The pecking order of cross-border investment

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Abstract

Is there a pecking order of cross-border investment in that countries become financially integrated through some types of investment rather than others? Using a novel database of bilateral capital stocks for all types of investment – foreign direct investment (FDI), portfolio equity securities, debt securities as well as loans – for a broad set of 77 countries, we show that such a pecking order indeed exists. The paper focuses on two key determinants of this pecking order: information frictions and the quality of host country institutions. Overall, we find that in particular FDI, and to some extent also loans, are substantially more sensitive to information frictions than investment in portfolio equity and debt securities. We also show that the share as well as the size of FDI that a country receives are largely insensitive to institutional factors in host countries, while portfolio investment is by far the most sensitive to the quality of institutions. This provides new evidence in favour of some hypotheses but contradicts others put forward in the literature on trade in financial assets.

1. Introduction

The debate in the literature on trade in financial assets makes the important point that the type of foreign financing of cross-border investment may not pursue a random pattern, but follows a certain "pecking order" regarding the composition of capital flows. One key focus has been on the role of information frictions, with some important theoretical contributions arguing that portfolio investment should be more sensitive to information frictions than FDI or bank loans due to a lack of ownership control of the former (Razin, Sadka and Yuen 1998). A second important strand of the literature has concentrated on the role of institutions in influencing the composition of cross-border investment (Albuquerque 2003; Wei 2000a), with the empirical work still being inconclusive on which types of capital are most affected by the institutional environment.

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The main contribution of the paper is to test empirically for the existence of such a pecking order and to identify its determinants in a bilateral country-pair setting. We concentrate on two determinants that have been central in the literature on trade in financial assets: the role of information frictions, and the role of institutions as drivers of cross-border investment. The paper builds on several seminal studies. In particular, Portes, Rey and Oh (2001) show that information frictions for a number of countries indeed exert a larger effect on portfolio equity and corporate debt than on government bond flows with the United States. The present paper is complementary to this as well as other studies, but innovates in a number of ways. First, using a novel dataset on bilateral holdings, the present paper is the first that includes all types of capital, ie also FDI and other investment/loans, and thus allows for a systematic comparison of all types of investment in the capital account. This is an important difference because especially FDI and loans are the dominant types of investment received by many if not most emerging markets and developing countries.[1]

Second, the empirical analysis covers 77 countries and thus is much broader in scope through addressing the issue of cross-border investment also from an emerging market economy (EME) perspective. This allows us to investigate and indeed empirically confirm that the effect of information on cross-border investment exhibits a sizeable asymmetry across countries, exerting a larger influence on EMEs. Third, our empirical methodology is distinct from most of the literature through building on the trade literature on the border effect (Anderson and van Wincoop 2003; Cheng and Wall 2005) which stresses the importance of including source and host country fixed effects and shows that the exclusion of such fixed effects may generate a sizeable estimation bias.

Our empirical results show that information frictions have a substantial effect on the pecking order as we find that FDI and loans are the most sensitive and foreign portfolio investment (FPI) equity and FPI debt securities the least sensitive types of investment to information frictions. For instance, the distance among country pairs has a 1.5 to 2 times larger impact on FDI stocks than on equity securities and debt securities. Similarly, we find loans to be as sensitive as FDI to information asymmetries, thus confirming and being in line with the literature on the capital structure of firms which has emphasised the special role of loans and their sensitivity to information (Myers 1984; Bolton and Freixas 2000). We use various proxies for information frictions – distance, the volume of bilateral telephone traffic, bilateral trade in newspapers and periodicals, and the stock of immigrants from the source country in the host – showing the robustness of this result to alternative specifications. While these empirical findings are new, we also confirm some of the existing findings, in particular that equity portfolio investment is not more sensitive to information frictions than debt securities (Portes, Rey and Oh 2001). Using our different econometric approach also reveals that the effects of information frictions tend to be larger than some found in the literature, though a precise comparison is impossible due to different country samples across studies.

Regarding the second determinant – the impact of institutions on the composition of cross-border investment – we make two key points. First, while many papers in the literature have focused on the effects of institutions on one or two particular types of capital flows, our analysis is the first to test for differences across all major components of the capital account. Our results show that portfolio investment is much more sensitive than FDI or loans to a broad set of institutional indicators, such as the degree of information disclosure in local credit market regulations, as well as accounting standards in the host country. Portfolio investment also reacts much more strongly to the risk of expropriation and repudiation costs,

[1] For example, in our sample the average share of FDI in total foreign investment is 46% for developing countries but only 22% for developed countries. Moreover, the share of combined FDI and loans accounts for even 76% of total foreign inward investment for EMEs. We discuss these issues in detail in section 3 of the paper.

confirming the hypothesis put forward by Albuquerque (2003), who argues that portfolio investment is easier to expropriate than other types of investment. Other hypotheses of the literature are, however, not confirmed by our analysis. For instance, portfolio investments in particular, but also loans, decrease substantially with the degree of corruption. By contrast, the stock of FDI is found to be less sensitive to corruption, which is consistent with some findings in the literature (see Daude and Stein, 2004) but contrary to others (eg Wei, 2000a). Overall, portfolio investment, and in particular equity securities, appear to be the most sensitive type of investment to institutional factors. Our results prove robust to various alternative proxies of institutions and country samples.

An additional point of the paper is that we also study the impact of financial market development on the pecking order of cross-border investment positions. We find that portfolio investment is substantially more sensitive to the degree of market openness and development than FDI or loans. For instance, capital account liberalisation and financial development change the *composition* of financial liabilities of a country by raising the share of portfolio investment substantially. Moreover, we find that the *volume* of FDI and loans is relatively insensitive to market developments as, for instance, capital account liberalisation does not have a statistically significant effect on the volume or stock of FDI or loans. This is in line with the evidence for capital flows of previous studies that use a different empirical strategy (see eg Montiel and Reinhart, 1999, Magud and Reinhart, 2005).

The findings of the paper have a number of implications. The paper underlines the role of bilateral information frictions as a barrier to cross-border investment, in particular for FDI and loans. Importantly, the paper emphasises that FDI should not necessarily be seen as an unconditional blessing for host countries. We present evidence that the share of inward FDI and also foreign loans is highest for countries with weak institutions and poorly developed or badly functioning capital markets. Therefore, although FDI may have beneficial effects on the economy, a composition of foreign investment that is heavily tilted towards FDI is likely to be a signal of some fundamental weaknesses of the host country economy, thus providing support for the argument of Hausmann and Fernández-Arias (2000) and Albuquerque (2003).

The remainder of the paper is organised in the following way. The next section provides a brief overview of the literature on the determinants of capital flows and the pecking order of cross-border investment. Section 3 outlines the empirical methodology and presents the data, together with a number of stylised facts on cross-border investment. The empirical results are discussed in Sections 4 and 5, including various robustness and sensitivity tests. Section 6 concludes and offers a short discussion of policy implications.

2. Related literature

Information frictions have been at the core of the debate on international capital flows.[2] Razin, Sadka and Yuen (1998) present a model that extends the pecking order argument from the corporate finance literature by Myers and Majlauf (1984) and Myers (1984) to international capital flows to analyse issues of capital taxation. In particular, they assume that FDI circumvents the informational problems completely, while portfolio debt and equity are subject to informational asymmetries where domestic investors observe the real productivity of the firm, while foreign investors do not. Therefore, FDI is the preferred form of financing in

[2] Portes and Rey (2005) and Portes, Rey and Oh (2001) provide references and a discussion of the finance literature related to information frictions. Also, see Harris and Raviv (1991) for an earlier survey on the empirical corporate finance literature on information frictions and asset markets.

the presence of information frictions, followed by portfolio debt and then equity. Neumann (2003) presents a version of lending with a moral hazard model by Gertler and Rogoff (1990) that focuses on the differences between international debt and equity financing. In contrast to Razin, Sadka and Yuen (1998), she assumes that ownership, even in the form portfolio equity, conveys some control and therefore information on the investment. Assuming that monitoring costs are decreasing in ownership, the implied pecking order is that FDI and equity are less costly ways of financing domestic investment than instruments that do not convey some degree of ownership and therefore information, like loans or debt.

Goldstein and Razin (2006) present a model that explains differences in volatility of FDI versus FPI through information asymmetries. Again the key assumption is that FDI implies ownership control of the firm and therefore more information than FPI. In addition, FDI is subject to a fixed cost in contrast to FPI. They assume that foreign investors are subject to privately observed liquidity shocks which drive down the price of selling the asset before maturity due to a standard "lemons" problem. Thus, there is a trade-off between efficiency and liquidity for foreign investors. Under these conditions, they show that in equilibrium, if production costs are higher in developed countries, developed countries will receive more FPI that developing countries, given that it would be less profitable to pay the fixed cost associated with FDI. Finally, Mody, Razin and Sadka (2003) present a similar model that predicts also that more countries with good corporate governance attract more FPI. While several of these theoretical models assume different sensitivity to information frictions across the different components of the capital account, it has not been tested systematically. Our paper tries to fill this gap in the literature.

Despite limited empirical evidence, the perceived wisdom is that certain types of capital inflows are more beneficial for receiving countries than others. In particular, FDI is generally seen as a "good" type of capital because it may promote growth in host countries by encouraging a transfer of technology and knowledge and by opening market access abroad (eg Aitken, Hanson and Harrison, 1997; Borensztein, De Gregorio and Lee, 1998).[3] On the other hand, portfolio investment flows are considered to be more volatile, may exacerbate the magnitude of business cycles and also induce or at least worsen financial crises (eg Claessens, Dooley and Warner, 1995; Chuhan, Claessens and Mamingi, 1998; Sarno and Taylor, 1999).

Other papers have challenged the view of considering FDI necessarily as "good cholesterol" (eg Hausmann and Fernández-Arias, 2000; Albuquerque, 2003). These papers show that actually the richest and least volatile economies, and countries with good institutions and well functioning markets, receive more FPI and relatively less FDI from abroad as a fraction of total capital inflows.

Finally, the existence and functioning of markets are potentially an important determinant of foreign investment, and are closely linked to the effects of information asymmetries. If markets are absent or are functioning poorly, firms may have no other choice than to use FDI to carry out an investment project (Hausmann and Fernandez-Arias, 2000). In this sense, FDI may function as a substitute for a functioning market mechanism. Thus, portfolio investment or bank loans may be preferred options for firms in an environment in which markets function well. In a broader sense, the quality of economic and political institutions is

[3] For papers that find a positive and differential impact of FDI on domestic investment and economic growth compared to portfolio investments, see Bosworth and Collins (1999), Razin (2004), and Mody and Murshid (2005). However, the literature is not conclusive on the impact of FDI on growth or the channels through which it acts. Alfaro, Kalemli-Ozkan and Volosovych (2004) find that FDI has a positive impact on economic growth provided that the domestic financial sector is sufficiently developed. Alternatively, Borensztein, De Gregorio and Lee (1998) find a positive impact of FDI in interaction with human capital. For some evidence of the effects of capital flow composition on currency crises, see Frankel and Rose (1996).

an analogy to the functioning of markets. In a country where property rights are poorly enforced and the risk of expropriation is high, firms may prefer FDI as it is harder to expropriate due to its information intensity and its inalienability (Albuquerque, 2003). Moreover, different types of investment may react differently to factors such as the degree of corruption, the functioning of the legal system and transparency (eg Wei, 2000b; Faria and Mauro, 2004; Alfaro, Kalemli-Ozkan and Volosovych, 2005; Papaioannou, 2005; Gelos and Wei, 2005). While several of these papers look at the effects on total capital flows, a specific type of flow, or the difference between portfolio and FDI, we contribute to the literature by analysing the effect of institutional variables on all major concepts of the capital account.[4] Moreover, other important differences between the present paper and the existing literature are the focus on bilateral capital stocks as well as the methodological approach, which allows us to control for information asymmetries as well as for both source and host country factors. Finally, we also study the impact of financial market development on the composition of the capital account.

3. Methodology, data and some stylised facts

This section gives an outline of the methodology and the main hypotheses for the empirical analysis (Section 3.1). The subsequent presentation of our data (Section 3.2) is then followed by a discussion of some key stylised facts of the pecking order of cross-border investment positions derived from our data (Section 3.3).

3.1 Methodology and hypotheses

The empirical analysis consists of two parts. In the first part, we attempt to understand the role of information frictions as a determinant of the pecking order of cross-border investment. The effects of information frictions are likely to be different across country pairs, ie one particular source country i may face a different degree of information costs and asymmetries vis-à-vis host country j than other source countries. For this purpose, we use a pseudo-fixed effects model of bilateral capital stocks held by residents of source country i in host country j:

$$\log(1+y_{ij}^{k}) = \alpha_i^k + \alpha_j^k + \beta^k X_{ij} + \varepsilon_{ij}^k \quad (1)$$

with y_{ij}^{k} as the holdings in US dollars of asset type k – where k = FDI, portfolio equity, portfolio debt securities, or loans – of residents of source country i in host country j; X_{ij} as a proxy of bilateral information frictions and additional controls; and α_i^k and α_j^k as source country and host country fixed effects.

Given that in our first step we want to identify consistently the effect of information frictions – a pair-effect variable – we also need to control for all other relevant factors that affect the volume of bilateral investment from a particular source country by including source and host country dummies as well as other bilateral controls that are likely to affect the level of

[4] While Alfaro, Kalemli-Ozkan and Volosovych. (2005) also test the effects of institutions on the capital account, their focus is on aggregate capital flows (defined as the sum of FDI and portfolio investment flows). Therefore, they do not include bank loans nor do they test or comment on differences among the different types of investment. As we will show below, we find this distinction to be important as different types of capital react fundamentally differently to information frictions as well as institutions.

bilateral investment.[5] In the second step, we try to explain the country fixed effects in order to understand which factors make host countries attractive places for investment.[6]

The vector of coefficients of interest to us in this first step is β^k, ie we want to test whether different types of asset holdings have a different degree of sensitivity to various proxies of information frictions X_{ij}. Note that we are interested in two separate hypotheses, one relating to the *volume effect* of information frictions (H_1) and the second one to the composition or *pecking order effect* (H_2), ie that one type of financial asset holdings (k_1) reacts differently to information frictions than other types of assets (k_2):

$$\text{Volume effect hypothesis} \quad H_1 : \beta^k = 0$$

$$\text{Pecking order effect hypothesis } H_2 : \beta^{k1} = \beta^{k2}$$

Our empirical analysis is cross-sectional, hence the explanatory power of the model comes purely from the cross-section, which is sensible given the focus on capital stocks and the fact that the independent variables on information frictions and institutions mostly change little over time.

Note also that we estimate the model using y_{ij}^k as the stocks in US dollars of asset type k. More precisely, we take the log value of the value in millions of US dollars and add one in order to be able to keep observations that are zero.[7] As there are several observations with a value of zero, it may raise the problem of censoring at zero. Although we use a TOBIT estimator and a two-step Heckman procedure to show that the results are largely robust to this specification, our preferred estimation technique is via seemingly unrelated regressions (SUR). This means that we estimate the four equations for each type of capital k simultaneously. The advantage of the SUR estimator is that it improves the efficiency of the estimates by allowing for cross-correlations of the residuals of the four equations. Moreover, it allows us to directly test our pecking order hypothesis H_2 in the model.

Note that we do not "normalise" the dependent variable by dividing by host country GDP for H_1 on the volume effect or by dividing by total asset liabilities of host country j for H_2 on the pecking order effect, as is frequently done in the literature. The reason is that each of these "normalisations" imposes restrictions on the parameters of the model that may not hold. Although such a normalisation is possible, our preferred specification is the one using the log of the levels of cross-border investment, given that it allows for more flexibility and enables us to test the volume and composition hypothesis in the same equation.[8]

More generally, although it may seem appealing to exclude the fixed effects in order to explicitly allow for including vectors of source country-specific variables X_i and of host

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[5] The inclusion of these country fixed effects has also been recommended by Anderson and van Wincoop (2003) in empirical trade models to control for multilateral resistance. In the case of investment positions, the problem of omitted and unobserved variables at the source or host level might also be more serious, given the lack of an overall accepted theory of bilateral investment positions that could be used as a benchmark for the empirical exercise.

[6] See Cheng and Wall (2005) for the relevance of such a two-step approach for trade. Lane and Milesi-Ferretti (2004) use a very similar approach to ours for the case of bilateral portfolio positions.

[7] However, in our final sample the number of zeros is relatively small. Out of the final 1,116 observations, FDI values are all strictly positive, FPI portfolio has 187 zero observations, FPI debt 125, and loans 84, respectively. Our results do not change if we drop these observations. While not reported here, these regressions are available upon request.

[8] It should be pointed out that the country dummies capture the size effects of the source and host in an accurate way.

country-specific variables X_j, this would imply excluding important unobserved components of relevant fixed effects and is likely to bias the estimators of interest β^k. We show below that the estimates of β^k indeed mostly change substantially when excluding the fixed effects.

In the second part of the analysis, our aim is to understand the factors that explain the host country fixed effects. More precisely, we want to understand the *role of markets and institutions in host countries as determinants of the composition of cross-border financial positions*. As these factors are symmetric, ie investors in all source countries face the same conditions in a particular host country, we use the fixed effects obtained from the gravity model (1) to test for the role of host country institutions and market conditions X_j on the pecking order and volume effects:

$$\alpha_j^k = \kappa^k + \lambda^k X_j + \mu_j^k, \tag{2}$$

where μ_j^k is an error term. Analogously to model (1), this specification allows us to formulate and test the two hypotheses with regard to the *volume effect* (H_3) and the *pecking order effect* (H_4) of markets and institutions:

$$\text{Volume effect hypothesis} \quad H_3 : \lambda^k = 0$$

$$\text{Pecking order effect hypothesis} \quad H_4 : \lambda^{k1} = \lambda^{k2}$$

Our preferred estimator is again the SUR, and the same caveats and discussion apply to this second stage as to the estimation of model (1).

3.2 Data

As the focus of the paper is on the pecking order of cross-border investment, our data are on *stocks* of various types of foreign investment, rather than capital flows per se. We use three different data sources to construct a comprehensive database that covers all four categories of the financial account – or what is still often referred to as the capital account; two terms which we use interchangeably throughout the paper – ie for FDI, for portfolio investment – distinguishing also between equity and debt securities – and for loans. For FDI, we use the UNCTAD database on bilateral FDI stocks. A database that is often employed in studies on FDI is the one provided by the OECD. However, the UNCTAD database is more comprehensive as it includes both industrialised countries and developing countries. The UNCTAD data have annual entries in US dollars for around 90 reporting countries vis-à-vis most countries in the world from 1980 to 2003. Unfortunately, there are many missing entries, so that we do not have bilateral stocks for all country pairs. Moreover, country pairs are excluded from the analysis if there are no entries for the past 10 years.

For portfolio investment, we use the Consolidated Portfolio Investment Survey (CPIS) by the IMF. It provides bilateral assets of portfolio equity and portfolio debt securities for 68 reporting countries.[9] We use the average figures for equity securities and for debt securities for 2001, 2002 and 2003. The CPIS also provides a breakdown between short-term and long-term debt securities. We conducted several tests but did not find systematic differences with this distinction, and thus ignore this dimension in the remainder of the paper.

[9] In fact, the effective number of reporting countries ends up being 67, because Pakistan reports only missing data.

For loans, we use the International Locational Banking Statistics (ILB) data provided by the Bank for International Settlements (BIS). The database comprises aggregate assets as well as aggregate liabilities of banks in 32 reporting countries vis-à-vis banking and non-banking institutions in more than 100 partner countries, capturing exclusively private claims. The reported assets and liabilities capture mostly loans and deposits, but may also include other transactions that fall under portfolio or direct investment (see BIS, 2003). To minimise this overlap, we use inter-bank claims, ie the data for assets and liabilities of banks in reporting countries vis-à-vis banks in partner countries. Although the number of reporting countries is smallest for this database, the fact that it includes data not only for assets but also for liabilities allows us to obtain a proxy also for asset holdings of non-reporting countries vis-à-vis reporting countries.

There are several caveats that are present for the various data sources. A first potential caveat is that the data stem from different sources, thus raising the issue of how comparable they are, though the definitions used are the same across sources. Moreover, one potentially important issue is that the data collection is generally based on the residence principle. This may imply that countries may report their asset holdings vis-à-vis their direct counterpart country but not vis-à-vis the country where the financial asset is ultimately invested. This of course would give enormous importance to financial centres as a lot of capital is channelled through these, but does not reflect the true bilateral holdings of financial assets. Hence we exclude financial centres from our analysis.

Moreover, note that our empirical analysis is purely cross-sectional for two reasons: due to the fact that capital stocks obviously change little from one year to the next and also due to data availability. Due to the potential importance of valuation changes and other special factors affecting the size of capital stocks in individual years, our cross-section is the average size of capital stocks over the five-year period of 1999–2003.

It is important to emphasise that we include only those country pairs for which all four types of asset holdings are available. This reduces the sample size to 77 countries. Appendix A shows the countries which are included. It reveals that the sample includes 22 richer, industrialised countries and 55 mainly emerging markets, but also some poorer developing countries. The country sample for the EMEs is roughly balanced across regions, with 12 in Africa/Middle East, 13 in Central and Eastern Europe, 13 in Asia and 17 in Latin America. The exclusion of many of the poorer developing countries is required by the fact that they do not have stock markets and/or bond markets. Thus the results on the pecking order are not driven by the absence of stock and bond markets in less developed countries. Further tests focusing only on industrialised countries and only for EMEs are conducted below and show the robustness of the findings to different country samples.

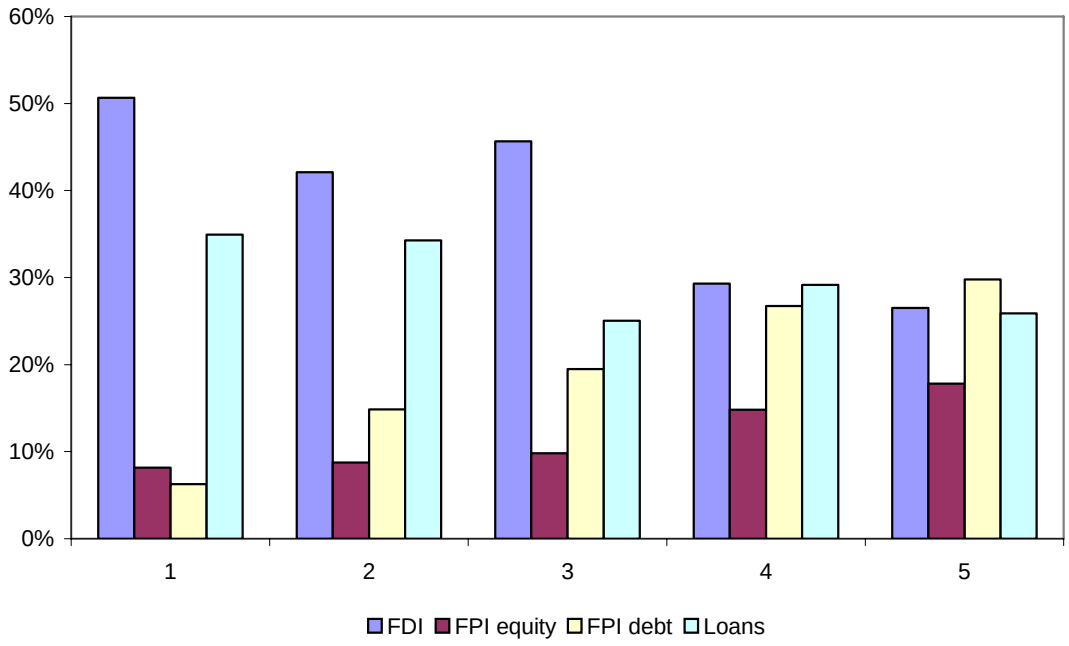
3.3 Some stylised facts on the pecking order

Figure 1 shows for a broad set of developed and emerging market economies that the poorest countries have the highest shares and the richest the lowest shares of FDI in total capital stocks.

This stylised fact – as well as several others discussed in detail in the paper – makes the important point that the type of foreign financing of cross-border investment does not pursue a random pattern, but follows a certain “pecking order”.

Figure 1

Composition of foreign investment by per capita country groups



Note: GDP per capita is measured as the average PPP GDP per capita over the period 1999-2003. The x-axis shows the first to fifth quintile of countries, ranging from those with the lowest to those with the highest GDP per capita.
Sources: IMF CPIS and IFS; UNCTAD; BIS; authors' calculations.

Table 1 presents some summary statistics for the different types of financial liabilities, ie the table shows the total stocks of different types of capital held by foreigners in the host countries implied by the data described in the previous subsection. There are clear, systematic differences in the composition and volume of capital stocks across countries. First, developing countries receive on average a higher *share* of FDI and loans than developed countries. For example, the average share of FDI in total foreign capital for developing countries is 44% while in the case of the developed countries FDI amounts only to 22%. In contrast, the share of portfolio equity and portfolio debt holdings is significantly higher for developed countries. Second, in terms of the *volume* of investments, developed countries receive significantly higher volumes of all types of capital. Developed countries receive on average – as a ratio of their GDP – around 2.5 times more FPI portfolio, 6.6 times more FPI debt, 2 times more loans, and 1.3 times more FDI than developing countries.

Table 2 shows the correlation coefficients and the significance of investment shares with regard to selected indicators of income, market development and institutions. First, there is a large negative correlation of -0.38 between the share of FDI in stocks and per capita income of a country. Loans are also negatively correlated, though the correlation coefficient is not statistically significant. The same finding applies to domestic financial market development – as proxied by the degree of capital account liberalisation and by the ratio of credit to the private sector as percentage of GDP: the more developed financial markets are, the lower the shares of FDI and loans a country receives. Figure 2 illustrates in more detail the relationships between these different types of capital and per capita GDP. Moreover, countries with a higher risk of expropriation (indicated by a lower value in the figure) receive a significantly higher share of FDI and loans.

Table 1

Summary statistics

Variable	Obs	Mean	Std dev	Min	Max
EMEs / developing countries					
FDI share	55	0.46	0.22	0.10	0.90
Loans share	55	0.30	0.18	0.00	0.70
FPI debt share	55	0.14	0.11	0.00	0.40
FPI portfolio share	55	0.10	0.11	0.00	0.50
FDI/GDP	55	0.42	0.48	0.00	2.70
Loans/GDP	55	0.34	0.91	0.00	6.80
FPI debt/GDP	55	0.13	0.14	0.00	0.50
FPI equity/GDP	55	0.11	0.22	0.00	1.40
Developed countries					
FDI share	22	0.22	0.10	0.05	0.38
Loans share	22	0.26	0.09	0.13	0.49
FPI debt share	22	0.35	0.16	0.03	0.66
FPI portfolio share	22	0.17	0.11	0.03	0.44
FDI/GDP	22	0.56	0.59	0.03	2.44
Loans/GDP	22	0.65	0.51	0.11	1.65
FPI debt/GDP	22	0.86	0.86	0.05	3.17
FPI equity/GDP	22	0.40	0.43	0.05	1.45
Total					
FDI share	77	0.394	0.23	0.05	0.92
Loans share	77	0.292	0.16	0.05	0.74
FPI debt share	77	0.198	0.16	0.00	0.66
FPI portfolio share	77	0.117	0.11	0.00	0.51
FDI/GDP	77	0.462	0.51	0.03	2.66
Loans/GDP	77	0.424	0.82	0.01	6.79
FPI debt/GDP	77	0.339	0.57	0.00	3.12
FPI equity/GDP	77	0.190	0.32	0.00	1.43

Sources: IMF CPIS and IFS; UNCTAD; BIS; authors' calculations.

By contrast, both equity security and debt security holdings are strongly positively correlated with GDP per capita. In addition, countries that have a large share of portfolio equity and debt stocks also have more developed domestic financial markets and better institutions. Moreover, when considering the correlation of the shares of different types of assets with the average growth rate of GDP per capita over 1980–2003, the correlations show that there is a positive and significant correlation only for portfolio investment.

Table 2

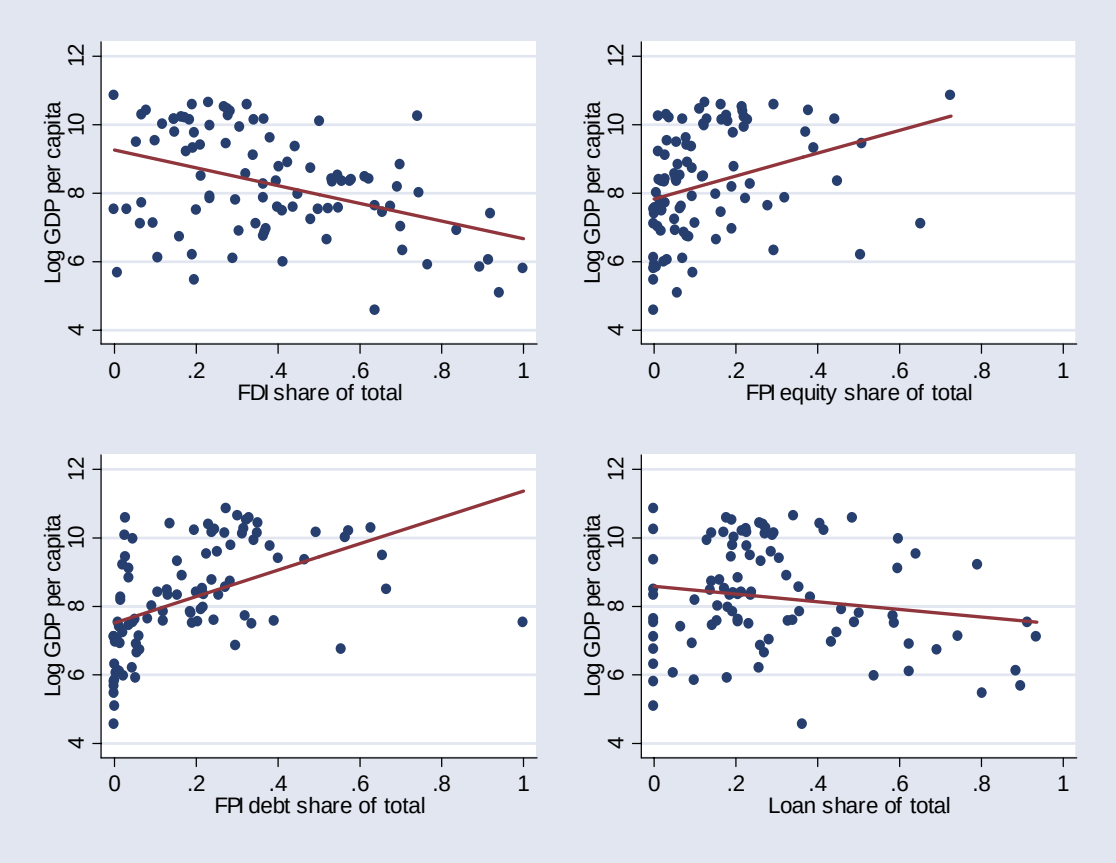
Correlation matrix

	FDI share	Loans share	FPI debt share	FPI equity share
FDI share	1.0000			
Loans share	**–0.5140**	1.0000		
FPI debt share	**–0.4270**	**–0.3380**	1.0000	
FPI equity share	**–0.2810**	**–0.2960**	–0.0570	1.0000
GDP per capita (log)	**–0.4050**	**–0.1700**	**0.4750**	**0.3190**
Private credit/GDP	**–0.3570**	–0.1060	**0.2460**	**0.4710**
KA openness	–0.1370	–0.1520	**0.2080**	**0.2020**
Property rights	**0.3470**	0.1470	**–0.3420**	**–0.4490**
GDP per capita growth	0.0300	–0.1440	–0.0970	**0.2870**

Note: Significant correlations at the 95% level are shown in bold.

Figure 2

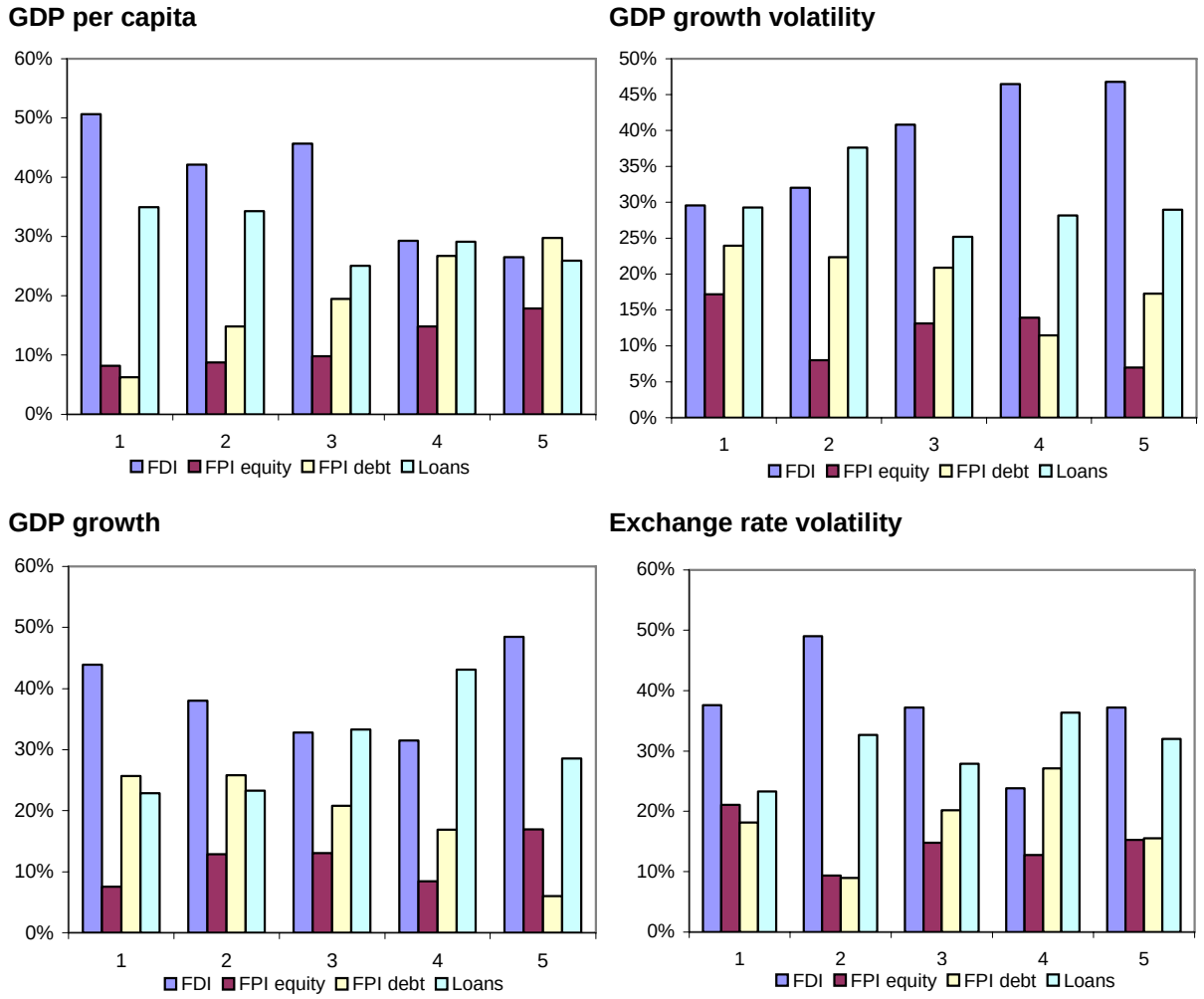
Stylised facts of pecking order: GDP per capita



Sources: IMF CPIS and IFS; UNCTAD; BIS; authors' calculations.

Figure 3

Stylised facts of pecking order: macro and exchange rate variables



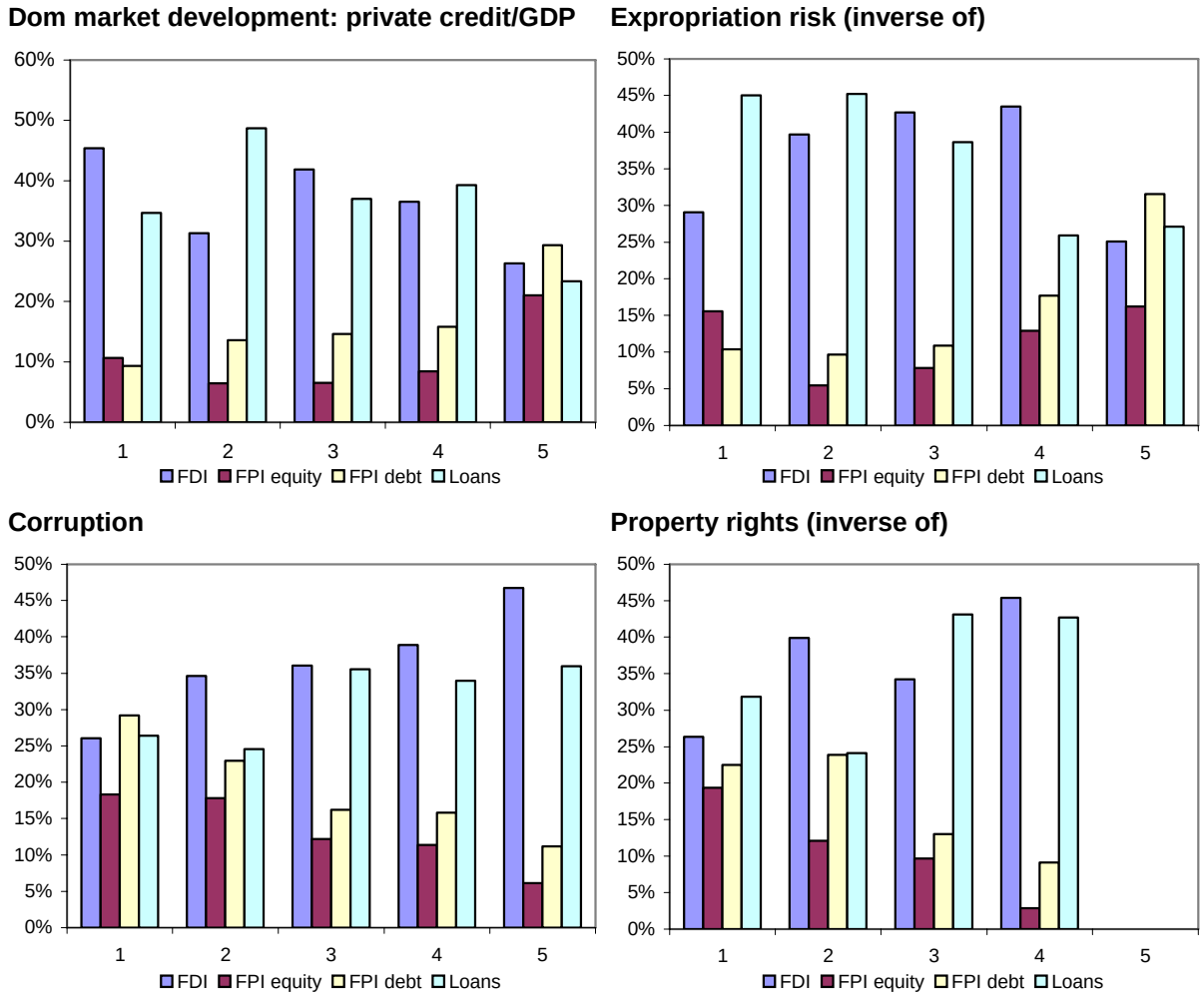
Note: GDP growth volatility is the standard deviation of annual real GDP growth rates over the period 1980-2003. Exchange rate volatility is defined as the standard deviation of the monthly nominal exchange rate changes vis-à-vis the US dollar over the period 1980-2003. The x-axis shows the first to fifth quintiles of countries. Sources: IMF CPIS and IFS; UNCTAD; BIS; authors' calculations.

Figures 3 and 4 illustrate these points in more detail by showing the distributions of the shares of individual types of capital by quintiles of the variable of interest, eg starting with the quintile of countries with the lowest GDP per capita on the left and leading up to those with the highest GDP per capita (top left panel of Figure 3). The top right panel of Figure 3 shows that countries that had the highest volatility in GDP growth rates – as measured as the standard deviation of annual real GDP growth rates over the period 1980-2003 – also experienced the highest degree of output volatility.

Figure 4 shows corresponding charts for market development and various institutional indicators. For instance, countries with the least developed domestic financial markets – as proxied by credit to the private sector to GDP – have the highest share of the inward investment from abroad in the form of FDI and loans, which both fall as domestic financial development improves. Moreover, the bottom left panel of Figure 4 indicates that countries with higher corruption receive relatively more FDI and loans, and substantially less portfolio investment. Finally, also countries with a worse protection of property rights – as indicated by a rise in the indicator shown – have a larger share of FDI and loans and relatively fewer equity and debt securities.

Figure 4

Stylised facts of pecking order: market development and institutions



Note: A higher value of the expropriation risk indicator means a lower degree of risk, and a larger indicator for property rights indicates a worse protection of property rights. The x-axis shows the first to fifth quintiles of countries.

Sources: IMF CPIS and IFS; UNCTAD; BIS; authors' calculations.

Overall, these stylised facts provide some first, descriptive evidence that there is indeed a pecking order in cross-border investment, as the various types of foreign capital stocks are strongly correlated with indicators of market development and institutions. A detailed analysis of the causality underlying these relationships is provided in the subsequent sections.

4. The pecking order and the role of information frictions

We now turn to our econometric results. We start with the analysis of the role of information frictions (Section 4), before presenting the findings with regard to the role of markets and institutions (Section 5).

4.1 Benchmark results

What is the role of information frictions in explaining the pecking order of cross-border investment positions? A first important issue is how to measure information frictions. We start

by following the common practice in the literature both on trade in goods and on trade in financial assets and proxy information frictions through the log geographic distance between country pairs. We then proceed by using various alternative measures for information. Table 3 shows the results of our benchmark model (1), which includes in addition to distance a set of standard gravity variables, such as dummy variables on whether or not the two countries have a common language, a common legal origin and colonial links, and whether they have a trade agreement or a joint investment treaty to facilitate cross-border investment. The results are compelling both with regard to our hypothesis H_2 about the pecking order of cross-border investment positions and with regard to the volume effects hypothesis H_1.

Table 3

Information frictions: distance

	FDI	**FPI equity**	**FPI debt**	**Loans**	**Significance for pecking order**					
					FDI vs			equity vs		debt vs
					equity	debt	loans	debt	loans	loans
Distance	–1.180***	–0.676***	–0.808***	–1.231***	**0.00**	**0.00**	0.52	**0.07**	**0.00**	**0.00**
	(0.068)	(0.057)	(0.063)	(0.068)						
Common language	0.433***	0.324**	0.111	0.247	0.54	0.11	0.32	0.22	0.67	0.46
	(0.160)	(0.135)	(0.149)	(0.161)						
Common legal origin	0.713***	0.568***	0.395***	0.438***	0.24	**0.02**	**0.04**	0.15	0.31	0.74
	(0.112)	(0.094)	(0.104)	(0.113)						
Colonial links	0.924***	0.333*	0.198	0.321	**0.01**	**0.01**	**0.02**	0.56	0.96	0.62
	(0.216)	(0.182)	(0.200)	(0.217)						
Trade agreement	–0.167	–0.336**	0.617***	0.230	0.38	**0.00**	**0.06**	**0.00**	**0.00**	**0.05**
	(0.175)	(0.147)	(0.163)	(0.176)						
Investment treaty	0.260**	0.027	0.094	0.429***	**0.06**	0.24	0.20	0.58	**0.00**	**0.01**
	(0.113)	(0.095)	(0.105)	(0.113)						
# obs	1116	1116	1116	1116						
R-squared	0.828	0.907	0.881	0.847						

Note: The underlying econometric model is that of (1): $\log\left(1+y_{ij}^{k}\right)=\alpha_i^k+\alpha_j^k+\beta^k X_{ij}+\varepsilon_{ij}^k$, with the right-hand columns showing the p-values for the pecking order hypothesis: $H_2:\beta^{k1}=\beta^{k2}$.

***,** and * show statistical significance of the coefficients at the 99%, 95% and 90% levels, respectively.

FDI and loans are substantially more sensitive to changes in distance than portfolio equity and portfolio debt investment. The differences in the effects are sizeable as the coefficients for FDI and loans are both around -1.2 as compared to point estimates of -0.67 and -0.80 for portfolio equity and debt. Also, these differences are highly statistically significant as shown in the right-hand columns of the table.[10]

[10] Note that while the information variables have a larger effect on FDI than on portfolio investment (our pecking order hypothesis), the goodness-of-fit of the model for FDI is generally somewhat lower than that of portfolio investment equity and debt. This finding comes from the lower explanatory power of the fixed effects in the models for FDI, which can be seen by estimating the models including only the fixed effects.

It is interesting to point out that the size of the estimated coefficients for distance is in line with the empirical literature on trade in assets, eg Portes and Rey (2005) report a coefficient of –0.89. In addition, the effect of distance on asset trade is greater than its effect on trade in goods, which according to Leamer and Levinsohn (1995) is mostly around -0.6. In the case of goods, Grossman (1998) shows that for sensible values of transportation costs, the distance elasticity should be around –0.03.[11] Thus, he concludes that information costs must be behind the empirical result that the effect is around 20 times larger. For trade in assets, it therefore seems that the case for distance reflecting information rather than trade costs is even more compelling. We explore this information hypothesis in more detail below.

The point estimates for the variables on what is often referred to as "familiarity" effects are sensible as they have the correct sign and are mostly statistically significant. Like for the distance variable, FDI reacts much more strongly to these familiarity effects than is the case for portfolio equity and debt investment. For instance, when both countries speak the same language, FDI stocks in host countries are 54 percent higher and portfolio equity investment 38 percent larger, whereas portfolio debt investment and loans are not statistically significantly different.[12]

4.2 Robustness: alternative proxies for information frictions

How robust are these findings to different proxies for information frictions? Clearly, it may seem odd to proxy information frictions for trade in financial assets through geographical distance as one would expect that geography should have little to do with financial transactions. However, the literature on capital flows has repeatedly found distance to be highly significant, see eg Portes and Rey (2005) for equity flows. Nevertheless, it is useful to employ alternative and ideally more direct proxies for information frictions. We use three proxies: the amount of telephone traffic between two countries, the trade in newspapers, and the bilateral stock of immigrants of the source country living in the host country and vice versa.

The intuition for the use of these variables as proxies for the degree of information frictions is straightforward. The volume of telephone call traffic was proposed first by Portes and Rey (2005) and has been used in the most recent empirical literature.[13] Telephone traffic is a proxy of the amount of information that flows between both countries, and it is assumed that a larger volume of information flows – controlling additionally for the size of both economies – implies less informational frictions. A similar rationale has been put forward to use trade in newspapers and periodicals by Nicita and Olarreaga (2000) to study information spillovers in goods markets. They report a high correlation of trade in newspapers with telephone traffic (a simple correlation of 0.77), but prefer their measure due to greater data availability. Finally, Gould (1994) analyses the impact of the stock of immigrants in the United States on trade between the Uunited States and the immigrants' country of origin. The intuition is that immigrants have better information on the markets and institutions in their home country, which would lower transaction costs.

Table 4 shows the results when adding telephone traffic to the benchmark model. One important result is that when adding telephone traffic, it is not only highly significant, but distance becomes insignificant for FDI and portfolio equity and debt investment. Distance

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[11] For a recent survey on the importance of trade costs, see Anderson and van Wincoop (2004).

[12] Note that the coefficients for the dummy variables are not strictly elasticities. The calculation of the elasticity, for instance for the former variable, can be done by using: exp(0.43) – 1 = 0.537.

[13] See Portes, Rey and Oh (2001) for the case of equity flows; Loungani, Mody and Razin (2002), as well as di Giovanni (2005) for FDI; and Mody, Razin and Sadka (2003) for FDI and equity.

retains its significance for loans, albeit with a much smaller coefficient of –0.34 as compared to –1.23 in the benchmark model of Table 3. It is important to point out that this result is not driven by multicollinearity problems between telephone traffic and distance, given that the simple correlation between both variables in our sample is just –0.13. In addition, although the sample is reduced due to the availability restrictions on telephone traffic, if we re-estimate the regression from Table 3 for this subsample, the distance coefficients are negative, significant, and not different from the estimates for the whole sample. Therefore, distance seems to be a proxy for overall information frictions in asset trade. When comparing the pecking order effect of information frictions, telephone traffic is again significantly larger for FDI and also loans than for equity and debt.

Table 4

Information frictions: distance versus telephone traffic

	FDI	**FPI equity**	**FPI debt**	**Loans**	**Significance for pecking order**					
					FDI vs			equity vs		debt vs
					equity	debt	loans	debt	loans	loans
Distance	–0.072	–0.091	–0.071	–0.341**	0.90	1.00	**0.10**	0.90	0.12	**0.09**
	(0.130)	(0.112)	(0.131)	(0.134)						
Telephone traffic	0.721***	0.447**	0.399***	0.595***	**0.00**	**0.00**	0.23	0.63	0.15	**0.06**
	(0.083)	(0.072)	(0.084)	(0.086)						
Common language	–0.016	0.130	0.126	–0.144	0.49	0.56	0.57	0.98	0.22	0.22
	(0.181)	(0.157)	(0.184)	(0.187)						
Common legal origin	0.505***	0.448***	0.327**	0.402***	0.70	0.30	0.52	0.42	0.77	0.63
	(0.126)	(0.109)	(0.128)	(0.130)						
Colonial links	0.353	–0.055	–0.177	–0.357	0.13	**0.10**	**0.01**	0.66	0.30	0.53
	(0.216)	(0.182)	(0.200)	(0.217)						
Trade agreement	–0.106	–0.299*	0.845***	0.304	0.37	**0.00**	**0.07**	**0.00**	**0.01**	**0.02**
	(0.184)	(0.159)	(0.186)	(0.190)						
Investment treaty	0.078	0.314**	0.313*	0.591***	0.21	0.29	0.01	1.00	0.17	0.16
	(0.162)	(0.140)	(0.164)	(0.167)						
# obs	595	595	595	595						
R-squared	0.873	0.928	0.884	0.850						

Note: The underlying econometric model is that of (1): $\log\left(1+y_{ij}^{k}\right)=\alpha_{i}^{k}+\alpha_{j}^{k}+\beta^{k}X_{ij}+\varepsilon_{ij}^{k}$, with the right-hand columns showing the p-values for the pecking order hypothesis: $H_2:\beta^{k1}=\beta^{k2}$.

***,** and * show statistical significance of the coefficients at the 99%, 95% and 90% levels, respectively.

Table 5

Information frictions: alternative information proxies

	FDI			FPI equity			FPI debt			Loans		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Distance	–1.021*** (0.073)^{E,D}	–0.736*** (0.115)^{E,D}	–0.225 (0.148)^{L}	–0.602*** (0.062)^{F,L}	–0.521*** (0.085)^{F,D,L}	–0.258** (0.111)	–0.722*** (0.069)^{F,L}	–0.345*** (0.095)^{F,E,L}	–0.073 (0.124)	–1.062*** (0.074)^{E,D}	–0.855*** (0.122)^{E,D}	–0.438*** (0.163)^{F}
Trade in newspapers	0.064*** (0.012)^{E,D}			0.030*** (0.010)^{F,L}			0.035*** (0.011)^{F,L}			0.069*** (0.012)^{E,D}		
Stock of foreigners		0.180*** (0.050)			0.105*** (0.037)			0.107** (0.041)			0.127** (0.053)	
Principal component			0.498*** (0.087)^{E,D}			0.298*** (0.065)^{F}			0.209*** (0.073)^{F,L}			0.406*** (0.096)^{D}
Common language	0.364** (0.159)	0.244 (0.207)	0.066 (0.229)	0.292** (0.135)	0.146 (0.153)	0.128 (0.172)	0.073 (0.148)	–0.069 (0.172)	0.097 (0.191)	0.173 (0.159)	–0.089 (0.220)	0.082 (0.252)
Common legal origin	0.665*** (0.111)^{D,L}	0.767*** (0.166)^{E}	0.759*** (0.186)^{E}	0.545*** (0.094)	0.451*** (0.123)^{F,L}	0.418*** (0.139)^{F,D,L}	0.368*** (0.104)^{F}	0.654*** (0.138)^{L}	0.712*** (0.155)^{E}	0.386*** (0.112)^{F}	1.012*** (0.176)^{E,D}	0.967*** (0.204)^{E}
Colonial links	0.778*** (0.215)^{E,D,L}	–0.274 (0.357)	–0.380 (0.370)	0.265 (0.182)^{F}	–0.279 (0.264)	–0.358 (0.278)	0.118 (0.201)^{F}	–0.071 (0.296)	–0.324 (0.309)	0.166 (0.216)^{F}	–0.577 (0.378)	–0.597 (0.407)
Trade agreement	–0.162 (0.173)^{D,L}	0.241 (0.197)^{D}	0.171 (0.205)^{D}	(0.333)** (0.147)^{D,L}	–0.037 (0.146)^{D,L}	0.022 (0.154)^{D,L}	0.620*** (0.162)^{F,E,L}	0.917*** (0.163)^{F,E,L}	0.693*** (0.172)^{F,E}	0.235 (0.174)^{F,E,D}	0.438** (0.209)^{E,D}	0.446** (0.226)^{E}
Investment treaty	0.218* (0.112)^{E}	–0.026 (0.225)^{D,L}	–0.435 (0.279)^{E,D,L}	0.007 (0.095)^{F,L}	0.334** (0.167)	0.318 (0.209)^{F}	0.071 (0.105)^{L}	0.617*** (0.187)^{F}	0.698*** (0.233)^{F}	0.385*** (0.112)^{E,D}	0.483** (0.239)^{F}	0.766** (0.307)^{F}
# observations	1116	474	332	1116	474	332	1116	474	332	1116	474	332
R-squared	0.832	0.864	0.876	0.908	0.928	0.938	0.882	0.904	0.913	0.851	0.842	0.839

Note: The underlying econometric model is that of (1): $\log\left(1+y_{ij}^{k}\right)=\alpha_{i}^{k}+\alpha_{j}^{k}+\beta^{k}X_{ij}+\varepsilon_{ij}^{k}$. The superscripted letters indicate for the pecking order hypothesis, $H_2:\beta^{k1}=\beta^{k2}$, that the respective coefficient is different that of FDI for ^{F}, different that of equity portfolio investment for ^{E}, different that of debt securities for ^{D} and different that of loans for ^{L}. ***,** and * show statistical significance of the coefficients at the 99%, 95% and 90% levels, respectively.

Table 5 gives the estimates for the other two alternative information proxies as well as for a model that instead includes the first principal component of the three proxies. We include the principal component of all three alternative proxies because it may help alleviate measurement errors related to each individual variable.[14] The results confirm that FDI and loans are more sensitive to information frictions. However, distance remains significant in most of these specifications, and with the same order as before as information generally has the largest effects on FDI and loans and the smallest impact on portfolio equity and debt.

4.3 Robustness: alternative model specifications and controls

Finally, we conduct a battery of sensitivity tests by using alternative econometric specification and by adding various controls to the empirical specification of the model. A first test is to ask whether the results are robust to taking ratios, of GDP or of total capital stocks, as dependent variables, which is commonly done in the literature, despite the controversial assumptions underlying such a specification, as discussed in Section 3.1. Table 6 shows the estimates for the benchmark model where the dependent variable is measured as a percentage of source and host country GDP and as a percentage of total capital flows from source country i to host country j. The results indicate that although the coefficients are very different, our overall results with regard to the pecking order still hold: FDI and loans are in both specifications significantly and substantially larger than portfolio equity and portfolio debt investment.

As the next step, we investigate the robustness of the results to using alternative econometric estimators. Table 7 provides the results for a TOBIT estimator and for an OLS estimator without source and host country fixed effects. The estimates of the TOBIT model are in line with those obtained from our OLS benchmark. Recall that the TOBIT model is a non-linear estimator that uses a mixture of a continuous distribution over the non-censored observations and a discrete distribution for the censored ones. The point estimates shown in the table are the marginal effects evaluated at the mean of the independent variables. Hence the size of the marginal effects is not so meaningful.

There are some interesting differences between the model with and that without fixed effects. The model without fixed effects is estimated by including nominal GDP (in US dollars) and the population of both the source country and the host country instead of the fixed effects. There are two important points to note from the results. First, almost all point estimates for the proxies of information frictions are substantially different from those of the benchmark fixed effects model. This lends support to the point we made above that it is important to estimate the model by including fixed effects as otherwise the point estimates are biased due to omitted variables. Nevertheless, even without the fixed effects our pecking order hypothesis is confirmed. Second, note that the hypothesis that the point estimates of the GDP variables are equal to one is rejected in almost all equations. This is a noteworthy fact because it stresses that a "normalisation" of the model, ie including the dependent variables as ratios of GDP, imposes incorrect restrictions on the parameters of the model.[15]

[14] About 81 percent of the total variation in the three alternative proxies is explained by their first principal component. The factor loadings are high for all three variables, so that they seem to be well represented by the first factor.

[15] We also tested for the importance of censoring, due to a few of the observations in our sample being zero, by using Heckman's (1979) two-step procedure. While the results are not shown for brevity reasons, the point estimates are very similar, underscoring that there is no significant bias stemming from a censoring problem in our data.

Table 6

Information frictions: ratios as % of GDP and total capital stocks

	FDI	FPI equity	FPI debt	Loans	FDI	FPI equity	FPI debt	Loans
	Ratio as % of GDP				Ratio as % of total capital stocks			
Distance	–0.453*** (0.054)^{E,D}	–0.105*** (0.016)^{F,D,L}	–0.243*** (0.030)^{F,E,L}	–0.527*** (0.056)^{E,D}	–0.282*** (0.065)^{E,D}	0.086 (0.062)^{F,L}	0.051 (0.062)^{F,L}	–0.339*** (0.050)^{E,D}
Common language	0.425*** (0.127)^{E,D,L}	0.058 (0.037)^{F,L}	0.010 (0.070)^{F,L}	–0.255* (0.131)^{F,E,D}	0.097 (0.150)^{L}	0.012 (0.142)	–0.238* (0.143)	–0.286** (0.115)^{F}
Common legal origin	–0.027 (0.089)^{D}	0.060** (0.026)^{D}	0.170*** (0.048)^{F,E}	0.151 (0.092)	0.246** (0.104)	0.212** (0.098)	0.021 (0.099)	0.109 (0.080)
Colonial links	0.355** (0.170)	0.200*** (0.050)^{L}	0.271*** (0.093)	0.516*** (0.176)^{E}	0.457** (0.204)^{E,L}	–0.100 (0.193)^{F}	0.009 (0.194)	–0.102 (0.157)^{F}
Trade agreement	0.127 (0.136)^{D}	–0.007 (0.040)^{D}	0.470*** (0.075)^{F,E,L}	–0.107 (0.141)^{D}	–0.219 (0.159)^{D}	–0.335** (0.151)^{D}	0.482*** (0.151)^{F,E,L}	–0.117 (0.122)^{D}
Investment treaty	–0.308*** (0.092)^{E,D}	–0.066** (0.027)^{F,L}	–0.080 (0.050)^{F,L}	–0.271*** (0.095)^{E,D}	–0.058 (0.121)^{L}	–0.002 (0.115)^{L}	–0.081 (0.115)^{L}	0.293*** (0.093)^{F,E,D}
# obs	1027	1027	1027	1027	842	842	842	842
R-squared	0.323	0.499	0.549	0.369	0.985	0.932	0.937	0.756

Note: The underlying econometric model is that of (1): $\log\left(1+y_{ij}^{k}\right)=\alpha_i^k+\alpha_j^k+\beta^k X_{ij}+\varepsilon_{ij}^k$. The superscripted letters indicate for the pecking order hypothesis, $H_2:\beta^{k1}=\beta^{k2}$, that the respective coefficient is different from that of FDI for ^{F}, different from that of equity portfolio investment for ^{E}, different from that of debt securities for ^{D} and different from that of loans for ^{L}.

***,** and * show statistical significance of the coefficients at the 99%, 95% and 90% levels, respectively.

Next, we test for the presence of asymmetries in the effects of information fictions across samples. In particular, it is possible that some types of countries are much more sensitive to information than others, for instance those where information is already very scarce. Table 8 shows the results when estimating the benchmark model (1) separately for when only industrialised countries and when only EMEs are the host countries. Overall, the results confirm that FDI and loans are most sensitive to information frictions. Moreover, some interesting differences across country groups emerge. In particular, capital stocks are much more sensitive to information and familiarity effects when the host country is an emerging market economy. The elasticity for FDI, for instance, is –1.54 for EMEs but only –0.89 for industrialised countries. Investment in EMEs also appears to be more sensitive to the common language and the colonial links. Taken together, these findings confirm our hypothesis on the pecking order, but also underline the presence of important asymmetries in the effect of information frictions.

One set of explanations that we have not analysed so far is *risk sharing or risk diversification* as a driver of cross-border investment. As discussed in Section 2, there is a large literature on the determinants of risk sharing and home bias. Thus the motivation for the type and direction of cross-border capital flows may not only be information frictions and institutions but also the attempt to diversify idiosyncratic, home country risk. Obstfeld and Rogoff (2000), Lane and Milesi-Ferretti (2004) and Aviat and Coeurdacier (2005) argue that a source country that receives a high share of its imports from a particular host country will want to acquire more capital in this specific host country in order to insure itself against terms of trade shocks to this country. Extending this argument to risk diversification, it may be optimal for investors to invest relatively more in those countries with the lowest or even a negative degree of output correlation with its own.

Table 7

Information frictions: alternative estimators

	FDI	FPI equity	FPI debt	Loans	FDI	FPI equity	FPI debt	Loans
	Without fixed effects				TOBIT estimator			
GDP: source cty	1.985*** (0.065)^{E,D,L}	2.167*** (0.062)^{F,D,L}	1.821*** (0.069)^{F,E,L}	1.100*** (0.074)^{F,E,D}				
GDP: host cty	0.854*** (0.045)^{E,D,L}	1.647*** (0.043)^{F,D,L}	1.386*** (0.048)^{F,E,L}	1.137*** (0.051)^{F,E,D}				
Population: source cty	–1.108*** (0.071)^{E,L}	–1.543*** (0.067)^{F,D,L}	–1.100*** (0.075)^{E,L}	–0.106 (0.080)^{F,E,D}				
Population: host cty	–0.093* (0.051)^{E,D,L}	–0.650*** (0.048)^{F,L}	–0.619*** (0.054)^{F,L}	–0.326*** (0.058)^{F,E,D}				
Distance	–0.462*** (0.064)^{E,L}	–0.181*** (0.061)^{F,D,L}	–0.460*** (0.067)^{E,L}	–0.717*** (0.073)^{F,E,D}	–1.072*** (0.051)	–0.988*** (0.056)	–0.954*** (0.057)	–1.445*** (0.054)
Common language	0.949*** (0.179)^{E,D,L}	1.263*** (0.169)^{F,D,L}	0.309 (0.188)^{F,E}	0.307 (0.202)^{F,E}	0.641*** (0.134)	0.556*** (0.125)	0.425*** (0.127)	0.183 (0.114)
Common legal origin	0.940*** (0.146)^{E,D}	0.603*** (0.138)^{F}	0.574*** (0.154)^{F}	0.805*** (0.165)	0.704*** (0.092)	0.547*** (0.090)	0.380*** (0.091)	0.271*** (0.080)
Colonial links	1.181*** (0.282)	0.729*** (0.267)^{D}	0.889*** (0.297)^{E}	1.370*** (0.319)	1.096*** (0.167)	0.917*** (0.168)	0.456** (0.176)	0.898*** (0.146)
Trade agreement	0.486*** (0.181)^{E}	0.723*** (0.172)^{F,D}	1.576*** (0.191)^{E,L}	0.837*** (0.205)^{D}	0.592*** (0.146)	0.453*** (0.146)	0.929*** (0.153)	0.011 (0.152)
Investment treaty	0.310** (0.125)^{E}	–0.153 (0.119)^{F,L}	0.048 (0.132)^{L}	0.504*** (0.142)^{E,D}	–0.129 (0.086)	–0.039 (0.087)	0.002 (0.088)	0.579*** (0.074)
# obs	1030	1030	1030	1030	1116	1116	1116	1116
(Pseudo) R-squared	0.651	0.757	0.679	0.589	0.357	0.486	0.418	0.369

Note: The underlying econometric model is that of (1): $\log\left(1+y_{ij}^{k}\right)=\alpha_i^k+\alpha_j^k+\beta^k X_{ij}+\varepsilon_{ij}^k$. The superscripted letters indicate for the pecking order hypothesis, $H_2:\beta^{k1}=\beta^{k2}$, that the respective coefficient is different from that of FDI for ^{F}, different from that of equity portfolio investment for ^{E}, different from that of debt securities for ^{D} and different from that of loans for ^{L}. Note that no such tests are possible for the TOBIT specification because it is not estimated as a system of equations.

***,** and* show statistical significance of the coefficients at the 99%, 95% and 90% levels, respectively.

Table 8

Information frictions: developed countries versus emerging market economies

	FDI	FPI equity	FPI debt	Loans	FDI	FPI equity	FPI debt	Loans
	Developed countries				Emerging market economies			
Distance	–0.893*** (0.097)^{E,D}	–0.693*** (0.076)^{F,D,L}	–0.513*** (0.076)^{F,E,L}	–1.047*** (0.096)^{E,D}	–1.543*** (0.106)^{E,D}	–0.589*** (0.095)^{F,D,L}	–1.019*** (0.097)^{F,E,L}	–1.595*** (0.100)^{E,D}
Common language	0.097 (0.203)	0.153 (0.158)	0.175 (0.159)	–0.091 (0.200)	0.942*** (0.260)^{E,D}	0.444* (0.232)^{F,L}	0.336 (0.238)^{F,L}	0.975*** (0.244)^{E,D}
Common legal origin	0.975*** (0.144)^{E,D}	0.655*** (0.112)^{F,D}	0.393*** (0.113)^{F,D,L}	0.853*** (0.142)^{D}	0.550*** (0.177)^{L}	0.543*** (0.158)^{L}	0.411** (0.162)^{L}	–0.104 (0.167)^{F,E,D}
Colonial links	0.681** (0.294)^{L}	0.326 (0.229)	0.397* (0.231)^{L}	–0.218 (0.291)^{F,D}	0.998*** (0.330)^{E}	0.083 (0.294)^{F,L}	0.387 (0.302)	0.851*** (0.310)^{E}
Trade agreement	0.206 (0.218)^{D}	–0.183 (0.170)^{D,L}	1.099*** (0.171)^{F,E,L}	0.441** (0.216)^{E,D}	0.212 (0.748)	1.226* (0.667)	0.808 (0.684)	0.663 (0.702)
Investment treaty	0.150 (0.224)^{L}	0.079 (0.175)L	0.374** (0.176)^{L}	0.879*** (0.222)^{F,E,D}	0.238* (0.140)^{D}	0.016 (0.125)	–0.065 (0.128)^{F}	–0.006 (0.132)
# obs	573	573	573	573	543	543	543	543
R-squared	0.872	0.928	0.917	0.848	0.780	0.857	0.842	0.854

Note: The underlying econometric model is that of (1): $\log\left(1+y_{ij}^{k}\right)=\alpha_i^k+\alpha_j^k+\beta^k X_{ij}+\varepsilon_{ij}^k$. The superscripted letters indicate for the pecking order hypothesis, $H_2:\beta^{k1}=\beta^{k2}$, that the respective coefficient is different from that of FDI for ^{F}, different from that of equity portfolio investment for ^{E}, different from that of debt securities for ^{D} and different from that of loans for ^{L}.

***,** and * show statistical significance of the coefficients at the 99%, 95% and 90% levels, respectively.

We therefore add to our benchmark model imports of source country *i* from host country *j* (see left panel of Table 9) to investigate whether the findings for information frictions change when controlling for proxies of risk sharing. The table shows that trade is indeed positively correlated with all four types of capital investment. As an alternative control, we include bilateral real exchange rate volatility, measured over the period 1990-2003, as a regressor (middle panel of Table 9) in order to test whether uncertainty and risk affects cross-border investment. It is, however, found to be significant only for investment in debt securities, and to a lesser degree for FDI.[16] We also attempt to control for the effect of global factors on cross-border investment. The intuition is that two countries that exhibit a very different responsiveness to global shocks should also have less bilateral investment. We use daily US short-term interest rate changes as our proxy for global shocks, and take the difference in the reaction of short-term interest rates between the source country and host country as our measure of the different response to global shocks.[17] The right panel of Table 9 shows that the difference in the response to such global shocks indeed reduces bilateral portfolio investment and loans, though not FDI.

[16] We also tested for the interaction effect of exchange rate volatility and information, but did not find any additional effect of this interaction in the empirical model.

[17] Short-term interest rates for most countries are three-month money market rates, if available. The estimation is based on daily interest rate changes over the period 1990–2004.

Table 9

Information frictions: robustness tests with trade, exchange rate volatility and global interest rate shocks as controls

	FDI	FPI equity	FPI debt	Loans	FDI	FPI equity	FPI debt	Loans	FDI	FPI equity	FPI debt	Loans
	With control for trade				With control for exchange rate volatility				With control for global interest rate shock			
Distance	–0.692*** (0.088)^{E}	–0.362*** (0.074)^{F,D,L}	–0.689*** (0.083)^{E}	–0.773*** (0.088)^{E}	–1.232*** (0.073)^{E,D}	–0.655*** (0.062)^{F,L}	–0.694*** (0.068)^{F,L}	–1.246*** (0.074)^{E,D}	–0.995*** (0.079)^{E,D}	–0.605*** (0.063)^{F,L}	–0.563*** (0.075)^{F,L}	–1.063*** (0.083)^{E,D}
Trade: imports	0.384*** (0.047)^{E,D}	0.247*** (0.040)^{F,D,L}	0.119*** (0.044)^{F,E,L}	0.382*** (0.047)^{E,D}								
Exchange rate volatility					10.875* (5.968)^{D}	–4.388 (5.028)^{D}	–23.816*** (5.502)^{F,E,L}	3.136 (6.004)^{D}				
Global interest rate shock									0.191 (0.150)^{E,D,L}	–0.389*** (0.119)^{F}	–0.345** (0.142)^{F}	–0.322** (0.158)^{F}
Common language	0.384** (0.161)^{D}	0.334** (0.136)^{D}	0.037 (0.152)^{F,E}	0.176 (0.162)	0.454*** (0.160)	0.316** (0.135)^{D}	0.066 (0.148)^{E}	0.253 (0.161)	0.368** (0.175)^{D,L}	0.257* (0.139)	0.050 (0.166)^{F}	0.025 (0.184)^{F}
Common legal origin	0.603*** (0.113)^{L}	0.500*** (0.095)	0.390*** (0.106)	0.330*** (0.113)^{F}	0.703*** (0.112)^{D,L}	0.572*** (0.094)	0.417*** (0.103)^{F}	0.435*** (0.113)^{F}	0.628*** (0.124)^{D}	0.538*** (0.098)	0.443*** (0.118)^{F}	0.631*** (0.131)
Colonial links	0.811*** (0.216)^{E,D,L}	0.208 (0.183)^{F}	0.135 (0.203)^{F}	0.209 (0.218)^{F}	0.922*** (0.215)^{E}	0.334* (0.181)^{F}	0.200 (0.199)	0.321 (0.217)	0.905*** (0.252)^{E,D,L}	0.380* (0.199)^{F}	0.221 (0.239)^{F}	0.304 (0.265)^{F}
Trade agreement	–0.075 (0.173)^{D}	–0.283* (0.147)^{D,L}	0.632*** (0.163)^{F,E,L}	0.267 (0.175)^{E,D}	–0.068 (0.183)^{D,L}	–0.376** (0.154)^{D,L}	0.399** (0.169)^{F,E}	0.258 (0.184)^{F,E}	0.080 (0.184)^{D,L}	–0.170 (0.145)^{D,L}	0.877*** (0.174)^{F,E}	0.463** (0.193)^{F,E}
Investment treaty	0.042 (0.118)^{L}	–0.038 (0.100)D	–0.010 (0.111)^{E,L}	0.297** (0.119)^{F,E,D}	0.222* (0.115)^{L}	0.042 (0.096)^{L}	0.177* (0.106)^{L}	0.419*** (0.115)^{F,E,D}	0.458*** (0.144)	0.335*** (0.114)	0.330** (0.137)	0.532*** (0.152)
# observations	1027	1027	1027	1027	782	782	782	782	1027	1027	1027	772
R-squared	0.841	0.911	0.883	0.851	0.845	0.920	0.895	0.849	0.830	0.912	0.876	0.823

Note: The underlying econometric model is that of (1): $\log\left(1+y_{ij}^{k}\right)=\alpha_{i}^{k}+\alpha_{j}^{k}+\beta^{k}X_{ij}+\varepsilon_{ij}^{k}$. The superscripted letters indicate for the pecking order hypothesis, $H_2:\beta^{k1}=\beta^{k2}$, that the respective coefficient is different from that of FDI for ^{F}, different from that of equity portfolio investment for ^{E}, different from that of debt securities for ^{D} and different from that of loans for ^{L}.

***,** and * show statistical significance of the coefficients at the 99%, 95% and 90% levels, respectively.

Table 10

Information frictions: robustness tests with institutional controls

	FDI			FPI equity			FPI debt			Loans		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Information:												
Distance	–1.180*** (0.068)^{E,D}	–0.939*** (0.079)^{E,D}	–1.162*** (0.073)^{E}	–0.676*** (0.057)^{F,L}	–0.557*** (0.066)^{F,D,L}	–0.652*** (0.061)^{F,L}	–0.808*** (0.063)^{F,L}	–0.628*** (0.078)^{F,E,L}	–0.802*** (0.068)	–1.231*** (0.068)^{E,D}	–0.933*** (0.083)^{E,D}	–1.228*** (0.074)^{E}
Common language	0.433*** (0.160)	0.302* (0.160)	0.358** (0.173)	0.324** (0.135)	0.265* (0.134)	0.287** (0.144)	0.111 (0.149)	0.096 (0.158)	–0.024 (0.161)	0.247 (0.161)	–0.131 (0.168)	0.093 (0.175)
Common legal origin	0.713*** (0.112)^{D,L}	0.683*** (0.112)^{E}	0.808*** (0.130)^{E}	0.568*** (0.094)	0.565*** (0.094)^{F,L}	0.598*** (0.108)^{F,D,L}	0.395*** (0.104)^{F}	0.314*** (0.111)^{L}	0.347*** (0.120)^{E}	0.438*** (0.113)^{F}	0.695*** (0.118)^{E,D}	0.587*** (0.131)^{E}
Colonial links	0.924*** (0.216)^{E,D,L}	0.838*** (0.226)	1.289*** (0.255)	0.333* (0.182)^{F}	0.428** (0.190)	0.440** (0.212)	0.198 (0.200)^{F}	0.686*** (0.224)	0.309 (0.237)	0.321 (0.217)F	0.475** (0.238)	0.472* (0.257)
Trade agreement	–0.167 (0.175)^{D,L}	0.209 (0.186)^{D}	–0.032 D (0.187)	–0.336** (0.147)^{D,L}	0.038 (0.157)^{D,L}	–0.233 (0.156)^{D,L}	0.617*** (0.163)^{F,E,L}	1.130*** (0.185)^{F,E,L}	0.736*** (0.174)^{F,E}	0.230 (0.176)^{F,E,D}	1.036*** (0.197)^{E,D}	0.504*** (0.189)^{E}
Investment treaty	0.260** (0.113)^{E}	0.237 (0.144)^{D,L}	0.224* (0.123)^{E,D,L}	0.027 (0.095)^{F,L}	0.051 (0.121)	0.003 (0.102)^{F}	0.094 (0.105)^{L}	0.300** (0.143)^{F}	0.065 (0.114)^{F}	0.429*** (0.113)^{E,D}	0.471*** (0.152)^{F}	0.467*** (0.124)^{F}
***Institutions*:**												
Cap account openness	6.821*** (0.466)^{E,D}			2.525*** (0.392)^{F,L}			4.039*** (0.433)^{F}			4.786*** (1.246)^{E}		
Expropriation risk		0.938*** (0.305)^{E,D,L}			1.796*** (0.286)^{F,L}			2.384*** (0.302)^{F,L}			–0.657* (0.359)^{F,E,D}	
Property rights			0.834*** (0.271)^{D}			1.052*** (0.228)^{L}			2.121*** (0.269)^{F,L}			0.778*** (0.196)^{E,D}
# observations	1116	1027	704	1116	1027	704	1116	1027	704	1116	1027	704
R-squared	0.828	0.841	0.841	0.907	0.911	0.917	0.881	0.883	0.881	0.847	0.851	0.837

Note: The underlying econometric model is that of (1): $\log\left(1+y_{ij}^{k}\right)=\alpha_{i}^{k}+\alpha_{j}^{k}+\beta^{k}X_{ij}+\varepsilon_{ij}^{k}$. The superscripted letters indicate for the pecking order hypothesis, $H_2:\beta^{k1}=\beta^{k2}$, that the respective coefficient is different from that of FDI for ^{F}, different from that of equity portfolio investment for ^{E}, different from that of debt securities for ^{D} and different from that of loans for ^{L}.

***,** and * show statistical significance of the coefficients at the 99%, 95% and 90% levels, respectively.

It is important to stress that trade, exchange rate volatility and possibly are likely to be to some extent endogenous to cross-border investment and one would need to find suitable instruments if one wanted to investigate the link between risk sharing and capital flows. However, the important point to note for the objective of this paper is that information frictions as proxied by distance (or other information proxies when substituted for distance) retain their significance and the pecking order of FDI and loans being the most sensitive to information frictions and portfolio investment the least sensitive is confirmed.[18]

Finally, in order to ensure that the coefficients of the information variables are not capturing, for instance, the differential between host and source country institutional characteristics, we estimate the benchmark model (1) by including interaction variables between host and source country institutional characteristics X_{ij}, measured as the sum of the institutional variables of both. Table 10 shows the results of this extension, using three different institutional variables (KA openness, expropriation risk, and property rights). Most importantly, the table shows that the pecking order hypothesis regarding our information proxies is confirmed, ie FDI continues to be significantly more sensitive to information than portfolio investment. Moreover, the explanatory power stemming from institutional factors – gauged from estimating the model separately with only information proxies and only institutional variables – is similar in magnitude. However, the main difficulty relates to institutions, as their coefficients cannot be interpreted in a meaningful way in this context. In particular: better institutions in the host country should *raise* cross-border investment from country i in country j. The opposite holds true for the source country: better institutions in country i should *lower* cross-border investment outflows from country i. Hence an insignificant coefficient for institutional interactions X_{ij} in the framework of Table 10 cannot be interpreted in a meaningful way as institutions may still be highly important, only that the positive effect of institutions in host country j may be offset by the negative effect of institutions in source country i. Thus, as explained in Section 3.1, we attempt to analyse the role of institutions in the second step of model (2), to which we turn in the next section.

Overall, the first key result that we take from this section is that there is a clear pecking order with regard to information frictions. FDI and loans are substantially more sensitive to information frictions than portfolio investment. The differences are large and statistically significant. These findings are also robust to several alternative proxies for information frictions, in particular when using telephone traffic. Moreover, various robustness tests confirm the specification of the model and underline the robustness of the results on the pecking order hypothesis to alternative specifications and different econometric estimators.[19]

Thus, the results indicate that FDI and loans are more sensitive to information frictions – or more information-intensive – than portfolio investment, equity and debt. A possible explanation for this fact is that FDI and loans in general require frequent interaction and a deeper knowledge of the markets where they operate. Also, especially for the case of FDI, once an asset has been acquired, direct ownership makes the asset less liquid given the potential lemon problem in case of a re-sale, as Goldstein and Razin (2006) point out. Thus,

[18] As a final check, we find that the results are robust to using alternative country samples, i.e. our pecking order hypothesis that FDI and loans are most sensitive to information frictions is confirmed for both emerging market countries as well as industrialised countries. Results are available upon request.

[19] We have also conducted further robustness checks, especially splitting the sample between industrialised and emerging economies, and the results hold for both groupings of countries. While we do not present the results here due to space considerations, they can be found in an earlier working paper version (Daude and Fratzscher, 2006).

FDI becomes partially irreversible or costlier to liquidate, and therefore more sensitive to information in the first place.[20]

5. The pecking order and the role of institutions and financial market development

We now turn to the role of financial markets and institutions. The central focus is on the question of whether we can identify a pecking order of cross-border capital positions with regard to the degree of development and openness of markets and the quality of institutions in the host country. For this purpose, we extract the host country fixed effects from model (1) and then estimate model (2), ie we attempt to explain the host country fixed effects through market conditions and institutions. Note that given the specification of model (1) where the dependent variable is measured in value terms, we need to control for size effects in model (2). We do so by including host country GDP in each of the specifications below, though we omit to show the point estimates for this variable for brevity reasons.[21] All variables used are described in more detail in Appendix B.

We start with the role of *market development and openness*. We use three different proxies. First, we employ a capital account openness dummy. This dummy takes the value of one if the country had fully liberalised its capital account by the mid-1990s, and is zero otherwise. Data for this variable come from the IMF's Annual Report of Exchange Arrangements and Exchange Restrictions (AREAER). The finding is remarkably strong as portfolio equity and portfolio debt investment react strongly to capital account openness, whereas the coefficients for FDI and loans are positive but only marginally statistically significant (see Table 11). The magnitude of the effects is large: a country that is open receives about 80% more equity capital and 80% more debt investment compared to an economy with a closed capital account.[22]

Second, we investigate the effect of the development of the domestic financial sector on the pecking order. We include credit to the private sector as a proxy for financial development. Table 11 shows that the elasticities are by the far the largest for equity investment, which is about twice as large as that for debt securities and FDI. These differences are statistically significant, while in the case of FDI investment appears to not react to changes in the degree of financial market development in the host country.

Third, we analyse the role of the development of the local stock market, and proxy this through stock market capitalisation. The bottom panel of Table 11 indicates again that equity investment is most strongly related to changes in market capitalisation but nevertheless also cross-border investment in debt securities, loans and FDI react, though to a lesser extent.

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[20] Although we cannot distinguish between greenfield investments and mergers and acquisitions in our data, this informational friction is linked to ownership control and thus applies to both types of FDI.

[21] Observe that all regressions exhibit a very high R-squared. This reflects the fact that the country effects are highly correlated with country size measured by GDP of 0.87, 0.90, 0.81 and 0.83 between the estimated host country fixed effects and the host's GDP for FDI, portfolio equity, portfolio debt and loans, respectively.

[22] Recall that only countries with existing stock and bond markets are included in the analysis, so that the results are not driven by an absence of such markets in closed economies.

Table 11

Role of market development and transparency

	FDI	FDI equity	FPI debt	Loans		FDI	FDI equity	FPI debt	Loans
	Market openness and development					**Transparency**			
Cap account openness	0.262 (0.232)	0.825** (0.354)	0.803** (0.372)	0.387 (0.288)	**Quality disclosure**	0.137* (0.074)^{E}	0.389*** (0.111)^{F,D,L}	0.191 (0.121)^{E}	0.134 (0.093)^{E}
# observations	69	69	69	69	# observations	65	65	65	65
R-squared	0.7556	0.8184	0.6801	0.7019	R-squared	0.7449	0.8355	0.6968	0.7079
Financial development	0.462 (0.321)^{E,D,L}	2.270*** (0.424)^{F,D,L}	1.396*** (0.469)^{F,E}	1.344*** (0.366)	**Accounting standards**	0.019 (0.011)^{E}	0.067*** (0.014)^{F,D,L}	0.033** (0.015)^{E}	0.024** (0.012)^{E}
# observations	64	64	64	64	# observations	37	37	37	37
R-squared	0.7311	0.8693	0.7537	0.7575	R-squared	0.5543	0.8117	0.6446	0.6261
Stock market capitalisation	0.435*** (0.126)^{E,L}	1.104*** (0.131)^{F,D,L}	0.560** (0.219)^{E}	0.743*** (0.133)^{F,E}	**Property rights**	–0.139 (0.118)^{E,D,L}	–0.847*** (0.158)^{F,L}	–0.904*** (0.156)^{F,L}	–0.570*** (0.133)^{F,E,D}
# observations	46	46	46	46	# observations	63	63	63	63
R-squared	0.6589	0.8880	0.6045	0.7349	R-squared	0.7410	0.8680	0.7992	0.7684

Note: The underlying econometric model is that of (2): $\alpha_j^k = \kappa^k + \lambda^k X_j + \mu_j^k$. The superscripted letters indicate for the pecking order hypothesis, $H_4 : \lambda^{k1} = \lambda^{k2}$, that the respective coefficient is different from that of FDI for ^{F}, different from that of equity portfolio investment for ^{E}, different from that of debt securities for ^{D} and different from that of loans for ^{L}. ***,** and * show statistical significance of the coefficients at the 99%, 95% and 90% levels, respectively.

Table 12

Role of investor protection and corruption

	FDI	FDI equity	FPI debt	Loans		FDI	FDI equity	FPI debt	Loans
	Investor protection					Corruption			
Expropriation risk	0.054 (0.125)^{E,D,L}	0.913*** (0.166)^{F,L}	0.952*** (0.175)^{F,L}	0.492*** (0.143)^{F,E,D}	**TI**	–0.048 (0.049)^{E,D,L}	–0.407*** (0.059)^{F,L}	–0.372*** (0.061)^{F,L}	–0.198*** (0.052)^{F,E,D}
# observations	66	66	66	66	# observations	61	61	61	61
R-squared	0.7497	0.8644	0.7562	0.7326	R-squared	0.7508	0.8835	0.7896	0.7618
Repudiation costs	0.078 (0.093)^{E,D,L}	0.781*** (0.115)^{F,,L}	0.701*** (0.132)^{F,L}	0.445*** (0.103)^{F,E,D}	**WDR**	–0.146 (0.099)^{E,D,L}	–0.583*** (0.137)^{F,L}	–0.434*** (0.143)^{F}	–0.335*** (0.107)^{F,E}
# observations	66	66	66	66	# observations	56	56	56	56
R-squared	0.7516	0.8832	0.7528	0.7542	R-squared	0.7330	0.8372	0.7109	0.7382
Days of enforcements	–0.103 (0.147)^{E,D}	–0.626*** (0.222)^{F,L}	–0.573** (0.229)^{F}	–0.277 (0.182)^{E}	**German survey**	–0.025 (0.036)^{E,D,L}	–0.254*** (0.048)^{F,L}	–0.242*** (0.048)^{F,L}	–0.113** (0.044)^{F,E,D}
# observations	65	65	65	65	# observations	57	57	57	57
R-squared	0.7335	0.8258	0.7127	0.7091	R-squared	0.7210	0.8477	0.7630	0.7051

Note: The underlying econometric model is that of (2): $\alpha_j^k = \kappa^k + \lambda^k X_j + \mu_j^k$. The superscripted letters indicate for the pecking order hypothesis, $H_4 : \lambda^{k1} = \lambda^{k2}$, that the respective coefficient is different from that of FDI for ^{F}, different from that of equity portfolio investment for ^{E}, different from that of debt securities for ^{D} and different from that of loans for ^{L}. ***,** and * show statistical significance of the coefficients at the 99%, 95% and 90% levels, respectively.

As a next step, we analyse the role of institutions for the pecking order of cross-border capital positions. As discussed in detail in Section 2, there have been a number of studies arguing that different types of capital should react differently to various institutional features. For instance, Albuquerque's (2003) model implies that FDI is harder to expropriate as the information required for and obtained by FDI is inalienable. Various other studies have focused on individual types of capital flows and how they are linked to other institutional elements such as corruption, transparency and political risk (eg Wei, 2000a; Papaioannou, 2005; Gelos and Wei, 2005).

We test the effect of various institutional features. While it is hard to determine which institutional factors to focus on, we are guided in our choice of institutional variables by the mostly theoretical literature discussed in Section 2. The sources for these variables are manifold, stemming partly from La Porta, Lopez-de-Silanes and Shleifer (1998) and Djankov et al (2002) and partly from the databases of the World Bank Doing Business and of the International Country Risk Guide (ICRG).

Tables 11 and 12 show the findings for three sets of institutional variables. First, we look at the role of *transparency*. For this, we employ both a measure of the quality of information disclosure and of the quality of the accounting standards required by law in the host country – with higher values indicating a better quality. For both measures, portfolio equity investment reacts the strongest to changes in these transparency measures, while in the case of accounting standards the coefficient for debt securities and loans is also significant at a 10% level. FDI and loans are the least responsive. In fact, the elasticity of equity investment is about three times larger than that for FDI and for loans.

Second, we analyse the role of *investor protection* (last regression in Table 11 and Table 12). In particular, a lower risk of *expropriation* – indicated by a higher value of the variable in the table – has a highly significant impact mainly on portfolio investment. By contrast, the elasticity of loans is only about one half of that of portfolio investment, while FDI does not react at all to differences in expropriation risk. This finding thus provides strong support for the hypothesis formulated by Albuquerque (2003) and is line with the stylised facts presented above in Section 3.

Moreover, Table 11 shows that an improvement in the quality of property rights – indicated by a decline in the variable in the table – has a significant and the largest impact on portfolio equity and debt investment, a lower effect on loans, but no effect on FDI. An almost identical picture emerges for repudiation costs and for the quality of enforcement of laws and regulations – which is measured in terms of the number of the days it takes to enforce a particular ruling: the higher the number, the worse the system of enforcement. Overall, all three measures therefore indicate that investor protection has the largest effect on portfolio investment but does not appear to have any significant effect on FDI stocks.

Third, we analyse the importance of *corruption* for the pecking order. We use three alternative proxies for corruption: the first from Transparency International, the second from the World Development Report of the World Bank, and the third from a survey of German manufacturing firms. All three indicators have been used previously by Wei (2000b). In all cases, a higher value indicates a higher degree of corruption. Overall, the same finding emerges for all three of the proxies: corruption has the strongest negative effect on portfolio investment and some, though smaller, effect on loans. Corruption does not appear to have any significant effect on FDI. This finding is in line with Daude and Stein (2004), who do not find a robust relation between different corruption indicators and FDI in contrast to other institutional indicators.

Table 13

Role of market development and transparency – 3SLS estimator

	FDI	FDI equity	FPI debt	Loans		FDI	FDI equity	FPI debt	Loans
	Market openness and development					Transparency			
Cap account openness	0.828* (0.460)^{E,D}	1.796** (0.717)^{F,D}	2.953*** (0.850)^{F,E,L}	1.112* (0.572)^{D}	**Quality disclosure**	–0.035 (0.136)^{E}	0.548*** (0.199)^{F,D,L}	0.117 (0.215)^{E}	0.147 (0.165)^{E}
# observations	65	65	65	65	# observations	65	65	65	65
R-squared	0.7162	0.8015	0.5682	0.6843	R–squared	0.7238	0.8303	0.6950	0.7079
Financial development	0.898* (0.538)^{E,L}	2.376*** (0.700)^{F}	1.491* (0.775)	2.207*** (0.266)^{F}	**Accounting standards**	0.019 (0.015)^{E}	0.069*** (0.018)^{F,D,L}	0.039* (0.019)^{E}	0.022 (0.015)^{E}
# observations	64	64	64	64	# observations	37	37	37	37
R-squared	0.7233	0.8692	0.7535	0.7364	R–squared	0.5543	0.8117	0.6434	0.6256
Stock market capitalisation	0.520*** (0.199)^{E,L}	1.036*** (0.205)^{F}	0.595* (0.341)	1.027*** (0.218)^{F}	**Property rights**	–0.468 (0.288)^{E,D,L}	–1.922*** (0.533)^{F,L}	–1.291*** (0.422)^{F}	–0.970*** (0.330)^{F,E}
# observations	45	45	45	45	# observations	33	33	33	33
R-squared	0.6374	0.8793	0.6017	0.6970	R–squared	0.7345	0.6593	0.6848	0.6645

Note: The underlying econometric model is that of (2): $\alpha_j^k = \kappa^k + \lambda^k X_j + \mu_j^k$. The superscripted letters indicate for the pecking order hypothesis, $H_4 : \lambda^{k1} = \lambda^{k2}$, that the respective coefficient is different from that of FDI for ^{F}, different from that of equity portfolio investment for ^{E}, different from that of debt securities for ^{D} and different from that of loans for ^{L}. The estimator is a three-stage least-squares (3SLS) one, where the instruments are legal origin dummies and religion dummies for market development and settler mortality (in logs) for institutions.

***,** and * show statistical significance of the coefficients at the 99%, 95% and 90% levels, respectively.

Table 14

Role of investor protection and corruption – 3SLS estimator

	FDI	FDI equity	FPI debt	Loans		FDI	FDI equity	FPI debt	Loans
	Investor protection					**Corruption**			
Expropriation risk	0.532* (0.306)^{E,D,L}	2.188*** (0.511)^{F,L}	1.473*** (0.462)^{F}	1.108*** (0.325)^{F,E}	**TI**	–0.163 (0.101)^{E,D,L}	–0.689*** (0.162)^{F,L}	–0.462*** (0.141)^{F}	–0.338*** (0.116)^{F,E}
# observations	34	34	34	34	# observations	31	31	31	31
R-squared	0.7683	0.7560	0.7003	0.7406	R–squared	0.7564	0.7691	0.7098	0.6773
Repudiation costs	0.416* (0.239) ^{E,D,L}	1.711*** (0.389) ^{F,L}	1.152*** (0.371) ^{F}	0.867*** (0.266)^{F,E}	**WDR**	–0.441 (0.270)^{E,D,L}	–1.860*** (0.618)^{F,L}	–1.274*** (0.485)^{F}	–0.890*** (0.351)^{F,E}
# observations	34	34	34	34	# observations	28	28	28	28
R-squared	0.7695	0.7691	0.6828	0.7165	R–squared	0.7460	0.5087	0.5050	0.5714
days for enforcement	–0.649 (0.444)^{E,D,L}	–2.666*** (0.444)^{F,L}	–1.791** (0.725)^{F}	–1.346** (0.646)^{F,E}	**German survey**	–0.125* (0.076)^{E,D,L}	–0.470*** (0.114)^{F,L}	–0.317*** (0.101)^{F}	–0.232** (0.096)^{F,E}
# observations	33	33	33	33	# observations	27	27	27	27
R-squared	0.6712	0.5034	0.5159	0.3297	R–squared	0.6809	0.7435	0.7024	0.5492

Note: The underlying econometric model is that of (2): $\alpha_j^k = \kappa^k + \lambda^k X_j + \mu_j^k$. The superscripted letters indicate for the pecking order hypothesis, $H_4 : \lambda^{k1} = \lambda^{k2}$, that the respective coefficient is different from that of FDI for ^{F}, different from that of equity portfolio investment for ^{E}, different from that of debt securities for ^{D} and different from that of loans for ^{L}. The estimator is a three-stage least-square (3SLS) one, where the instrument is settler mortality (in logs).

***,** and * show statistical significance of the coefficients at the 99%, 95% and 90% levels, respectively.

We conduct various sensitivity tests to check for the robustness of these findings. For instance, we find very similar results when controlling also for GDP per capita in model (2). The stylised facts of Section 3 underline that there is a high correlation between per capita GDP and the pecking order of cross-border capital positions. However, the fact that the results hold also when controlling for GDP per capita stresses that market development and institutions have a large and significant effect on the pecking order independent of the level of development of a country.

As a further important sensitivity test, we use an IV estimator to take into account the possibility that institutional arrangements and market development may be. We estimate the system using a three-stage least-squares estimator (3SLS), which in essence implies instrumenting the institutional variables. An additional advantage of this approach is that we also address potential measurement errors in the institutional variables with our estimation technique. We draw our instruments from the literature on law and finance and the literature on institutions and economic development. Specifically, we use legal origin dummies and dummies for religion which have been found to be important determinants of financial markets development and regulations (see La Porta, Lopez-de-Silanes and Shleifer, 1997, 1998). In the case of institutions, we use the mortality of settlers from Acemoglu, Johnson and Robinson (2001). Our approach therefore also draws on Alfaro, Kalemli-Ozkan and Volosovych (2005).[23]

The results for the 3SLS estimates are given in Tables 13 and 14. Overall, the key point is that the results are highly robust to those without instrumenting of the institutions. All the results described above are qualitatively identical when using 3SLS, underlining that portfolio investment is substantially more sensitive to institutions and market development than FDI, and to some extent also than loans. It is also reassuring to observe that with the IV estimates the effects on FDI turn significant, but remain significantly smaller than for portfolio investment. Moreover, the fact that the size of the coefficients and their significance increase somewhat also helps to stress the robustness of the results.[24]

In summary, we find that market development and institutions are strongly related to the pecking order of cross-border investment. The key finding of this section is that portfolio investment, in particular in equity securities, is the type of capital that is the most sensitive to differences in market development/openness and the quality of host country institutions. A second key result is that FDI appears to be the type of capital that is most immune to the quality of domestic institutions. We find that FDI is least sensitive in all institutional categories, including with regard to transparency, investor protection, the degree of corruption and expropriation risk.

6. Conclusions

Is there a pecking order of cross-border investment in that countries become financially integrated primarily through one type of investment rather than others? The perceived wisdom in much of the debate on financial integration and trade in financial assets is that FDI constitutes a type of investment that is desirable from a host country perspective because it

[23] We recognise that the instruments, especially the legal code dummies, might be poor. However, it is reassuring that in general our instrument for institutions – settler mortality – passes over-identification tests. Moreover, it is by itself not significant and therefore excludable from the empirical model.

[24] Finally, we also find that the results are largely robust across country subsamples, ie when only analysing emerging markets/developing countries, with few qualitatively meaningful differences across these groups. Results are available upon request.

brings about a transfer of know-how, creates access to foreign markets and reduces the risks of financial distress. However, the facts of cross-border capital positions also show that countries that are richer have higher growth and that better institutions receive a higher share of their foreign investment in the form of portfolio investment and a much lower share through FDI and loans.

The objective of this paper has been to analyse whether there is a natural pecking order in cross-border investment. We focus on the role of two key determinants for the trade in financial assets that have been central in this literature in recent years: the importance of information frictions, and the role of institutions. Recent theoretical contributions to this literature emphasise the importance of differences in the ownership structure of different forms of investment. In particular, FDI has stronger ownership implications and thus tends to be more information-sensitive than portfolio equity or debt investment. A second strand of the literature has focused on the implications of this theory for the role of institutions. One line of reasoning is that, due to the larger information sensitivity of FDI, it is also harder to expropriate and thus it may be more immune to differences in the quality of institutions and market development.

The intended contribution of the paper is to test these hypotheses empirically for a broad set of countries. To our knowledge, this is the first paper that provides a comprehensive comparison of all four types of cross-border investment – distinguishing between FDI, portfolio equity securities, debt securities and loans. We develop and use a unique, combined data source of the capital stocks, rather than capital flows, for 77 countries.

The empirical results are compelling and confirm our hypotheses on the pecking order of cross-border investment. First, information frictions across countries are an important determinant of the pecking order of cross-border capital positions. In line with the theory on the capital structure of the firm, we find that FDI, and to some extent loans, are the types of capital most sensitive to information frictions, whereas portfolio investment is much less responsive. The magnitude of these pecking order effects is large: FDI and loans are about 1.5 to 2 times more sensitive to information frictions than equity and portfolio investment. This finding is robust to several sensitivity tests, including: the use of alternative proxies for information frictions; various specifications of the econometric model; controlling for other determinants, such as risk diversification; and across-country samples, both for industrialised and for emerging market economies.

The second key result of the paper is that the degree of market development and the quality of host country institutions are important determinants of the pecking order of cross-border investment. We find that portfolio investment is substantially more sensitive than FDI and loans to both market development – such as the openness of the capital account and the development of the domestic financial sector – and to domestic institutional features. We use three proxies for the quality of institutions – the degree of transparency, investor protection and corruption – and show that this result is robust across all these different elements of host country institutions. These results confirm some hypotheses formulated in the literature but contradict others. For instance, in line with the argument by Albuquerque (2003), we find that FDI does not react to differences from the risk of expropriation, whereas portfolio equity and debt investment are highly sensitive to this risk. Similarly, we do not find that corruption has a more detrimental effect on FDI, as hypothesised in the literature, but that the magnitude of FDI is not sensitive to corruption, whereas portfolio investment is. This implies that, in fact, corruption tilts the composition of foreign investment significantly towards FDI, and to a lesser extent towards loans.

The findings of the paper have a number of important policy implications. In particular, the empirical results indicate that a large share of foreign investment that takes the form of FDI – despite the various benefits FDI may ultimately entail – may not necessarily be a blessing, but may in fact also be a signal of some underlying weaknesses – either in terms of weak institutions or in terms of the poor functioning or underdevelopment of domestic financial

markets – of the host country. By contrast, a large share of foreign investment that comes through portfolio equity or debt securities is likely, at least in part, to signal well functioning domestic financial markets and the trust of foreign investors in domestic institutions.

References

Acemoglu, D., Johnson, S., Robinson, J. 2001. The Colonial Origins of Comparative Development: An Empirical Investigation. American Economic Review 91(5), 1369–1401.

Aitken, B., Hanson, G.H., Harrison, A.E. 1997. Spillovers, Foreign Investment and Export Behavior. Journal of International Economics 43(1-2), 103-32.

Albuquerque, R. 2003. The Composition of International Capital Flows: Risk Sharing Through Foreign Direct Investment. Journal of International Economics 61, 353–383.

Alfaro, L., Kalemli-Ozkan, S., Volosovych, V. 2005. Why Doesn't Capital Flow from Rich to Poor Countries? An Empirical Investigation. NBER Working Paper 11901, Review of Economics and Statistics (forthcoming).

Anderson, J., van Wincoop, E. 2003. Gravity with Gravitas: A Solution to the Border Puzzle. American Economic Review 93, 170–192.

Anderson, J., van Wincoop, E. 2004. Trade Costs. Journal of Economic Literature 42, 691–751.

Aviat, A., Coeurdacier, N. 2004. The Geography of Trade in Goods and Assets. DELTA (Paris, France) Working paper 2004-10, May 2004, forthcoming in Journal of International Economics.

Bank of International Settlements, 2003. Guide to International Banking Statistics. BIS Papers No. 16, April 2003.

Bolton, P., Freixas, X. 2000. Equity Bonds and Bank Debt: Capital Structure and Financial Market Equilibrium Under Asymmetric Information, Journal of Political Economy 108(2), 324-351.

Borensztein, E., De Gregorio, J., Lee, J-W. 1998. How Does Foreign Direct Investment Affect Economic Growth? Journal of International Economics. 45 (1), 115-135.

Bosworth, B., Collins, S. 1999. Capital Flows to Developing Countries: Implications for Saving and Investment. Brooking Papers on Economic Activity, 1, 143–180.

Cheng, I-H., Wall, H.J. 2005. Controlling for Heterogeneity in Gravity Models of Trade and Integration. Federal Reserve Bank of St. Louis Review 87(1), 49–63.

Choe, H., Kho, B.-C., Stulz, R., 2004. Do Domestic Investors Have An Edge? The Trading Experience of Foreign Investors in Korea. Review of Financial Studies.

Chuhan, P., Claessens, S. and Mamingi, N. 1998. Equity and Bond Flow to Latin America and Asia: The Role of Global and Country Factors. Journal of Development Economics. 55(2), 441-465.

Claessens, S., Dooley, M., Warner, A. 1995. Portfolio Capital Flows: Hot or Cool? World Bank Economic Review 9 (1), 153–179.

Dahlquist, M., Robertsson, G., 2001. Direct Foreign Ownership, Institutional Investors, and Firm Characteristics. Journal of Financial Economics 59, 413–440.

Daude, C., Fratzscher, M., 2006. The Pecking Order of Cross-border Investment. ECB Working Paper Series No. 490, February.

Daude, C., Stein, E., 2004. The Quality of Institutions and Foreign Direct Investment, mimeo, Inter-American Development Bank.

Di Giovanni, J. 2005. What drives capital flows? The case of cross-border M&A activity and financial deepening. Journal of International Economics 65, 127–149.

Djankov, S., Glaeser, E., La Porta, R., Lopez-de-Silanes, F., Shleifer, A. 2002. The Regulation of Entry. Quarterly Journal of Economics 117(1), 1-37.

Dvorak, T. 2005. Do Domestic Investors Have an Information Advantage? Evidence from Indonesia. Journal of Finance 60(2), 817–839.

Faria, A., Mauro, P. 2004. Institutions and the External Capital Structure of Countries. IMF Working Paper 04/236, December 2004.

Frankel, J., Rose, A. 1996. Currency crashes in emerging markets: An Empirical Treatment. Journal of International Economics, 41, 351–366.

Gelos, G., Wei. S. 2005. Transparency and International Investors' Behavior, Journal of Finance (forthcoming).

Gertler, M., Rogoff, K. 1990. North-South Lending and Endogenous Domestic Capital Market Inefficiencies. Journal of Monetary Economics 26, 245–266.

Goldstein, I., Razin, A. 2006. An Information-based Trade off between Foreign Direct Investment and Foreign Portfolio Investment. Journal of International Economics 70, 271–295.

Gould, D. 1994. Immigrant Links to the Home Country: Empirical Implications for U.S. Bilateral Trade Flows. Review of Economics and Statistics, Vol. 76, No. 2, 302–316.

Grossman, G. (1998). "Comment" on A Deardoff, "Determinants of bilateral trade: does gravity work in a neoclassical world?" in *The regionalisation of the world economy,* J Frankel (ed), Chicago University Press.

Grossman, G. and Kenneth S. Rogoff, (Eds.), 1995. The Handbook of International Economics: Vol. III, North Holland, Amsterdam ; New York, 1339–1394.

Hausmann, R., Fernandez-Arias, E. 2000. Foreign Direct Investment: Good Cholesterol? IADB Working Paper 417.

Harris, M., Raviv, A. 1991. The Theory of Capital Structure. Journal of Finance 46(1), 297–355.

Heckman, J., 1979. Sample Selection Bias as a Specification Error. Econometrica 42, 153–168.

Klein, M., Peek. J., Rosengren, E. 2002, Troubled Banks, Impaired Foreign Direct Investment: The Role of Relative Access to Credit. American Economic Review 92(3), 664-682.

La Porta, R., López de Silanes, F., Shleifer, A. 1997. Legal Determinants of External Finance. Journal of Finance. 52(3), 1131-1150.

La Porta, R., López de Silanes, F., Shleifer, A. 1998. Law and Finance. Journal of Political Economy. 106(6), 1113-1155.

Lane, P., Milesi-Ferretti, G. M. 2004. International Investment Patterns. Institute for International Integration Studies (IIIS) Discussion Paper No. 24, June 2004.

Leamer, E., Levinsohn, J. 1995. International Trade Theory: The Evidence, in Gene M.

Lucas, R. 1990. Why Doesn't Capital Flow From Rich to Poor Countries? American Economic Review (Papers and Proceedings) 80(2), 92-96.

Magud, N., Reinhart, C. 2005. Capital Controls: An Evaluation, in Sebastian Edwards (Ed.), International Capital Flows, Chicago: Chicago University Press for the NBER.

Martin, P., Rey, H. 2004. Financial Super-markets: Size Matters for Asset Trade. Journal of International Economics 64, 335–361.

Mauro, P., 1995. Corruption and Growth. Quarterly Journal of Economics, 110, 681–713.

Mody, A., Murshid, A. 2005. Growing up with Capital Flows. Journal of International Economics, 65, 249–266.

Mody, A., Razin, A., Sadka, E. 2003. The Role of Information in Driving FDI Flows: Host-Country Transparency and Source-Country Specialization. NBER Working Paper 9662.

Montiel, P., Reinhart, C. 1999. Do Capital Controls and Macroeconomic Policies Influence the Volume and Composition of Capital Flows? Evidence from the 1990s. Journal of International Money and Finance 18, 619–635.

Myers, S., 1984. The Capital Structure Puzzle. Journal of Finance 39, 575–592.

Myers, S., Majlauf, N. 1984. Corporate financing and investment decisions when firms have information investors do not have. Journal of Financial Economics 5, 147–175.

Neumann, R., 2003. International capital flows under asymmetric information and costly monitoring: implications of debt and equity financing. Canadian Journal of Economics 36(3), 674–700.

Nicita, M., Olarreaga, M., 2000. Exports and information spillovers, Policy Research Working Paper #2474, The World Bank, Washington DC.

Obstfeld, M., Rogoff, K. 2000. The Six Major Puzzles in International Economics: Is there a Common Cause? In: NBER Macroeconomics Annual 2000, University of Chicago Press, Chicago.

Papaioannou, E. 2005. What drives international bank flows? Politics, institutions and other determinants. ECB Working Paper No 417.

Portes, R., Rey H., Oh, Y. 2001. Information and Capital Flows: The Determinants of Transactions in Financial Assets, European Economic Review 45, 783–96.

Portes, R., Rey, H. 2005. The determinants of cross-border equity flows. Journal of International Economics 65, 269–296.

Razin, A. 2004. The Contribution of FDI Flows to Domestic Investment in Capacity, and Vice Versa, in Ito, Takatoshi, and Andrew K. Rose (Eds.), Growth and Productivity in East Asia, NBER-East Asia Seminar on Economics, Vol. 13, 149-167.

Razin, A., Rubinstein, Y., Sadka, E. 2005. Fixed Costs and Bilateral FDI Flows: Conflicting Effects of Country Specific Productivity Shocks, mimeo.

Razin, A., Sadka, E., Yuen, C. W. 1998. A pecking order of capital flows and international tax principles. Journal of International Economics 44, 45–68.

Sarno, L., Taylor, M. 1999. Hot Money, Accounting Labels and the Permanence of Capital Flows to Developing Countries. Journal of Development Economics. 59 (2), 337-64.

Wei, S.-J. 2000a. Local Corruption and Global Capital Flows. Brookings Papers on Economic Activity, 2000(2), 303-354.

Wei, S.-J. 2000b. How Taxing is Corruption on International Investors. Review of Economics and Statistics 82(1), 1-11.

Appendix

A: Country sample

EMEs and developing countries				Developed countries	
Latin America	**Asia**	**Eastern Europe**	**Africa/Middle East**	**Europe**	**Other**
Argentina	Bangladesh	Bulgaria	Cote d'Ivoire	Austria	Australia
Bolivia	China	Croatia	Egypt	Belgium	Canada
Brazil	Hong Kong	Cyprus	Ghana	Denmark	Japan
Chile	India	Czech Republic	Israel	Finland	New Zealand
Colombia	Indonesia	Estonia	Kenya	France	United States
Costa Rica	Kazakhstan	Hungary	Morocco	Germany	
Ecuador	Korea	Latvia	Namibia	Greece	
El Salvador	Malaysia	Lithuania	Nigeria	Iceland	
Guatemala	Pakistan	Poland	South Africa	Ireland	
Honduras	Philippines	Romania	Tanzania	Italy	
Jamaica	Singapore	Russia	Tunisia	Netherlands	
Mexico	Sri Lanka	Slovenia	Zambia	Norway	
Paraguay	Vietnam	Turkey		Portugal	
Peru				Spain	
Trinidad & Tob.				Sweden	
Uruguay				Switzerland	
Venezuela				United Kingdom	

B: Variable definitions and sources

Variable definition	Source
Bilateral FDI stocks – FDI asset holdings of source country *i* in host country *j* in millions of US dollars	UNCTAD
Bilateral portfolio equity and portfolio debt stocks – average 2001-2003 holdings of source country *i* in host country *j* in millions of US dollars	Coordinated Portfolio Investment Survey (CPIS), IMF
Bilateral loans – aggregate assets and aggregate liabilities of banks in reporting countries vis-à-vis banking and non-banking institutions in host countries	International Locational Banking Statistics (ILB), BIS
Distance – log bilateral great circle distance in miles between economic centres of source country and host country	Andy Rose's website
Telephone traffic – volume of telephone call traffic between source and host country	ITU Directions of Trade

Trade in newspapers and periodicals – exports from country *i* to country *j* plus exports from *j* to *i* in millions of US dollars	UN Comtrade database Exports of item 8922 SITC Rev.2
Bilateral stock of foreigners – sum of foreigners born in country *i* currently living in country *j* and vice versa	OECD Database on Foreign-born and Expatriates
Common language – dummy equal to one if both countries speak the same language and zero otherwise	Andy Rose's website; CIA World Factbook
Common legal origin – dummy equal to one if both countries have legal system with same origin and zero otherwise	La Porta et al (1998)
Colonial links – dummy equal to one if both countries have been linked through colonisation	Andy Rose's website; CIA World Factbook
Trade agreement – dummy equal to one if both countries have a bilateral trade agreement or are part of a common agreement and zero otherwise	Andy Rose's website
Investment treaty – dummy equal to one if both countries have a bilateral investment treaty and zero otherwise	UNCTAD
Bilateral trade – the imports of goods and services of host country from source country in millions of US dollars	IFS, IMF
GDP correlation – bilateral correlation of annual real GDP growth rates between host and source countries over the period 1960-2003	IFS, IMF and OECD
Capital account openness – dummy equal to one if the host country had fully liberalised its capital account by 1996 and zero otherwise	Annual Report of Exchange Arrangements and Exchange Restrictions (AREAER), IMF
Financial development – credit to the private sector in USD millions	IFS, IMF
Stock market capitalization – average stock market capitalisation in USD millions over the period 1999-2003	Datastream and national sources
Quality of information disclosure – index that goes from 0 to 7 with higher values indicating that regulation requires more disclosure of information (see source for more details)	World Bank – Doing Business Database
Accounting standards – rating of companies in seven different categories in 1990. The index goes from 0 to 100, with higher values representing better standards	La Porta et al (1998)
Property rights – index that goes from 0 to 5, with higher values representing bad protection of property rights	Heritage Foundation
Expropriation risk – index goes from 0 to 10, with high values representing low risk	ICRG – PRS
Repudiation risk – index goes from 0 to 10, with high values representing low risk	ICRG – PRS
Days of enforcement – the time taken to resolve a dispute – in calendar days – counted from the moment the plaintiff files the lawsuit until settlement or payment	World Bank – Doing Business Database
TI corruption – index goes from 0 to 10, with higher values indicating higher levels of corruption	Transparency International (Wei, 2000b)
WDR corruption – index goes from 1 to 8, with higher values indicating higher levels of corruption	World Bank (Wei, 2000b)
German exporters' corruption index – survey-based index that goes from 0 to 10. Higher values represent higher levels of corruption	Wei (2000b)