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Abstract

There has been considerable bilateral variation in the pattern of portfolio capital flows during the global financial crisis: for a given destination, investors from different countries adjusted their holdings to different degrees. We show that the size of the initial bilateral holding, geographical distance, common language, the level of trade and common institutional linkages help to explain the pattern of adjustment. These bilateral factors are more important for equities than for bonds and for investors from developing countries than for investors from advanced countries.

Keywords: International capital flows, International portfolios, External adjustment

JEL classification: F30, F41, G15

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1. Introduction

The global financial crisis provides a new testing ground for understanding the behaviour of international investors. At the aggregate level, Milesi-Ferretti and Tille (2011) have examined the dramatic decline in gross capital flows during the crisis, while Lane and Milesi-Ferretti (2011) have studied the contraction in net capital flows.

However, it is also informative to examine shifts in the behaviour of bilateral capital flows during the crisis. In particular, the dynamics of bilateral holdings 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. 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). 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.

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.

The literature that empirically analysed 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 (2006), Lane and Milesi-Ferretti (2007, 2008) 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 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 or a particular source country increasing/decreasing allocations to all destinations) in order to focus more narrowly on the variation across country pairs in portfolio dynamics.

We explore variation across country pairs in relation to portfolio adjustment during the initial phase of the crisis period between end-2007 and end-2009. 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?

For the crisis period, we find that the bilateral composition of the shift in portfolio positions during the crisis can be linked to several factors. First, there was a “reversion to the mean” effect in that investors disproportionately dis-invested from those destinations in which the pre-crisis levels of relative bilateral holdings were the largest. Second, the decline in bilateral holdings was larger, the greater the distance between investor and destination countries. There is also some evidence that the levels of bilateral trade and common language ties also played a role in determining shifts in bilateral holdings. Finally, it also appears that institutional linkages (common membership of various types of regional blocs) are also correlated with bilateral portfolio dynamics. At a general level, we note that these bilateral factors are relatively more important for portfolio equity holdings than for portfolio debt holdings and have greater explanatory power for investors from developing countries than for investors from advanced economies.

The evidence in this paper is consistent with the patterns found by De Haas and Van Neeltje (2011) for bilateral bank lending during the crisis. In particular, these authors find that bank lending during the crisis was declining in the geo-

graphical distance between creditors and debtors. It is also consistent with the portfolio evidence in Galstyan and Lane (2011). However, that paper only considered a limited set of destination countries (Eastern Europe) and was confined just to the 2007-2008 period, whereas the current paper covers 2007-2009.

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 Approach

The purpose of the paper is to uncover whether bilateral linkages influenced capital flows during the crisis period. The shifts in portfolio over the crisis period are analysed by the following model

$$\begin{aligned} \Delta \ln(A_{ij}) = & \alpha_i + \alpha_j + \gamma \ln(A_{ij2007}) + \mu \ln(IMP_{ij}) + \lambda \ln(DIST_{ij}) + \eta LANG_{ij} \\ & + \varpi EA_{ij} + \chi EU27_{ij} + \pi NAFTA_{ij} + \phi ASEAN_{ij} + \varepsilon_{ij} \end{aligned} \quad (1)$$

where $\Delta \ln(A_{ij})$ is the log change in bilateral portfolio holdings between end-2007 and end-2009, α_i and α_j are source-country and destination-country dummies, $\ln(A_{ij2007})$ is the outstanding log bilateral portfolio position at end-2007, $\ln(IMP_{ij})$ is the log of bilateral imports in 2007, $\ln(DIST_{ij})$ is the log of bilateral distance, $LANG_{ij}$ is a dummy for common language, and EA_{ij} , $EU27_{ij}$, $NAFTA_{ij}$ and $ASEAN_{ij}$ are dummies for which take the value 1 if both source and destination countries are members of the corresponding regional blocs (euro area, European Union, NAFTA and ASEAN respectively) and 0 otherwise.

The source and host country fixed effects capture common portfolio dynamics during the crisis: α_i captures the change in aggregate foreign portfolio asset holdings by source country i , while α_j captures the change in the aggregate foreign portfolio liability position of destination country j . Holding fixed these aggregate dynamics, the changes in bilateral positions can be related to bilateral characteristics. Since the magnitude of the bilateral adjustment during the crisis period might be directly related to the scale of the initial bilateral exposure, we have included end-2007 level of bilateral asset holdings as a control variable. Ge-

ographical factors proxy bilateral trade and information costs and are captured by bilateral imports, bilateral distance and the common language dummy.

Two specifications are estimated: with and without the set of bloc membership dummies. In the first instance, we estimate the model by simple OLS. Then, the analysis is extended to allow for “non-spherical disturbances”. In this case, we assume that the error term is composed of two components: one component affects the bi-directional flow of capital, while the other affects the unidirectional flow only, $e_{ij} = \varepsilon_{ij} + u_{ij}$. We assume that ε_{ij} and u_{ij} are orthogonal, but ε_{ij} and ε_{ji} are not. This implies a set of non-zero off-diagonal elements. Furthermore, it is reasonable to maintain that the variance of e_{ij} is source-country specific: $\sigma_i^2 \neq \sigma_k^2$. In this case, OLS is inefficient and we estimate the regressions using GLS.

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 2001.¹ We look at the changes in portfolio holdings between end-2007 and end-2009. We focus on long-term portfolio debt assets and portfolio equity assets.²

It is important to be aware of the limitations of the CPIS data (see the extensive discussion in Lane and Milesi-Ferretti 2008). 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 only captures the initial destinations - it cannot “look through” intermediated holdings in financial centers that are ultimately re-invested in other destinations. (As is standard in the literature, we drop the major offshore financial centers from the sample for this reason.) 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 in-

¹A trial survey was conducted in 1997 with only a limited number of reporting countries.

²The CPIS also provides data on short-term portfolio debt assets but the coverage of these holdings is very sparse.

stance, 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, so 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.

In terms of the other variables, the level of bilateral imports is calculated from the IMF's *Direction of Trade Statistics* database. The distance and language variables are taken from CEPII *Distances* database.

We consider several sample variations. The broadest sample includes all reporting countries. In addition, we also split the set of source countries between advanced economies and developing economies.

4. Empirical Analysis

4.1. Bilateral Patterns

To illustrate the importance of bilateral variation in portfolio dynamics, Figures 1 and 2 show a subset of the residuals from a panel regression of $\Delta \ln(A_{ij})$ on host and source country effects only (which removes aggregate common factors from the data). As an example, we choose the US as the source country in the case of assets and the host country in the case of liabilities. The downward diagonal bar captures the bilateral component of US assets, while the upward diagonal bar captures the bilateral component of US liabilities. To make the graph readable, negative states are highlighted in red. Numbers on top of the bars indicate the initial position in billions of US dollars. For instance, the growth rate of US long-term debt asset holdings in Argentina that is due to the bilateral component is 40 percent while the growth rate of US long-term debt liabilities is 126 percent. It is

clear from the graphs that the bilateral component of the dynamics in portfolio holdings is quite substantial.

4.2. Long-Term Portfolio Debt: OLS Estimates

Table 1 presents the OLS estimates for the logarithmic change in debt assets. In all of the specifications, the initial position enters with a negative and statistically significant coefficient: the larger the initial stock of assets, the faster the capital flight. A possible interpretation is that entities with larger positions faced higher pressure to exit. Another interpretation is that large initial positions may have indicated an over-investment that required rapid correction during the crisis.

In the full sample, the coefficient on imports is positive and statistically significant, implying that shifts in the bilateral composition of portfolio debt holdings can be linked to cross-country variation in the level of bilateral trade. The geographical proximity matters as well: countries that are further away run faster. The latter can be rationalized within an information costs framework. In terms of common membership of regional blocs, columns (2) and (4) indicate that common membership of the euro area was associated with less capital flight.

To get a sense of the magnitude of these coefficients, consider a scenario in which two countries are identical except one of the countries has twice the initial capital stock. A coefficient of -0.29 [column (2)] implies bilateral capital flight was 20 percent higher.³ Similarly, if trade is twice that of an otherwise identical country, the bilateral capital outflow was 3 percent smaller. Countries that are twice the distance of close neighbors are estimated to experience a larger capital outflow to the tune of 15 percent. Finally, regional groups also facilitates a buildup of foreign assets. In case of the euro area, the differential is 44 percent while the differential is 29 percent for the EU.

$R^2_{control}$ 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

³ $\Delta \ln stock_{2.stock_0} - \Delta \ln stock_{stock_0} = -0.29 \ln(2) = -0.2$.

variance of the dependent variable. It is instructive to see the non-negligible impact that bilateral characteristics have on debt flows. Finally, $F(\text{blocs})$ captures the joint significance of regional blocs: these blocs are jointly important for the total sample and a sub-sample of advanced countries.

4.3. Portfolio Equity: OLS

Table 2 describes the OLS results for the portfolio equity category. As was the case for portfolio debt, the initial position enters with a negative and statistically significant coefficient in all of the specifications. In all samples, the coefficient on imports is positive and statistically significant. Geographical proximity matters as well: countries that are further away run faster. Although the language dummy was not significant in the case of debt flows, it has a non-negligible impact on the bilateral flow of portfolio equity.

As with debt assets, consider a scenario, where two countries are identical except one of the countries has twice the initial capital stock. A coefficient of -0.34 [column (2)] implies a 24 percent larger capital outflow.⁴ Similarly, if trade is twice that of an identical country, the rate of bilateral capital outflow is 12 percent smaller. Countries that are twice the distance of close neighbors are expected to experience a 14 percent larger capital outflows. Sharing a common language implies a 45 percent smaller capital outflow. Finally, common membership of regional groups are also associated with smaller capital flows: in the case of ASEAN, the growth rate differential is equal to 139 percent. Note also that the negative coefficient on NAFTA in the total sample is driven by the sample of developing countries.

Across Tables 1 and 2, it is noteworthy that the marginal R^2 statistic indicates that the set of bilateral factors are more important in explaining portfolio equity dynamics than portfolio debt dynamics. In addition, bilateral factors are more important in explaining the behaviour of the set of developing-country reporters than the set of advanced-country reporters.

⁴ $\Delta \ln stock_{2.stock_0} - \Delta \ln stock_{stock_0} = -0.34 \ln(2) = -0.24$.

4.4. Re-Estimating with GLS

Tables 3 and 4 describe the results of the regressions within a GLS framework. As expected, GLS resulted in efficiency gains compared to OLS, but the general conclusions remain the same. In terms of magnitudes, the estimated impact of bilateral factors is smaller.

For instance, comparing column (2) in Tables 1 and 3, the smaller coefficient on the initial stock of bilateral debt holdings implies that a country with twice the initial exposure has a 15 percent faster capital outflow in the GLS estimates compared to 20 percent in the OLS estimates. Furthermore, bilateral trade is no longer individually significant in columns (1) and (2) in the GLS estimates. The distance effect is also smaller, with a doubling of distance now associated with an 11 percent faster capital outflow. In the GLS estimates, common membership of the euro area is associated with a 32 percent smaller capital outflow, while common membership of the European Union is associated with of foreign assets a 24 percent smaller capital outflow.

Similarly, looking at column (2) of Table 4, the results for portfolio equity dynamics also indicate slightly smaller magnitudes. A doubling of the initial holding is associated with a 19 percent larger capital outflow, while a doubling in bilateral trade is associated with a 7 percent smaller capital outflow. Countries that are twice the distance of close neighbors are estimated to experience a 13 percent smaller capital outflow, while sharing a common language reduces the bilateral capital outflow by 29 percent, compared to two countries with different languages. Finally, common membership of the euro area is associated with a 19 percent smaller capital outflow (this dummy was not significant for portfolio equity in the OLS estimates), while common ASEAN membership is associated with a 129 percent smaller capital outflow.

5. Conclusions

This paper has presented evidence that bilateral factors influenced the pattern of capital flows during the global crisis. Put differently, bilateral factors not only influence the average level of bilateral portfolio holdings but also influence the

nature of the adjustment process. In particular, we show that the size of the initial bilateral holding, geographical distance, common language, the level of trade and common institutional linkages help to explain the pattern of adjustment. In addition, we find that these bilateral factors are more important for equities than for bonds and for investors from developing countries than for investors from advanced countries.

These results have implications for the international transmission of financial shocks and the analysis of financial stability, since it is not sufficient to only examine the dynamics of aggregate country-level capital flows. In future work, it would be helpful to establish some of the mechanisms by which bilateral factors influence the behaviour of capital flows during crisis periods.

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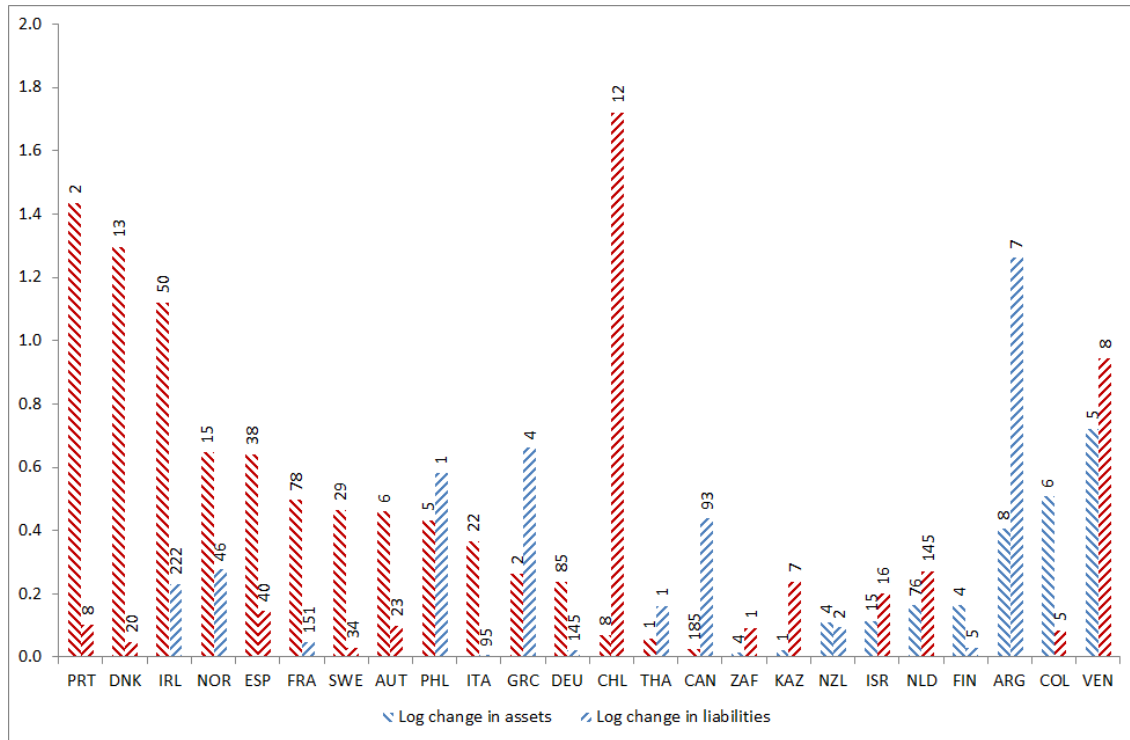
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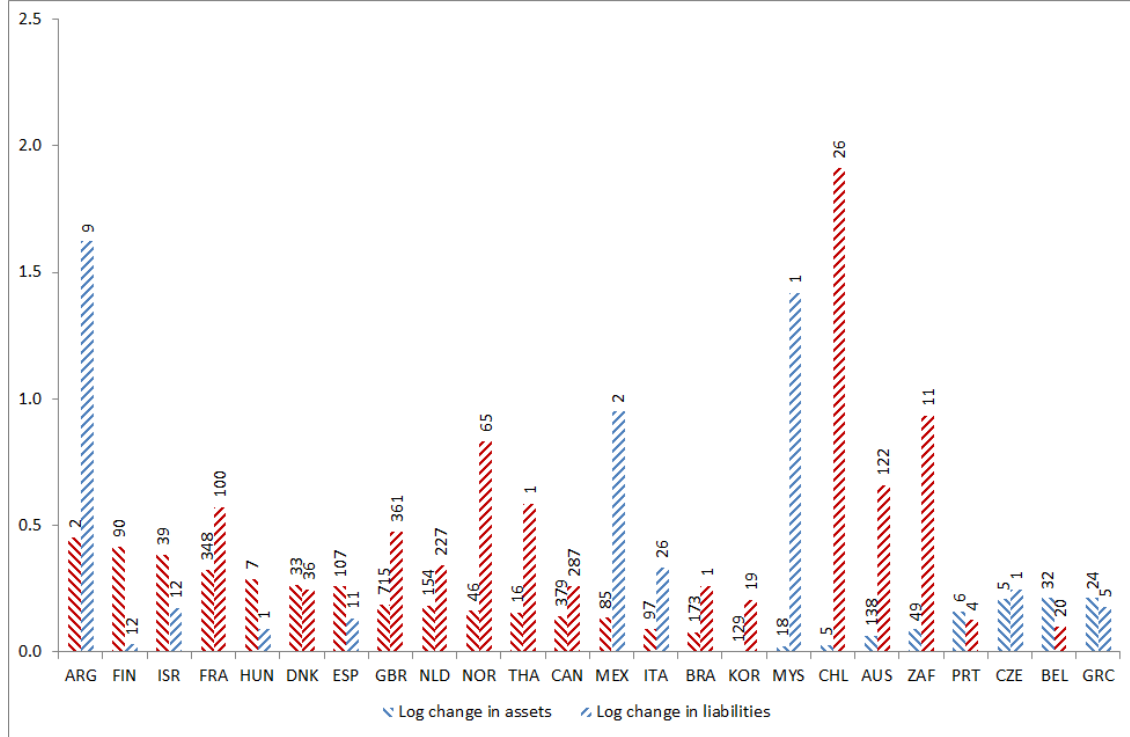
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Figure 1: Long-Term Portfolio Debt



Note: The graph shows a subset of residuals from a panel regression of $\Delta \ln(A_{ij})$ on host and source country effects only. On the graph, the US is the source country in case of assets and the host country in case of liabilities. The downward diagonal bar captures the bilateral component of US assets, while the upward diagonal bar captures the bilateral component of US liabilities. Negative states are highlighted in red. Numbers on top of the bars indicate the initial position in billions of US dollars.

Figure 2: Portfolio equity



Note: The graph shows a subset of residuals from a panel regression of $\Delta \ln(A_{ij})$ on host and source country effects only. On the graph, the US is the source country in case of assets and the host country in case of liabilities. The downward diagonal bar captures the bilateral component of US assets, while the upward diagonal bar captures the bilateral component of US liabilities. Negative states are highlighted in red. Numbers on top of the bars indicate the initial position in billions of US dollars.

Table 1: Long-Term Portfolio Debt: OLS

	(1)	(2)	(3)	(4)	(5)	(6)
$\ln(A_{ij2007})$	-0.28 (0.02)***	-0.29 (0.02)***	-0.17 (0.02)***	-0.20 (0.02)***	-0.48 (0.04)***	-0.47 (0.04)***
Trade	0.05 (0.03)*	0.05 (0.03)*	-0.01 (0.03)	-0.01 (0.03)	0.09 (0.07)	0.08 (0.07)
Distance	-0.32 (0.06)***	-0.22 (0.07)***	-0.22 (0.07)***	-0.18 (0.07)**	-0.58 (0.13)***	-0.48 (0.14)***
Language	0.15 (0.13)	0.17 (0.13)	0.20 (0.13)	0.19 (0.13)	-0.12 (0.30)	-0.05 (0.31)
EA		0.44 (0.17)***		0.66 (0.17)***		0.35 (0.55)
EU27		0.29 (0.17)*		0.02 (0.17)		0.52 (0.34)
NAFTA		-0.05 (0.56)		-0.07 (0.50)		-0.47 (1.56)
ASEAN		0.70 (0.46)				0.89 (0.69)
R^2_{control}	0.25	0.25	0.32	0.32	0.3	0.3
R^2	0.34	0.35	0.35	0.36	0.49	0.5
R^2_{marginal}	0.12	0.13	0.05	0.07	0.27	0.28
F(blocs)		(4.52)***		(6.75)***		(1.22)
Observations	1642	1642	1067	1067	559	559
Source countries	All	All	Adv.	Adv.	Dev.	Dev.

Note: The dependent variable is $\Delta \ln(A_{ij})$ between end of 2007 and end of 2009. 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. $R^2_{\text{marginal}} = 1 - RSS/RSS^{\text{control}}$, where RSS is the residual sum of squares. F(blocs) captures joint significance of regional blocs. Estimated by OLS.

***, **, * significant at 1, 5 and 10 percent respectively.

Table 2: Portfolio Equity: OLS

	(1)	(2)	(3)	(4)	(5)	(6)
$\ln(A_{ij2007})$	-0.34 (0.02)***	-0.34 (0.02)***	-0.31 (0.02)***	-0.31 (0.02)***	-0.46 (0.03)***	-0.45 (0.03)***
Trade	0.16 (0.03)***	0.17 (0.03)***	0.08 (0.03)**	0.08 (0.03)**	0.20 (0.08)**	0.18 (0.08)**
Distance	-0.22 (0.06)***	-0.20 (0.07)***	-0.15 (0.06)**	-0.18 (0.07)**	-0.53 (0.16)***	-0.46 (0.17)***
Language	0.45 (0.13)***	0.45 (0.13)***	0.35 (0.12)***	0.33 (0.12)***	0.55 (0.32)*	0.52 (0.32)
EA		0.16 (0.18)		0.43 (0.16)***		-0.63 (0.72)
EU27		-0.05 (0.17)		-0.23 (0.16)		0.39 (0.38)
NAFTA		-1.39 (0.58)**		-0.51 (0.49)		-3.79 (1.52)**
ASEAN		1.39 (0.46)***				1.53 (0.69)**
R^2_{control}	0.29	0.29	0.41	0.41	0.27	0.27
R^2	0.43	0.44	0.51	0.52	0.48	0.5
R^2_{marginal}	0.20	0.21	0.18	0.19	0.29	0.31
F(blocs)		(4.14)***		(2.8)**		(3.16)**
Observations	1619	1619	1026	1026	576	576
Source countries	All	All	Adv.	Adv.	Dev.	Dev.

Note: The dependent variable is $\Delta \ln(A_{ij})$ between end of 2007 and end of 2009. 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. $R^2_{\text{marginal}} = 1 - RSS/RSS^{\text{control}}$, where RSS is the residual sum of squares. F(blocs) captures joint significance of regional blocs. Estimated by OLS.

***, **, * significant at 1, 5 and 10 percent respectively.

Table 3: Long-Term Portfolio Debt: GLS

	(1)	(2)	(3)	(4)	(5)	(6)
$\ln(A_{ij2007})$	-0.20 (0.01)***	-0.21 (0.01)***	-0.15 (0.02)***	-0.17 (0.02)***	-0.42 (0.03)***	-0.43 (0.03)***
Trade	0.02 (0.01)	0.02 (0.01)	-0.01 (0.02)	-0.01 (0.02)	0.11 (0.05)**	0.09 (0.05)*
Distance	-0.22 (0.04)***	-0.16 (0.04)***	-0.21 (0.04)***	-0.15 (0.05)***	-0.43 (0.10)***	-0.34 (0.11)***
Language	0.12 (0.08)	0.14 (0.08)	0.10 (0.09)	0.12 (0.09)	0.17 (0.23)	0.23 (0.23)
EA		0.32 (0.11)***		0.49 (0.12)***		0.45 (0.54)
EU27		0.24 (0.11)**		0.12 (0.13)		0.54 (0.27)**
NAFTA		-0.13 (0.40)		-0.14 (0.39)		-0.36 (2.13)
ASEAN		0.24 (0.33)				0.64 (0.51)
R^2_{control}	0.25	0.25	0.32	0.32	0.30	0.30
R^2	0.34	0.35	0.35	0.36	0.49	0.50
R^2_{marginal}	0.12	0.13	0.05	0.07	0.27	0.28
Observations	1642	1642	1067	1067	559	559
Off-diagonal	-0.06	-0.07	-0.02	-0.03	-0.26	-0.24
Source countries	All	All	Adv.	Adv.	Dev.	Dev.

Note: The dependent variable is $\Delta \ln(A_{ij})$ between end of 2007 and end of 2009. 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. $R^2_{\text{marginal}} = 1 - RSS/RSS^{\text{control}}$, where RSS is the residual sum of squares. Off-diagonal is the element off the main diagonal in the variance-covariance matrix. Variance of the error term varies by source country. Estimated by GLS.

***, **, * significant at 1, 5 and 10 percent respectively.

Table 4: Portfolio Equity: GLS

	(1)	(2)	(3)	(4)	(5)	(6)
$\ln(A_{ij2007})$	-0.28 (0.01)***	-0.28 (0.01)***	-0.29 (0.01)***	-0.29 (0.01)***	-0.42 (0.02)***	-0.42 (0.02)***
Trade	0.09 (0.02)***	0.10 (0.02)***	0.06 (0.02)**	0.06 (0.02)***	0.16 (0.06)**	0.15 (0.06)**
Distance	-0.18 (0.04)***	-0.19 (0.04)***	-0.16 (0.04)***	-0.20 (0.04)***	-0.50 (0.12)***	-0.43 (0.13)***
Language	0.28 (0.08)***	0.29 (0.08)***	0.24 (0.08)***	0.24 (0.08)***	0.47 (0.25)*	0.45 (0.24)*
EA		0.19 (0.10)*		0.29 (0.11)**		-0.48 (0.52)
EU27		-0.14 (0.11)		-0.20 (0.12)		0.17 (0.30)
NAFTA		-0.61 (0.33)*		-0.46 (0.31)		-3.83 (1.78)**
ASEAN		1.29 (0.45)***				1.55 (0.54)***
R^2_{control}	0.29	0.29	0.41	0.41	0.27	0.27
R^2	0.43	0.44	0.51	0.52	0.48	0.50
R^2_{marginal}	0.20	0.21	0.18	0.19	0.29	0.31
Observations	1619	1619	1026	1026	576	576
Off-diagonal	-0.01	-0.03	-0.03	-0.05	-0.02	-0.01
Source countries	All	All	Adv.	Adv.	Dev.	Dev.

Note: The dependent variable is $\Delta \ln(A_{ij})$ between end of 2007 and end of 2009. 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. $R^2_{\text{marginal}} = 1 - RSS/RSS^{\text{control}}$, where RSS is the residual sum of squares. Off-diagonal is the element off the main diagonal in the variance-covariance matrix. Variance of the error term varies by source country. Estimated by GLS.

***, **, * significant at 1, 5 and 10 percent respectively.



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