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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 debt 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.¹

The baseline panel specification can be written as

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

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

¹In what follows, we consider the pre-crisis period to be 2001-2007 and the crisis period [within our data span] to be 2008.

dummy, γ_{ij} is a country-pair fixed effect ($\gamma_{ij} \Leftrightarrow \gamma_{ji}$), 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 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 baseline specification we examine an expanded specification that includes regional dummies

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

where $EU27_{ij}$ takes a value of 0 before 2003 and 1 subsequently if both source and host countries belong to the European Union.² 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 $NATO$ membership in a given year as another type of institutional linkage that may bind source and host countries, which may be especially relevant for non-EU destinations in emerging Europe.³

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

$$\begin{aligned} \Delta \ln(A_{ij}) = & \alpha_i + \alpha_j + \gamma \ln(A_{ij2007}) + \lambda \ln(DIST_{ij}) \\ & + \varpi BORD_{ij} + \mu EU27_{ij} + \eta EA_i + \pi NATO_{ij} + \varepsilon_{ijt} \end{aligned} \quad (3)$$

²Although the new member states did not join the European Union until 2004, we start the dummy in 2003 to allow for anticipation effects.

³NATO 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).

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*, *EA* and *NATO* 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 2001.⁴ 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.⁵

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

⁴A trial survey was conducted in 1997 with only a limited number of reporting countries.

⁵Due 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.

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.

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.⁶

4. Empirical Results

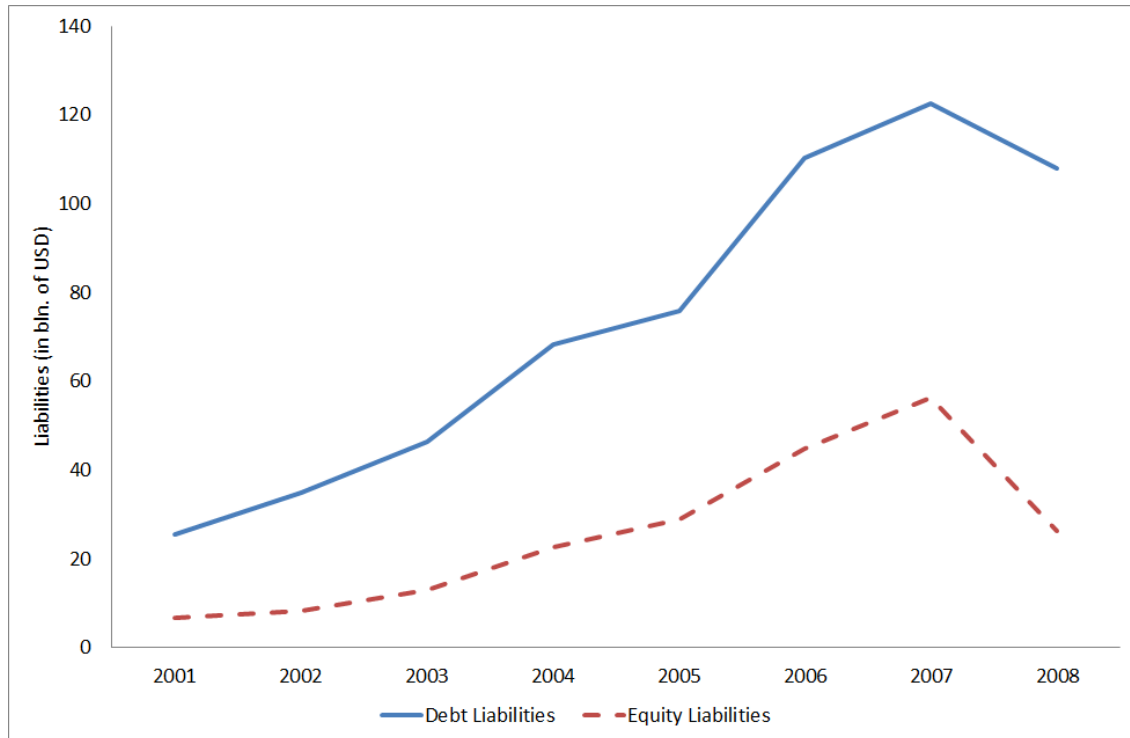
4.1. Stylized Facts

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

⁶The 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.

especially severe for portfolio equity liabilities.

Figure 1: Portfolio Debt and Equity Liabilities of NMS



Note: Author's calculations based on CPIS data.

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 2001-2007.⁷ 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.⁸ 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.

⁷Bulgaria had the highest level of debt as a share of GDP among all NMS in 2001.

⁸Hungary experienced an increase of 3.7 percentage points.

Table 1: Summary of Aggregate Positions: 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 |

Note: Stock of portfolio debt liabilities, expressed as a percentage of GDP. 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 of portfolio equity liabilities, expressed as a percentage of GDP. 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.⁹ 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.¹⁰ The Slovak Republic is the only country that receives most of its equity funds from other new member states.

⁹These countries do not include new members of the EU that joined in 2004. The sample of countries varies among destination countries.

¹⁰These 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: Regional 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: Regional shares in total equity liabilities. Authors' calculations based on CPIS. The sample of source countries varies among destination countries.

4.2. Panel Estimates: 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, $R^{2, \text{control}}$ 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^{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 (0.03)* | 0.05 (0.03)* | 0.05 (0.03)* | 0.08 (0.06) | 0.08 (0.06) | 0.08 (0.06) |
| er.vol. | 6.71 (8.37) | 7.07 (8.46) | 7.03 (8.48) | 4.93 (12.42) | 4.93 (12.42) | 4.95 (12.41) |
| EU27 | | 0.08 (0.21) | 0.02 (0.21) | | -0.30 (0.66) | -0.43 (0.62) |
| EA | | 0.07 (1.08) | -2.62 (0.94)*** | | 0.22 (0.70) | -0.19 (1.03) |
| NATO | | | 0.18 (0.19) | | | -0.06 (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. $R^{2, \text{control}}$ 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. $R^{2, \text{marginal}} = 1 - \text{RSS}/\text{RSS}^{\text{control}}$, 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 (0.02) | -0.01 (0.02) | -0.01 (0.02) | 0.02 (0.05) | 0.02 (0.05) | 0.01 (0.05) |
| er.vol. | 8.66 (9.33) | 11.12 (9.47) | 11.18 (9.47) | 5.79 (11.80) | 5.79 (11.80) | 6.00 (11.81) |
| EU27 | | 0.54 (0.21)** | 0.55 (0.22)** | | 2.89 (0.72)*** | 1.00 (0.87) |
| EA | | 2.79 (1.05)*** | -0.08 (1.28) | | 3.23 (1.07)*** | 1.95 (0.78)** |
| NATO | | | -0.06 (0.21) | | | -0.24 (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. $R^{2, \text{control}}$ 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. $R^{2, \text{marginal}} = 1 - \text{RSS}/\text{RSS}^{\text{control}}$, 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, $R^{2, \text{control}}$ 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^{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 (0.03)*** | -0.16 (0.03)*** | -0.16 (0.03)*** | -0.22 (0.06)*** | -0.21 (0.06)*** | -0.21 (0.06)*** |
| distance | -0.27 (0.13)** | -0.01 (0.14) | -0.01 (0.14) | -0.44 (0.22)** | 0.01 (0.24) | 0.01 (0.24) |
| border | | 0.85 (0.32)*** | 0.85 (0.32)*** | | 1.23 (0.48)** | 1.23 (0.48)** |
| EU27 | 0.04 (0.22) | 0.12 (0.22) | 0.17 (0.23) | -0.32 (0.82) | 0.18 (0.73) | 1.26 (0.29)*** |
| EA | 0.32 (0.43) | 0.63 (0.46) | 0.67 (0.57) | 0.18 (0.80) | 0.35 (0.76) | 0.35 (0.76) |
| NATO | | | -0.15 (0.21) | | | -1.07 (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. $R^{2, \text{control}}$ 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. $R^{2, \text{marginal}} = 1 - \text{RSS}/\text{RSS}^{\text{control}}$, where RSS is the residual sum of squares. Stock₂₀₀₇ 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) but not in column (6). This makes sense since NATO membership is not an important differentiating factor across members of the European Union, whereas it may represent an institutional anchor for non-EU countries in emerging Europe.

Table 8: Cross-sectional Regressions: Portfolio Equity Liabilities

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| stock ₂₀₀₇ | -0.35 (0.05)*** | -0.35 (0.05)*** | -0.35 (0.05)*** | -0.31 (0.06)*** | -0.32 (0.06)*** | -0.32 (0.06)*** |
| distance | -0.71 (0.15)*** | -0.64 (0.16)*** | -0.62 (0.15)*** | -0.84 (0.24)*** | -0.61 (0.24)** | -0.61 (0.24)** |
| border | | 0.25 (0.32) | 0.27 (0.32) | | 0.59 (0.50) | 0.59 (0.50) |
| EU27 | 0.02 (0.25) | 0.05 (0.26) | -0.18 (0.25) | -3.79 (1.01)*** | -1.87 (0.69)*** | -4.97 (0.89)*** |
| EA | 0.95 (0.69) | 2.73 (0.66)*** | 1.23 (0.72)* | 2.32 (0.56)*** | 2.89 (0.74)*** | 4.38 (1.33)*** |
| NATO | | | 0.53 (0.25)** | | | 1.50 (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. $R^{2, \text{control}}$ 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. $R^{2, \text{marginal}} = 1 - \text{RSS}/\text{RSS}^{\text{control}}$, where RSS is the residual sum of squares. Stock₂₀₀₇ 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 has been to examine shifts in 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 debt 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 equity 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. Over time, it will be important to revisit our estimates once later generations of the data are released, since the end-2008 data only capture the initial stages of the global crisis.

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