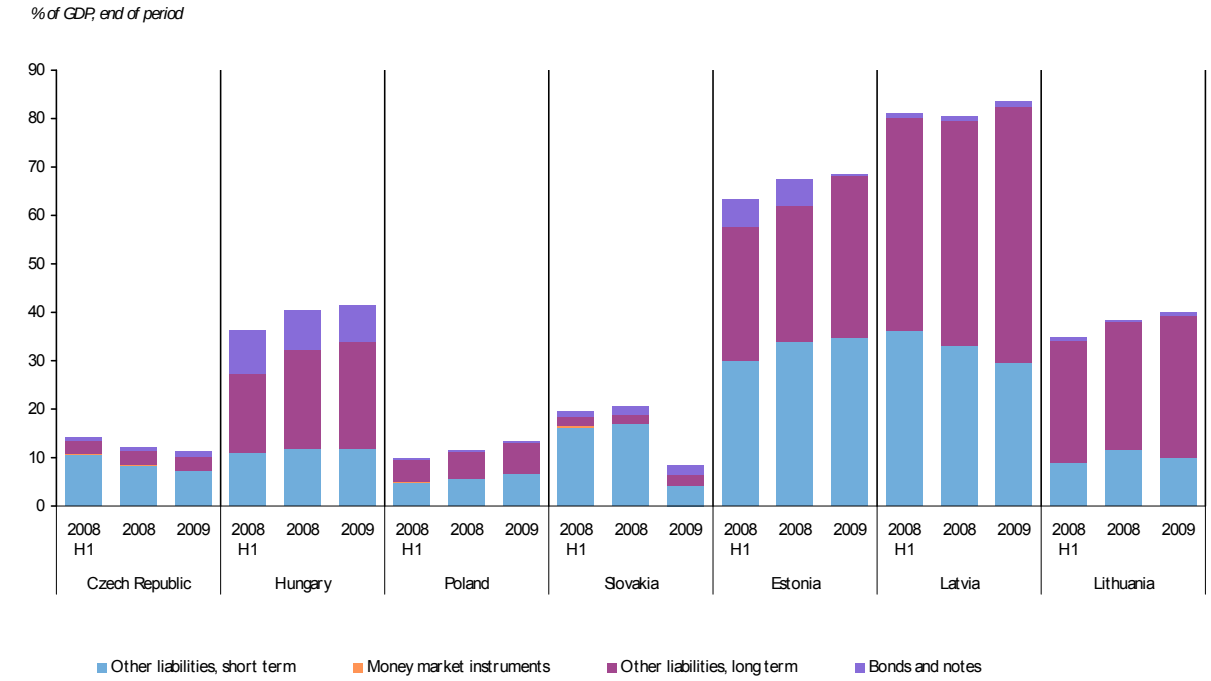
A closer look at the (available) data shows that a high share of short-term debt (on the basis of original maturity) in mid-2008 did not necessarily go hand in hand with large liability-side outflows over the subsequent one-and-a-half years. While a full-fledged analysis is restricted by data limitations (e.g. lack of information on the currency structure of external liabilities), the following developments are still noteworthy in a cross-country perspective. The Bulgarian banking sector recorded strong short-term inflows in the second half of 2008 and only a modest decline in 2009. As a result, short-term external debt – which had been very high in mid-2008 both as a percentage of total external debt and of GDP – did not decline in the review period. Measured in euro, short-term debt even increased by 12% from mid-2008 to end-2009, whereas long-term debt declined by 11%. As already noted, in Bulgaria the rollover risk was reduced because a large part of short-term debt was from Bulgarian subsidiaries to their parent banks. In Poland and Croatia, short-term debt (in terms of euro) increased at an only slightly lower rate than long-term debt. A rather modest decline in short-term debt was seen in Estonia (2% measured in euro), Hungary (3%) and Lithuania (5%). In turn, Russia, Ukraine and Slovenia saw the sharpest declines in short-term debt (50% to 60%), followed by the Czech Republic, Latvia (both around 30%) and Romania (25%).

As a result, the most marked decline in the share of short-term debt in total external debt was observed in Ukraine (by 18 percentage points to 15%). In the Czech Republic, Latvia, Romania, Russia and Slovenia, the ratio declined by about 10 percentage points. In Poland, Lithuania, Croatia and Hungary, the share of short-term debt to total external debt stayed almost unchanged, even though Poland had a relatively high ratio of short-term debt to total external debt in mid-2008. In Bulgaria and Estonia, the ratio even increased slightly. Slovakia represents a special case for the reasons mentioned above, with the share of short-term debt falling sharply to 50% of total external debt (and to 4% of GDP).

[82] In mid-2008, the share of short-term debt to total external debt amounted to 85% in Slovakia, about 75% in Bulgaria and the Czech Republic, 45% to 50% in Poland, Estonia and Latvia and 25% to 35% in Hungary, Lithuania, Slovenia, Croatia, Romania, Ukraine and Russia.

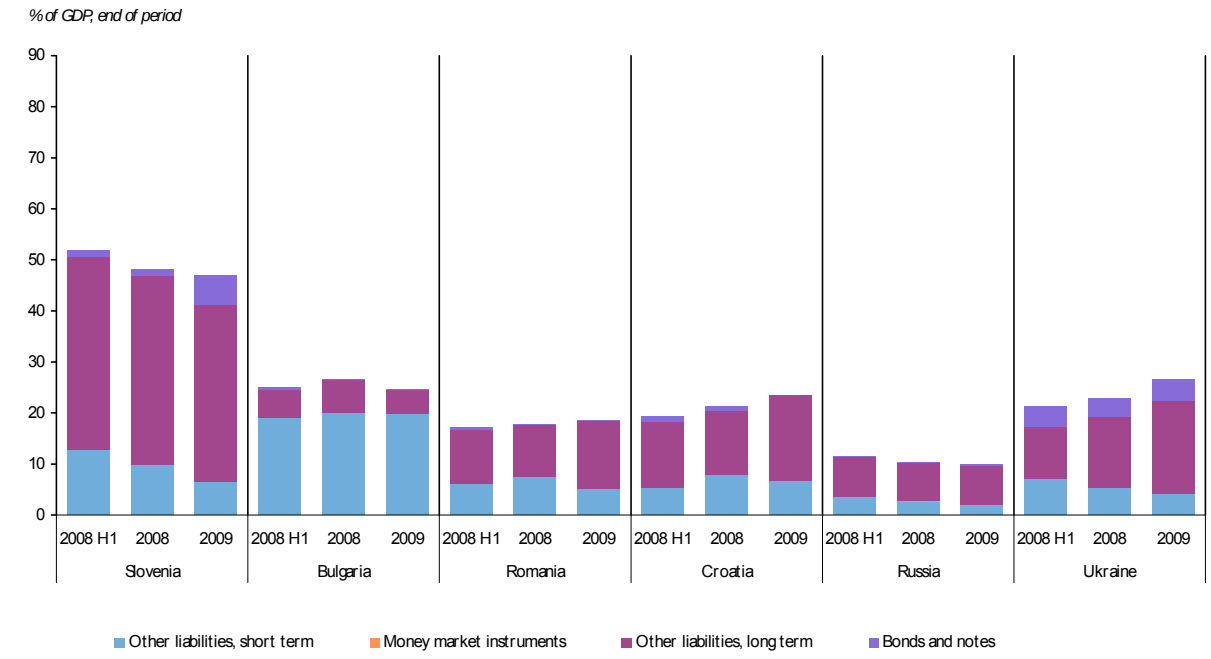
[83] In mid-2008, the share of short-term debt to GDP amounted to 36% in Latvia, 30% in Estonia, nearly 20% in Bulgaria and Slovakia, 13% in Slovenia, about 11% in the Czech Republic and Hungary and between 4% to 7% in Lithuania, Poland, Croatia, Ukraine, and Russia.

Graph 5.a: Structure of banks' external debt



Source: IMF, national central banks

Graph 5.b: Structure of banks' external debt



Source: IMF, national central banks

7.2 OTHER IINVESTMENTS MUCH MORE IMPORTANT THAN PORTFOLIO IINVESTMENTS

External liabilities continued to be dominated by loans and deposits during the review period (see charts A-2a and A-2b in the appendix). The dependence on portfolio securities remained relatively unchanged in Ukraine and

increased in Slovenia and in Hungary, where the country's biggest bank, OTP, accounts for a significant portion of this component. In Slovenia, the stock of long-term portfolio debt securities (supported by state guarantees) increased markedly as a percentage of total external liabilities in the second half of 2009, while the share of loans and deposits declined as a consequence of the sizeable outflows since the intensification of the global crisis. In Hungary, foreign holdings of portfolio equity securities became more important in 2009 and reached the highest level as a percentage of GDP (5%) in our country sample. Portfolio equity securities remained nonnegligible also in Poland (2% of GDP), but their share in total external liabilities declined due to an increase in long-term loans as well as currency and deposits.

The (still large) currency and deposits as well as loan liabilities positions also include the financing of local subsidiaries by foreign parent banks. However, the lack of systematic data on the share of parent bank funding within these components severely hampers any systematic analysis. Therefore, the next section will provide an overview of information from national central banks on parent bank funding and a proxy for parent bank funding derived from BIS banking statistics.

8. PARENT BANK FUNDIN PLAYS AN IMPORTANT ROLE

While some observers argue that the integration of CESEE banks into international banking groups attenuated the slowdown in capital inflows (Berglöf et al., 2009; EBRD, 2009), a lack of data prevents us from giving concrete figures on parent bank funding for the whole sample. Information available from national central banks and the IMF in general supports the hypothesis that parent bank funding was a positive factor during the crisis, in particular in the third and fourth quarters of 2008, when the global crisis intensified. While the role of parent bank funding is usually seen to be positive, there are still concerns that if an important parent bank experiences persistent financial tensions (which could result from market concerns about sovereign debt sustainability in the home country of that bank), these strains could also spill over to the region (see IMF, 2010a).

8.1 COORDINATED INTERNATIONAL POLICY RESPONSE BOLSTERS PARENT BANKS

The coordinated measures taken by euro area countries to support their respective banking systems proved beneficial for the CESEE region, as most home country authorities permitted parent bank support of subsidiaries (including the use of state capital injections for subsidiaries), i.e. there was no ring-fencing. Apart from the repo arrangements for Poland and Hungary mentioned above, CESEE countries outside the euro area also benefited indirectly from other measures taken by the ECB. In particular, the ECB extended liquidity support to euro area-based banks, which helped these banks continue the refinancing of their CESEE subsidiaries. As part of the euro area, Slovakia and Slovenia benefited directly from those measures. Moreover, Hungary, Latvia and Romania (and other countries in the region not covered in this study), which agreed on a multilateral support package with the IMF and the EU, benefited from the European Bank Coordination Initiative ("Vienna Initiative"), which was successful in coordinating the response of major public and private stakeholders to the financial crisis in CESEE (EBRD, 2009). As part of this initiative, EU-based parent banks pledged to keep their direct and indirect exposures and to recapitalize their CESEE subsidiaries if needed.

8.2 PUBLICLY AVAILABLE INFORMATION POINTS TO POSITIVE ROLE OF PARENT BANKS

Information from national central banks sheds further light on the issue of parent bank financing during the crisis period. According to Magyar Nemzeti Bank (MNB, 2009 and 2010), foreign parent banks increased the financing of their *Hungarian* subsidiaries by nearly EUR 3 billion in the last quarter of 2008. In 2009, the volume of external funding began to decline as a result of normalizing liquidity conditions and of balance sheet adjustments. The share of parent bank funds in total external funds rose to 60% by the end of 2009, compared to about 50% in mid-2008. The MNB argues that parent bank commitments mitigated the risks arising from the high rate of short-term foreign funding. In addition, parent banks increased their own subsidiaries' capital in numerous cases.

Naradowy Bank Polski (NBP, 2009a) reports that the risk of a withdrawal of foreign funding did not materialize in *Poland*. The largest increase in liabilities to parent entities was recorded in September and October 2008. Moreover, most Polish banks decided to retain 2008 profits in capital, and some banks also received subordinated loans from parent entities. After marked growth in the fourth quarter of 2008, funding from foreign parent entities remained at a stable level in 2009 (NBP, 2009b). Because foreign parent banks continued to renew financing provided in autumn 2008, the Polish banking sector was able to continue lending despite difficulties in obtaining long-term funding from the domestic interbank market.

According to Banka Slovenije (2009), refinancing risks related to external liabilities primarily affected domestically owned banks, which constitute a considerable part of *Slovenia*'s banking system. In the second half of the 2008, the majority of external borrowing (about three-quarters) was raised by foreign-owned banks. The

large domestic banks made debt repayments in the final quarter of 2008. Similarly, in the first two months of 2009, they again raised no new loans from abroad. As funding conditions tightened in autumn 2008, banks actively competed over interest rates on deposits by the nonbanking sectors for some time, but have only partly made up for the loss of funding from foreign banks. The banks compensated for the drop in external funding with government deposits, government-guaranteed bonds and funds raised at the ECB. In 2009, accessing external funding was still easier for foreign-owned banks than for domestically owned banks. However, the amount of newly raised loans remained below the precrisis level (Banka Slovenije, 2010).

In the case of *Bulgaria*, the IMF finds that foreign parent banks have broadly maintained their level of funding of their local subsidiaries (IMF, 2010a). In 2008, the Bulgarian National Bank requested commitment letters from foreign parents to ensure that they provide adequate liquidity and capital. (In fact, this concern was not specifically related to Bulgaria but characteristic of the region as a whole.) The IMF also stresses that the decline in total foreign funding resulted in strong competition for domestic deposits in Bulgaria (and other CESEE countries).

In *Croatia*, foreign credit inflows, mostly from parent banks, were important for maintaining bank liquidity during the most severe turbulence in international financial markets. In the first nine months of 2009, banks continued to rely on foreign sources, above all deposits of their foreign owners, to compensate for the sluggish collection of resident deposits. Stronger owner support in the form of deposits together with a slight increase in resident deposits and reliance on previously accumulated liquidity reserves enabled banks to continue their lending activities in 2009 (HNB, 2009 and 2010).

According to Lietuvos Bankas (LB, 2009), *Lithuania* avoided liquidity problems in the fourth quarter of 2008, as parent banks fully compensated the decline in domestic deposits in the case of foreign-owned banks. By contrast, domestically owned banks responded to the liquidity shock by offering substantially higher deposit interest rates. In 2008, the banking sector's debt to parent banks soared by 38% to 43% of total balance sheet liabilities, which corresponds to about 94% of the banking sector's external liabilities. During 2009, financial flows generated by a shrinking loan portfolio and by the deposits attracted were used to reduce liabilities to parent banks (see chart A-3 in the appendix). The amount of funds provided by parent banks decreased to 39% of total balance sheet liabilities at end-2009 (LB, 2010). However, as a percentage of external liabilities, the share of parent bank funds increased to 98%. At the same time, domestically owned banks actively competed in the deposit market by offering high interest rates (LB, 2010).

Eesti Pank reports that in autumn 2008, *Estonian* banks were able to compensate the slight decrease in deposits by drawing additional funds from parent banks where necessary (Eesti Pank, 2008). At a later stage, the funding needs of banks decreased in line with demand for new lending. Furthermore, Eesti Pank states that the parent banks of larger market participants had sufficient access to wholesale funding and were able to provide funding to their subsidiaries in Estonia. Nevertheless, the competition for domestic deposits increased (Eesti Pank, 2010). In February 2009, Eesti Pank entered into a precautionary arrangement with the Swedish central bank to enhance its capabilities to provide liquidity under the currency board regime in place in Estonia. According to Eesti Pank, the arrangement was a step to complement high liquidity and capital buffers of Swedish banks' branches and subsidiaries operating in Estonia.[84]

The financial stability reports of Latvijas Banka also give interesting insights into the role of parent bank funding in *Latvia*, as they contain explicit information on the developments of assets and liabilities of subsidiaries of both foreign-owned and domestically owned banks (Latvijas Banka, 2009 and 2010). In the fourth quarter of 2008, foreign-owned banks received additional funds from their parent banks. At that time, domestically owned banks were confronted with large-scale outflows of nonresident deposits (their dominant funding source) and repayments of syndicated loans. Deposit outflows had to be compensated by central government deposits (deposited at Parex banka, the country's second-largest bank, which the state had to take over during the crisis). In 2009, liabilities of foreign-owned banks to their parent banks decreased mainly on account of a contraction of the loan portfolio and an increase of paid-up and subordinated capital. For domestically owned banks, the structure of funding was notably affected by a further decrease in deposits as well as by repayments of syndicated loans. The amount of Treasury deposits with Parex banka stayed largely constant over the year 2009.

In *Russia,* banks on an aggregate level experienced sizeable outflows and large government-controlled banks were hardly in a position to access external funding markets in 2009, but subsidiaries of foreign banks raised additional funds from their parent institutions. Banks with foreign stakeholdings in authorized capital proved more resilient to the financial crisis due to their conservative strategies and support from parent banks (Bank of Russia, 2010).

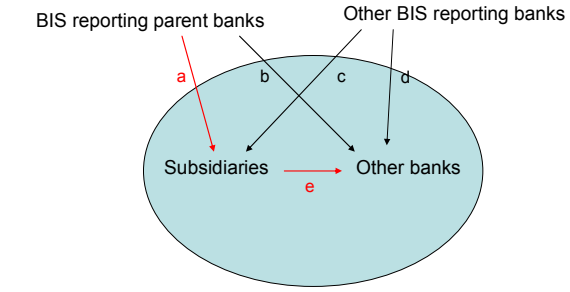
Ukraine faced severe balance-of-payments pressures, but according to the IMF, foreign banks have been able to secure funding from their parents (IMF, 2009b).

[84] http://www.eestipank.info/pub/en/press/Press/pressiteated/pt2009/_02/pt0227

8.3 A PROXY FOR PARENT BANK FUNDING

BIS banking statistics also confirm that parent banks have continued to support their subsidiaries and branches in CESEE and have been a more stable source of funding than other external sources. As the BIS banking statistics do not include a direct measure for claims of parent banks vis-à-vis their CESEE subsidiaries, we construct a proxy by using the difference between BIS locational statistics on an immediate borrower basis (which do not net out intragroup lending) and BIS consolidated statistics (which do). This proxy no doubt has certain shortcomings and has to be used with caution, because first, the population sample of locational and consolidated statistics is different,[85] and second, item e in chart 6, i.e. foreign currency lending from subsidiaries to other banks, cannot be singled out so that the proxy underestimates the claims of parent banks towards their subsidiaries. Thus, when looking at developments over time, the proxy is particularly biased if subsidiaries of foreign parent banks are to a large extent involved in interbank foreign currency lending and this component shows strong fluctuations. Third, the locational statistics include cross-border claims of BIS reporting banks vis-à-vis central banks while the consolidated statistics do not. However, the amount of these claims is usually negligible. Fourth, the proxy underestimates parent bank funding, if parents partly finance their CESEE subsidiaries via non related entities located in a financial center (round-tripping of funds).

Graph 6: A proxy for parent bank funding on the basis of positions vis-à-vis banks



Locational = a + b + c + d

Consolidated = b + c + d + e

Proxy = Locational – Consolidated = a - e

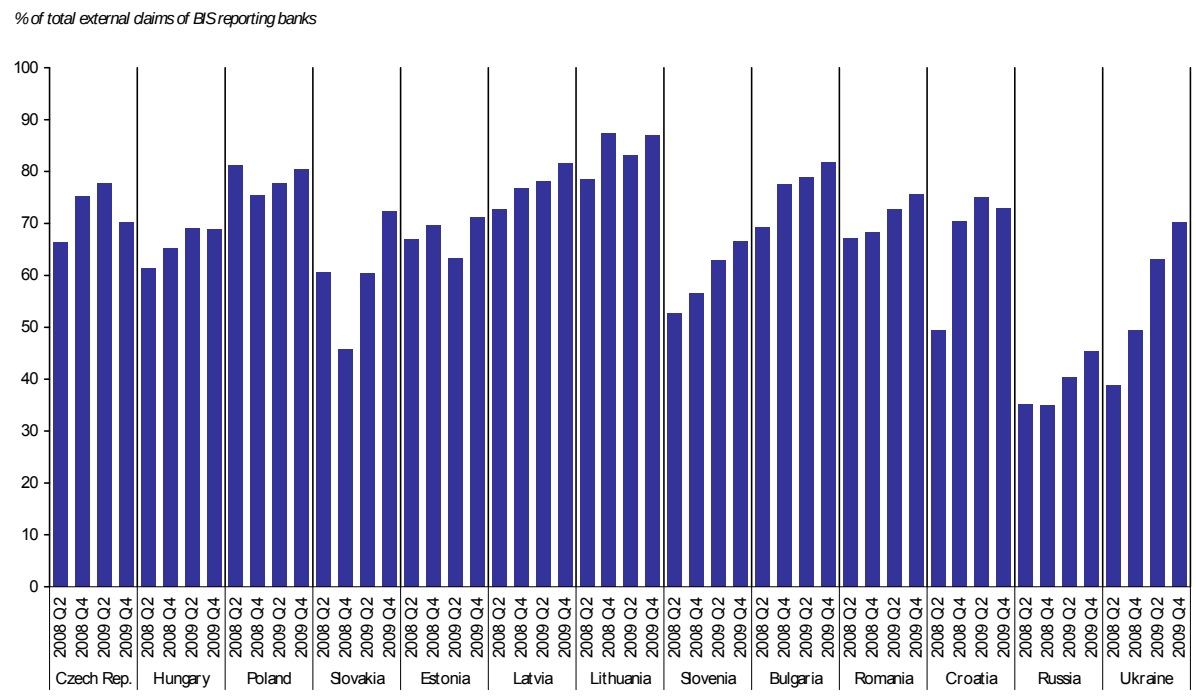
Note: e comprises only foreign currency interbank lending

Source: BIS 2008a, 2008b and 2009, author's considerations

Despite its shortcomings, this proxy is to our knowledge and assessment, the best option available. Interestingly, the share of intragroup lending to subsidiaries in total external claims of BIS reporting banks increased vis-à-vis all CESEE banking sectors from mid-2008 until end-2009. It is also noteworthy that this increase (from comparably low levels) was particularly strong in Slovenia, Russia and above all in Ukraine, i.e. in banking sectors which experienced severe total outflows. Only in the case of Poland does the proxy indicate that the share of parent bank lending to domestic subsidiaries in total external claims of BIS reporting banks declined in the second half of 2008, which does not appear to be in line with the observations reported by the NBP (see above). According to the NBP, parent bank funding increased markedly in the fourth quarter of 2008.

[85] BIS locational statistics comprise 42 reporting countries, while BIS consolidated statistics cover only 30 countries. The following countries are included in the locational statistics but not in the consolidated statistics: Bahamas, Bahrain, Bermuda, Cayman Islands, Cyprus, Guernsey, Isle of Man, Macao SAR, Malaysia, Netherlands Antilles, South Africa, South Korea.

Graph 7: A proxy for parent bank lending to CESEE subsidiaries



Source: BIS, OeNB calculations

9. CONCLUDING REMARKS

In this paper, we present systematic regional and cross-country information about the refinancing structure of the banking sectors in 13 CESEE countries, namely the CESEE EU Member States, Croatia, Ukraine and Russia. Our goal was to present the most recent data available (covering the period from mid-2008 until end-2009) and to focus on the situation following the intensification of the financial crisis.

Sizeable net external liabilities that had accumulated in the years prior to the crisis in most CESEE countries under review raised concerns that liquidity and refinancing risks for banking sectors in this region could materialize in an environment of deteriorating global funding conditions. We have examined whether these risks have materialized.

Our analysis shows that, notwithstanding the severe global financial turbulences, the majority of CESEE banking sectors received additional funds from abroad (in net terms) in the third and fourth quarters of 2008. Taking together these two quarters, outflows were seen only in Russia, Slovenia, the Czech Republic and Latvia. Yet, in the course of 2009, liability-side net capital flows to banks (at least temporarily) turned negative (or remained negative) in all countries except Poland. However, the size of these outflows differed considerably across banking sectors.

Looking the whole review period, our findings suggest that the outflows affected above all banking sectors that had very high net foreign liabilities at the onset of the crisis (i.e. in the Baltic countries, particularly Latvia and Estonia) and banking sectors with comparatively low levels of foreign ownership (Slovenia, Ukraine and Russia) Moreover, external assets helped to cope with external financing constraints in most countries except Russia and Ukraine.

Information available from national central banks as well as a proxy for parent bank funding, which we derived from BIS banking statistics, suggest that foreign-owned banks were indeed supported by their parent institutions (mostly euro area-based banks). In particular, there is substantial evidence that foreign ownership reduced the rollover risk in those cases in which short-term loans were mostly from parent banks.

As a result, the maturity structure of external debt did not change substantially across the country sample during the review period. Hence, it seems that, for the stability of funding, creditors (and their relationship with the debtors) are at least as important as the maturity structure of refinancing. These findings – larger outflows in case of initially larger net foreign liabilities and the positive role of parent bank funding – are confirmed by the results of other recent studies reviewed in section 2.

In some countries, the provision of additional funds from parent banks helped to compensate for temporary deposit withdrawals or a stagnation of the deposit base (particularly in Lithuania, Estonia, Croatia). In other countries, the banking sectors – on an aggregate level – were confronted with external funding constraints and deposit withdrawals at the same time (Russia, Ukraine). It should be noted, however, that disaggregated information in countries with a low level of foreign ownership suggests that foreign-owned banks found it easier to obtain external funds than domestically owned banks. As a consequence of external funding constraints (in particular wholesale funding), the competition for domestic deposits increased. Some national central banks report that particularly domestically owned banks actively competed for deposits by offering higher rates, while in other countries all banks intensified their efforts to attract deposits irrespective of their ownership.

Against the background of still relatively high net external liabilities, most CESEE banking sectors will remain confronted with considerable rollover needs over the next few years. In fact, some of them remain highly dependent on external financial resources. Those banking sectors that were able to roll over most of their short-term debt during the last two years obviously still have a large share of short-term external debt on their balance sheets. The nature of the refinancing structure (i.e. strong capital base, low dependence on capital markets, substantial funding from parent banks with a strong commitment to the region) is likely to mitigate refinancing risks, as it has so far in the financial crisis, in particular as long as parent banks remain in a position to fund their subsidiaries.

It is unlikely that the precrisis levels of new external financing in the form of parent bank and wholesale funding will be reached again for some time. On the supply side, large refinancing needs in the global banking sector, especially in the euro area, over the coming years (BIS, 2010; IMF, 2010c) might constrain the provision of additional funds to affiliated and nonaffiliated banks abroad and/or make these funds more costly. On the demand side, low private sector credit demand in the early stage of the still fragile recovery implies that the need for external funds by banks active in CESEE will remain subdued as well, in particular in the short run. This seems especially relevant for countries that are lagging behind in economic recovery. Nevertheless, net external liabilities will remain an important refinancing item, given that their levels are still high – a shift to a larger share of domestic funding can only be expected to be gradual for most CESEE countries.

What do our results suggest in terms of policy implications? Generally, from a funding perspective, the strategy of integrating CESEE banking sectors in European banking groups was successful in mitigating the impact of external shocks during this particular crisis episode. Public assistance (multilateral support packages for several CESEE countries as well as access to government support mechanisms and ECB liquidity by euro area parent banks) certainly helped parent banks to support their subsidiaries. Moreover, the Vienna Initiative reduced the risks of a negative equilibrium, as it ensured that banks had incentives to stay in the region and the reassurance that other banks would not withdraw, either.

The commitment of parent banks vis-à-vis their subsidiaries rests on several underlying factors. Parent banks perceive the CESEE region as extended home markets, not least because of the expected higher long-term profitability in these countries. Moreover, parent banks are eager to avoid endangering their reputation by suddenly withdrawing funds from subsidiaries (reputational risk). These factors can be expected to remain in place, suggesting that parent banks are likely to play a positive role also in possible future crises in the region as a whole or in individual countries.

This experience made in the more advanced CESEE countries may be relevant for other emerging economies, in which not all major banks have been privatized so far. However, Vogel and Winkler (2010) come to the conclusion that foreign banks did not keep cross-border bank flows stable to emerging markets in general and that CESEE countries have been different due to the special context of European integration. Moreover, the strategy of integrating national banking sectors into cross-border banking networks is not without risk. Financial strains can spill over to the host country if an important parent bank faces major financial difficulties.

Our findings also show that overly high net external liabilities were usually associated with more pronounced capital outflows from the banking sectors (in particular wholesale funding) during the crisis. This is one of the reasons why it would seem useful to consider policy measures to limit net external liabilities in phases of dynamic growth and financial sector development. While this study has focused on liability-side risks, proposals for regulatory measures also have to take into account the asset side (in particular, which kinds of loans do banks refinance with the different funding sources?) and, more generally, overall macrofinancial stability (for example, does domestic credit growth go hand in hand with large external imbalances?).

A direct way to address the issue of overly high net external liabilities in the banking sector would be to introduce a ratio of net external liabilities to banking assets.[86] This ratio, which would not include equity provided by foreign investors, would ensure that banks limit the size of external liabilities and/or build up sufficient external asset buffers. Such a measure could be particularly useful to limit the build-up of external liabilities for the purpose of funding domestic foreign currency loans to households, which typically cannot borrow cross-border. In a similar vein, Shin (2010) proposes to introduce a noncore liabilities tax as a tool to dampen the procyclicality of the financial system especially for emerging economies (core liabilities are essentially retail deposits and money market funds). In banking sectors, in which noncore liabilities mainly consist of external liabilities, this would have similar implications as a net external liability ratio. In fact, a net external liability ratio could be interpreted as a special case of a noncore liability tax, where the tax rate is zero up to a permitted threshold (which then would have to be defined in net terms) and infinite beyond that threshold. Alternatively, authorities could introduce a ratio of banks' liquid foreign currency claims to foreign currency liabilities – a measure that is already in place in Croatia. Another option would be to tax or limit (via prudential measures) foreign currency lending to reduce the need for external funds.

In turn, measures that aim at reducing lending in foreign currency should be accompanied by the development of local currency and capital markets. In fact, the EBRD already launched a Local Currency and Local Capital Markets Initiative in May 2010 (for more details see EBRD, 2010). This initiative aims at supporting and complementing the actions of many governments to build up local sources of funding and reduce the use of foreign exchange in the domestic financial system. These policy measures will have an impact on the refinancing structure of banking sectors in the region over time, as they will most likely induce CESEE banks to raise more domestic deposits and/or to issue more local currency-denominated bonds.

Overall, the financial crisis has put the CESEE banking sectors and their refinancing strategies to a severe test. Despite considerable differences across countries, CESEE banking sectors have weathered this shock without experiencing a meltdown in any country. Our study confirms that the integration of many CESEE banks into European banking networks has been a stabilizing factor at the height of the crisis, a finding that is also supported by other most recent papers. However, the experience gained from the crisis also suggests that, looking forward, policymakers should consider measures to avoid an overly high build-up of net external liabilities.

[86] To avoid circumventions, this ratio could also include local currency bonds issued by banks domestically through private placements that are acquired by foreign investors. Moreover, the ratio could also include domestically issued foreign currency bonds.

While the situation of CESEE banking sectors has started to stabilize more recently, the overall situation continues to be diverse and some fragilities are remaining. Therefore, in order to safeguard overall macrofinancial stability in the region, the refinancing developments of CESEE banking sectors still need to be monitored and analyzed.

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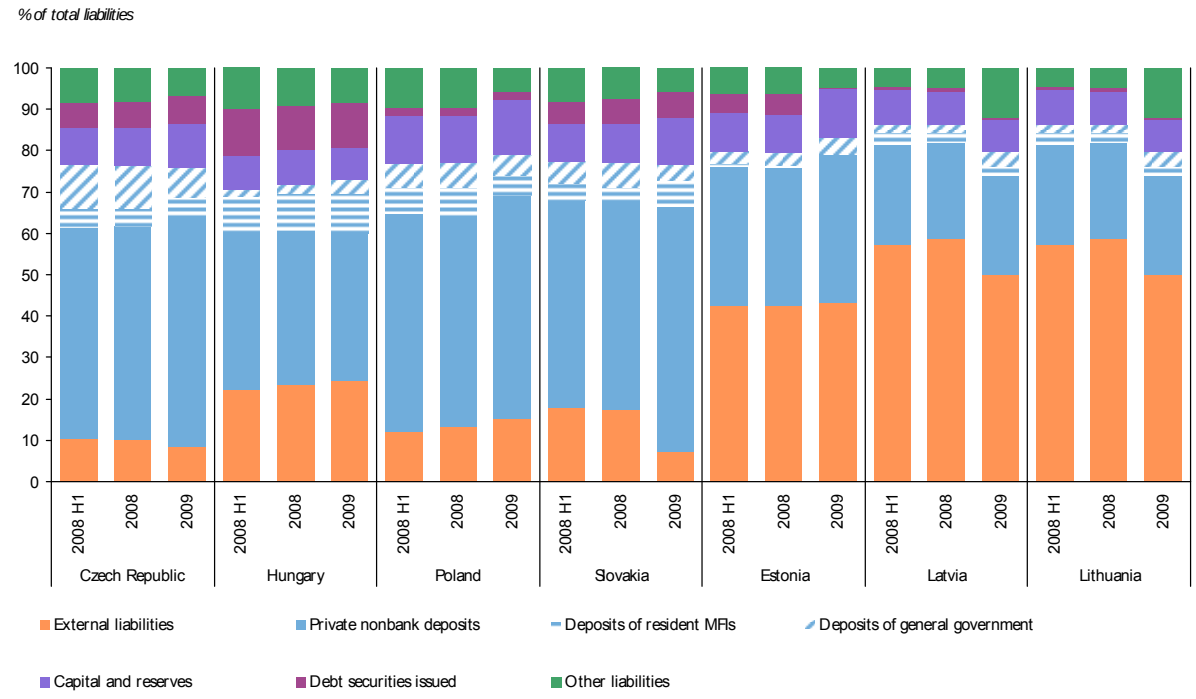
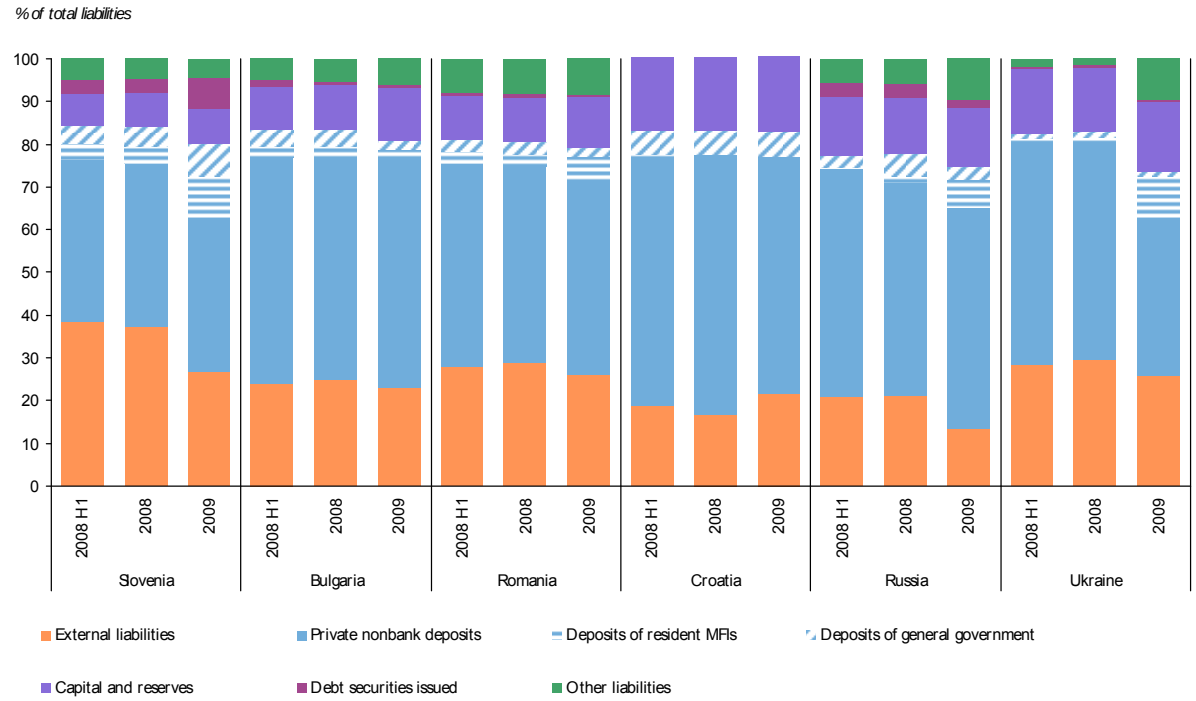
APPENDIX

Graph A-1.a: Gross liabilities



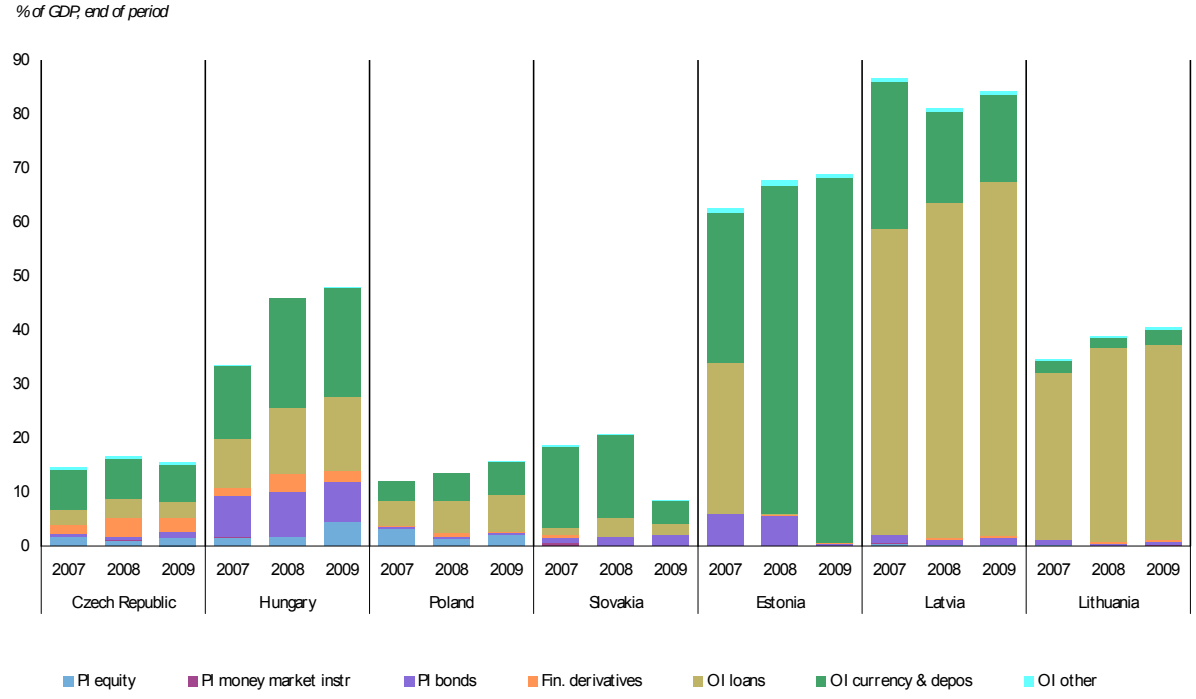
Source: National central banks

Graph A-1.b: Gross liabilities



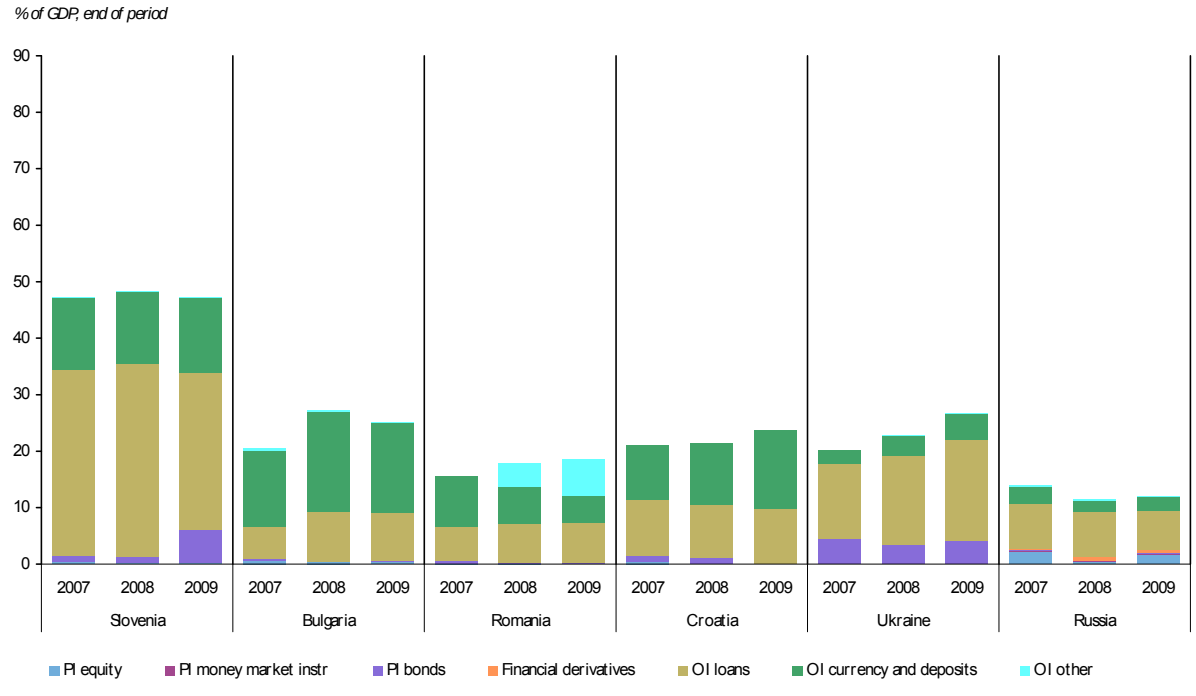
Source: National central banks

Graph A-2.a: Structure of banks' external liabilities



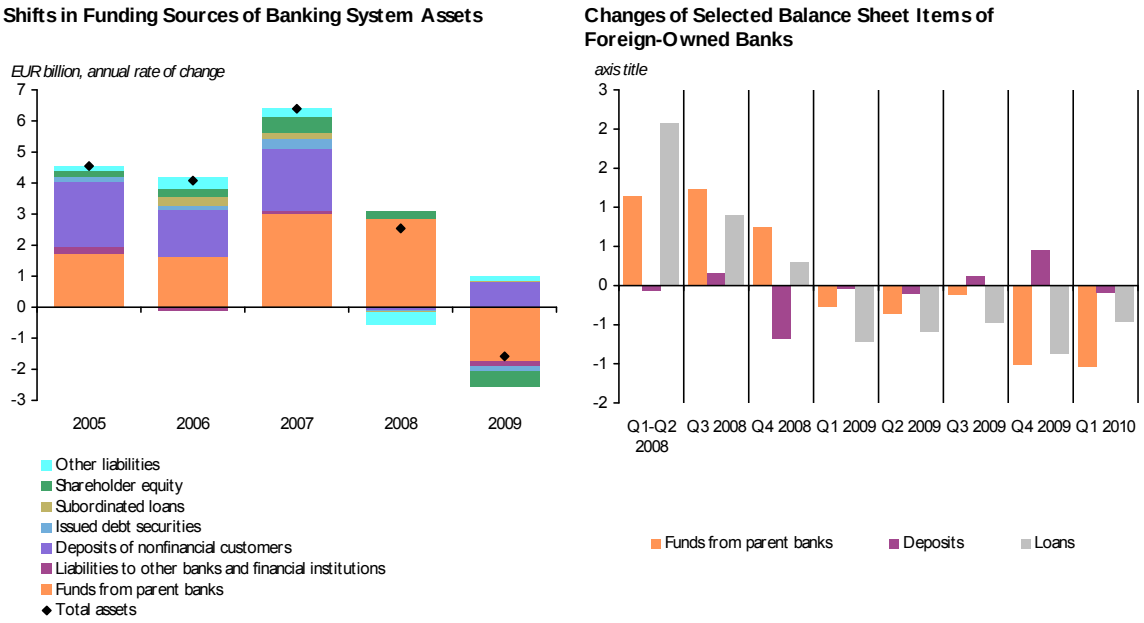
Source: IMF, national central banks
Note: PI = portfolio investments, OI = other investments. FDI-related positions are not included due to lack of data.

Graph A-2.b: Structure of banks' external liabilities



Source: IMF, national central banks
Note: PI = portfolio investments, OI = other investments. FDI-related positions are not included due to lack of data.

Graph A-3: Parent bank funding: The case of Lithuania



Source: Lietuvos Bankas calculations