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Equity and Bond Flows to Asia and Latin America

The Role of Global and Country Factors

Punam Chuhan
Stijn Claessens
and
Nlandu Mamingi

Equity and bond flows to a sample of Asian and Latin American countries are about equally sensitive to global factors and to country-specific factors.

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This paper — a product of the Debt and International Finance Division, International Economics Department — is part of a larger effort in the department to study the determinants of capital flows to developing countries. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Rose Vo, room S8-042, extension 31047. (July 1993, 36 pages).

Chuhan, Claessens, and Mamingi investigate what has motivated the large portfolio flows to several developing countries in recent years.

Using monthly data on U.S. capital flows to nine Latin American and nine Asian countries (instead of monthly reserves data), they analyze the behavior of bond and equity flows to those countries.

Using panel data, they find that global factors — such as a drop in U.S. interest rates and the slowdown in U.S. industrial production — are important in explaining capital inflows. But country developments are at least as important in determining those flows, especially for Asia.

They also find that equity flows are more sensitive than bond flows to global factors, but that bond flows are generally more sensitive to a country's credit rating and to the secondary market price of debt.

Equity and Bond Flows to Latin America and Asia: The Role of Global and Country Factors

by

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Summary

This paper investigates the factors (global and country-specific) motivating the large capital flows to a number of developing countries in recent years, extending previous work by Calvo et al. (1993). The paper estimates the influence of global factors such as US interest rates and US industrial activity on capital flows to developing countries. It also explores the importance of country-specific developments in explaining these flows. The paper includes the secondary market price of a country's debt (when available), the country's credit rating, the stock price-earnings ratio (when available), the relative return on the domestic stock market (when available), and the black market premium as additional explanatory variables.[1]

Because the global factors in the study directly represent developments within the US, we only consider monthly US capital flows. The paper distinguishes between the different types of US capital flows to allow for variation in the determinants of these flows. The focus is on equity and bond flows, the two most important components of portfolio flows. The study thus examines US portfolio equity and bond flows to 9 Latin American and 9 Asian countries.

On the econometric side, the paper employs a panel data approach, which is an appropriate technique for investigating the effects of a common set of global factors across a group of countries. At the same time, this approach allows for country-specific effects. The panel data methodology also reduces the problem of multicollinearity among variables.

We find that although global factors, such as the drop in US interest rates and the slowdown in US industrial production, are important in explaining capital inflows, domestic factors in the developing countries are at least as important in determining these flows. About half of the explained increase in flows to the Latin American countries in our sample can be attributed to the drop in US interest rates and the slowdown in the US economy. For the Asian countries, by contrast, country-specific factors are estimated to be three to four times more important than global factors in motivating the flows. A reversal equal to one standard deviation of the favorable movements in these global factors would motivate an annual outflow of about $3 billion for the two regions combined.

Among country-specific factors, we find that an across-the-board, one standard deviation increase in the institutional investor credit rating of the 9 Asian countries (the average rating for the countries over the period was 59 out of a maximum of 100) would lead to an increase in annual bond flows of about $3 billion. Capital inflows to the Latin American countries are much less sensitive to a combined index of their credit rating and secondary market price; here, a one standard deviation increase would only lead to an increase in annual bond flows of about $1 billion (note that their credit rating (28) is about half as high as for Asia).

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[1]Since several of these variables are not available for all countries in our study, we use a smaller sample in some estimations.

We also find evidence of variation in the sensitivity of the two flows to the explanatory variables. Equity flows are more sensitive than bond flows to global factors, although the relative sensitivity of each type of flow to US interest rates and U.S. industrial activity is similar by region. As expected, equity flows are more sensitive to a country's price-earnings ratio (with a negative sign) and rates of return on domestic stock markets (relative to the U.S.) than are bond flows. Bond flows, however, are generally more sensitive to a country's credit rating and secondary market price of debt than equity flows. While our evidence is not conclusive, these findings may be interpreted as being consistent with the possibility of credit rationing in the fixed-income market, something one would not expect in the equity markets.

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I. Introduction

Several Latin American countries have received large capital inflows in recent years, reversing a trend of outflows for most of the 1980s. Mexico, for example, saw its net external financing increase in the 1990-1992 period to 5.9% of its GDP, compared to an average net outflow of 0.7% in the 1983-1989 period (IMF, 1992b). Some Asian countries have also experienced large capital inflows in recent years: for developing countries in East Asia and Pacific current-account deficits as a share of GNP averaged 1.8 percent in 1991-1992, compared to 0.6 percent in 1989-1990 (World Bank, 1992).

Much of this new capital inflow has been in the form of portfolio investment, i.e., bonds and equities.[1] Portfolio equity and bond flows to all developing countries were $17.8 billion in 1991, and an estimated $31.3 billion in 1992 (Table 1). These flows are concentrated among a small group of "emerging" developing countries. For example, five major Latin American countries (Argentina, Brazil, Chile, Mexico, and Venezuela) received over 55 percent of portfolio flows to all developing countries in 1992, and seven South and East Asian countries (China, India, Indonesia, Korea, Malaysia, Philippines, and Thailand) received another 26 percent. This concentration implies that portfolio flows are an important source of finance for some developing countries. For Latin America, for example, portfolio flows accounted for about 50 percent of the region's overall net external long-term financing in 1991 (World Bank, 1992). While other developing countries have not participated to the same degree in this increase in portfolio flows, they have still seen an increase in overall capital inflows compared to much of the 1980s. The current account deficit for all developing countries as a percentage of GNP more than doubled to 1.4 percent in 1991 compared to the average for 1987-1990, and official foreign exchange reserves in many developing countries are now at historically high levels.

The recent surge in capital flows to many developing countries has raised questions regarding the characteristics of these flows, the most important being whether these flows are temporary or permanent. As a large number of developing countries with a wide spectrum of domestic economic conditions--macroeconomic policy and performance--have experienced these flows, the notion has arisen that portfolio flows may be driven by a common set of favorable global factors, factors which could reverse themselves in the future.

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[1]Bond flows have gone to both private and public sector entities, with close to 50 percent going to the private sector in 1992. Equity flows take a number of forms: direct equity purchases by investors in the host stock markets; investments through country funds; issue of rights on equities held by depository institutions (American Depository Receipts, ADRs, and Global Depository Receipts, GDRs); and direct foreign equity offerings. In the last three years equity flows have largely taken pla· th·ough ADRs. Next in importance have been (closed-end) country funds, followed by direct purch· and foreign equity offerings.

Table 1: Portfolio and other Long-Term Flows to all Developing Countries (net inflows in billions of US$)

Type of Flow	1989	1990	1991	1992	1989-92
Bond flows	3.5	4.7	10.2	21.7	40.1
Equity Flows	3.5	3.8	7.6	9.6	24.4
Country funds	2.2	2.9	1.2	1.3	7.5
International Issues	---	0.1	4.9	6.5	11.6
Direct Equity	1.3	0.8	1.5	1.8	5.3
Net FDI	23.3	24.0	33.9	38.3	119.5
Official Flows (excluding grants)	19.9	28.2	31.3	31.1	110.5
Commercial Banks	6.3	-4.1	3.9	4.2	28.2
Other Private LT	2.7	12.4	2.8		
Total	59.2	69.0	89.7	104.9	347.1
Memo: All Portfolio Flows	7.0	8.5	17.8	31.3	64.5

Source: World Bank, 1992.

In a recent paper, Calvo et al. (1993) have argued the importance of global factors--particularly the role of US interest rates (which declined precipitously over the period), the recent US recession (third quarter 1990 to first quarter 1991) and the slowdown in US industrial production over the 1989-1992 period--in explaining these inflows. Using monthly international reserves figures as proxies for capital flows (because they lack monthly data on capital flows), as well as monthly real exchange rate movements as indicators of these flows, Calvo et al. evaluate the experience for 10 Latin American countries for the period January 1988 to July 1992. They also derive the first two principal components for a series of global variables (various US interest rates, deviations from the trend in real disposable income, and indexes on returns in US stock and real estate markets). Then using the first two principal components on the series of global variables and the series on reserves and exchange rates themselves in a structural VAR-model, they estimate that about 50 percent of the variance of monthly forecast errors in the real exchange rates and reserves is accounted for by the global variables. Based on these results, they suggest that a reversal of favorable global conditions could induce a capital outflow from these countries.

Like the Calvo et al. study, this paper also investigates the factors motivating the recent capital inflows. This study differs from the former, however, in that it uses a different data set,

a number of alternative explanatory variables, and a different econometric methodology.[2] Most importantly, the paper directly investigates the behavior of capital inflows by employing monthly data on capital flows instead of data on reserves and real exchange rates. Official reserve, accumulation and capital inflows are not necessarily identical, particularly when the capital inflows are largely to the private sector. The relationship between these two variables depends on, among other things, the degree and type of government (exchange rate) intervention. While there has been a substantial degree of central bank intervention in these countries, and capital inflows and reserves do tend to co-move, the co-movement is imperfect and differs across countries (Calvo et al. point out, for example, that in Brazil and Uruguay there is no co-movement). Indeed, our results indicate that reserves are weakly correlated with portfolio flows, implying that reserves are a poor proxy for these flows (Annex 1 provides the details).

This study also distinguishes between the different types of portfolio capital inflows to allow for variation in the determinants of these flows. The focus is on equity and bond flows, the two most important components of portfolio flows. Because the global factors in the study directly represent developments within the US, we only consider US flows. The study thus focuses on US portfolio equity and bond flows to 9 Latin American and 9 Asian countries.

While the paper assesses the importance of global factors in explaining portfolio flows, it also attempts to systematically explore the influence of country-specific factors in explaining these flows. The paper includes the secondary market price of a country's debt (when available), the country's credit rating, the price-earnings ratio (when available), the return on the domestic stock market (when available), and the black market premium as explanatory variables. Since several of these variables are not available for all countries in our study, we use a smaller sample in some estimations. On the econometric side, the paper employs a panel data approach, which is an appropriate technique for investigating the effects of a common set of exogenous factors across a group of countries. At the same time, this approach also allows for country-specific effects.

The econometric results point to the importance of global and country-specific factors in influencing these capital inflows. To the extent that we are able to explain the flows, about half of the explained increase in the flows to the Latin American countries in our sample can be attributed to the drop in US interest rates and the slowdown in the US economy. For the Asian countries, country-specific factors are three to four times more important than global factors in motivating these flows. A reversal equal to one standard deviation of the favorable movements in these global factors would motivate an annual outflow of about $3 billion for the two regions combined.

Among country-specific factors, we find that an across the board, one standard deviation increase in the institutional investor credit rating of the 9 Asian countries (the average rating for

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[2]In addition, while the Calvo et al. paper has a forecasting focus, our aim is primarily to analyze the impact of different scenarios for the external environment on capital flows.

the countries over the period was 59 out of a maximum of 100), would lead to an increase in annual bond flows of about $3 billion. Capital inflows to the Latin American countries are much less sensitive to a combined index of their credit rating and secondary market price; here, a one standard deviation increase would only lead to an increase in annual bond flows of about $1 billion (note that their credit rating (28) is about half as high as for Asia).

We also find evidence of variation in the sensitivity of the two flows to the explanatory variables. Equity flows are more sensitive than bond flows to US interest rates and U.S. industrial activity, although the relative sensitivity of each type of flow to these global factors is similar by region. As expected, equity flows are also more sensitive to a country's price-earnings ratio (with a negative sign) and rates of return on domestic stock markets (relative to the U.S.) than are bond flows. Bond flows, however, are generally more sensitive to a country's credit rating and secondary market price of debt than equity flows. While our evidence is not conclusive, these findings may be interpreted as being consistent with the possibility of credit rationing in the fixed-income market, something one would not expect in the equity markets.

The rest of the paper is organized as follows. Section II outlines some theoretical considerations regarding the motivations of capital flows. Section III describes the data. Section IV presents the methodology and the empirical results. The concluding section outlines some directions for further research in this area.

II. Motivations of Capital Flows

The motivation of capital flows has long been a subject of research in economics and many tests of the degree of capital mobility among countries have been performed. Frankel (1992) provides a general survey of this literature. Montiel (1993) provides an overview of this literature as it deals with developing countries and also presents some new estimates regarding a number of empirical tests for developing countries. In general, this research has not been able to explain some observed characteristics of international capital flows. For example, the Feldstein-Horioka finding (of low capital mobility), first identified in 1980, still largely remains a puzzle as there are many other indications that, from an asset pricing and gross capital flow point of view, industrial country international capital markets are well integrated. In practice, this means that it has proven difficult to model capital flows in a world in which capital is imperfectly mobile.[3]

The finance perspective on the issue of capital flows is also useful. In portfolio models, because asset allocation is based on relative tradeoffs between expected risk and return, capital flows can be expected to be motivated by changes in perceived relative risk and returns. Much

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[3]When capital is imperfectly mobile, proper modelling of capital flows requires that the source of the imperfection be modelled. Also see Frankel (1992).

of the early international portfolio models followed the Tobin-Brainard model (e.g., Branson and Henderson, 1985) where assets are assumed to be imperfect substitutes and asset demand functions are estimated. But few recent papers follow this approach to modelling capital flows (e. g., McKibbin and Sachs (1991) assume assets are perfect substitutes). And recent empirical international finance papers deal with tests on asset-prices and do not concern themselves with the implications for equilibrium adjustments in stock positions, i.e., capital flows. Moreover, research in this area with a specific focus on capital flows to developing countries is limited.

Nonetheless, the literature allows us to identify some factors which are likely to play an important role in motivating capital flows, once the special situation of (indebted) developing countries (which are likely credit rationed) is taken into account. First, there are country-specific factors reflecting the opportunities and risks of investing in the country. Rates of return on stock markets, credit ratings, and secondary market prices of sovereign debt are thus likely to play a role in influencing the flows. Most of these indicators had an upward trend over the study period for the developing countries in our sample. Rates of returns on stock (equity) markets in many developing countries increased sharply in the last few years: over 1988-92, the IFC dollar-based composite index rose 294.2 percent for Latin America and 49.5 percent for Asia, compared to 108.4 percent for the S&P 500. Care should of course be taken to distinguish the ex-ante rates of return (which can motivate capital flows) from the measured ex-post rates. The credit ratings of many major developing countries also improved. For our sample of 9 Latin American countries the credit rating rose from an average of 27 points out of 100 in 1988 to 31 in 1992. Secondary market prices were higher by approximately two-thirds over end-1989 (using the weighted price for the group of severely indebted developing countries). Furthermore, there was a general trend towards a larger role of the private sector in these developing countries, along with liberalization of their economies, especially opening up of the capital account.[4]

Second, global factors may also have played an important influence. US short-term interest rates fell dramatically, by about half since 1988. For example, the three-month treasury bill rate was 3.3 percent at the end of 1992, compared to 5.9 percent at the beginning of 1988. Likewise, LIBOR on six-month US dollar deposits was 7.4 percent at the beginning of 1988, and stood at 3.7 percent at the end of 1992. Over this period, three-year US interest rates fell by 2.7 percentage points from 7.9 percent in the beginning of 1988. Other rates of return in the US, e.g., on real estate, have also been low in this period. Declining returns in the US markets may not only have made it more attractive for US investors to seek higher returns abroad, but may also have induced holders of flight capital to repatriate their funds. The slowdown in the US economy over the 1989-1992 period may have further contributed to the outflow of capital from the US. Regulatory and other changes in industrial countries (such as the introduction of

[4]For general surveys of the experiences and (macro-economic) issues involved with liberalization of the capital account, see Hanson (1992), Mathieson and Rojas-Suarez (1992), and Reisen and Fischer (1993).

Rule 144A[5] in the US) may have also facilitated access to international markets, particularly for portfolio flows (see further IMF (1992), Calvo et al. (1993) and World Bank (1992)). These global factors take on an increased importance given that the recent capital flows have gone to developing countries with a wide spectrum of domestic policies and economic developments.

The important (policy) question now is to what extent the capital inflows are a function of country-specific factors and to what extent of factors in industrial countries: i.e, has the recent decline in (US) interest rates been an important "push" factor or have the improved economic prospects in many developing countries been "pulling" flows to these countries?

III. Data

Data Sources The study uses monthly US capital flow data on gross and net purchases of non-US long-term securities from 9 Latin American countries and 9 Asian countries for the period January 1988 through September 1992.[6] The data was obtained from the US Treasury Department and is part of the Treasury's International Capital Reports (TIC).[7] TIC data is

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[5]Rule 144A, which was introduced in April 1990, has facilitated private placements in the US market by circumventing onerous filing requirements and easing restrictions on resale of privately placed securities.

[6]The Latin America countries are Argentina, Brazil, Chile, Colombia, Ecuador, Jamaica, Mexico, Uruguay, and Venezuela. The Asian countries in the sample are China, India, Indonesia, Korea, Malaysia, Pakistan, Philippines, Taiwan (China) and Thailand. Our data also covered three more Latin American countries (Panama, Peru and Trinidad and Tobago), but these countries were dropped because the flows either reflected the special banking status of the country (Panama) or were insignificant (Peru, and Trinidad and Tobago). In Asia, we dropped Hong-Kong from our sample because of the country's status as a international financial center. The results for a smaller group of countries (six Latin American and seven Asian) are also reported.

[7]We would like to thank Mr. Gary Lee of the US Treasury for his cooperation in providing the data. Quarterly data are published in Treasury Bulletin, Capital Movements section, Table CM-V-4, Foreign Purchases and Sales of Long-Term Securities, by Type and Country. The data cover transactions executed in the US for the accounts of foreigners, and transactions abroad for the accounts of reporting institutions by their domestic customers. The data includes new issues as well as transactions in outstanding issues. The data are collected by the Treasury from financial intermediaries (banks, brokers and other entities) in the US through so-called International Capital Form S reports. The data do not cover any direct dealings of US (institutional or individual) investors with foreign intermediaries (or direct borrowers or lenders) as these bypass the reporting system. This is probably more of a problem for industrial countries as for these countries institutional investors in the US may be willing to deal directly with the foreign entity, something which seems less likely in case of the less known (corporations in) developing countries. The data on bonds cover the purchase and sales of foreign securities in the US from and to the developing country. The data may thus include

disaggregated by type of capital flow, e.g., bonds (corporate), equities, and US government bonds. The total number of subcategories for long-term securities is 7.

In this study we focus on equity and bond flows only and exclude, for example, sales and purchases of money market CDs and commercial paper.[8] We correct the bond flows for the issuance of bonds under public debt conversions and the Brady plan (bonds issued in the debt-for-debt exchanges as well as any new money bonds) because these flows do not represent any voluntary new financing. This adjustment is done by including dummies for the months of issuance.[9] Although in principle we aim to model net capital flows, in this study we focus on gross bond inflows instead of net bond inflows. We prefer to use gross bond flows because net bond flows are influenced by countries' gross purchases of foreign assets (central banks' sterilization and other reserve operations, including the repurchases of the countries' own external obligations). A case in point is Mexico, where the central bank bought back $7.2 billion of public external debt over the two-year period preceding July 1992, mostly bonds issued under the 1989 Brady agreement (IMF, 1992b). For equity flows, on the other hand, we can correctly study the net flow figures as these are not influenced by central banks' operations (few central banks hold non-fixed income securities).

Capital Flow Data The bulk of US equity and bond flows to developing countries are concentrated in the 17 countries (Taiwan (China) is a high-income country) in our sample. In 1992, these countries' share was 88 percent for gross equities (97 percent for net equities) and 74 percent for gross bonds. The US share in total equity and bond flows to the sample countries (excluding Taiwan (China)) is likewise large, 67 percent of net equities and 50 percent of bonds in 1992. The large size of these shares implies that our data covers a substantial amount of portfolio flows to developing countries. The US share in total portfolio flows is much larger for the Latin American countries than for the Asian ones, however. As a result, the capital flows studied here cover a larger percent of overall capital inflows to Latin America than to Asia. For selected Latin American and Asian countries, US gross bond purchases and US net equity purchases are presented in figures 1 to 4. Table 2 presents the annual averages of the two

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transactions in bonds not issued by the developing country in question nor by US entities (e.g., US residents would purchase non-Mexican, non-US bonds from Mexico), but these transactions are likely to be small, and in any case, likely to be motivated by the same factors underlying the trading or issuing of bonds from the developing country itself. Data limitations do not allow for a systematic cross-check, but for countries for which other data were available the gross inflow figures for bonds correspond closely to estimates from other sources on the amount of new bonds issued by these countries in the US (on an annual basis).

[8]TIC-data are also collected on other cross-border claims. Stekler and Truman (1992) draw attention to some of the problems with the TIC-data as it concerns U.S. nonbank claims on foreign banks, short-term negotiable instruments (e.g., commercial paper), and trade-credits received and extended.

[9]In our sample, this happened in February 1988 (the so called Mexico-Morgan deal) and March 1990 for Mexico, December 1990 for Venezuela, and February 1991 for Uruguay.

types of flows, as well as the standard deviations and some other statistics, by region.

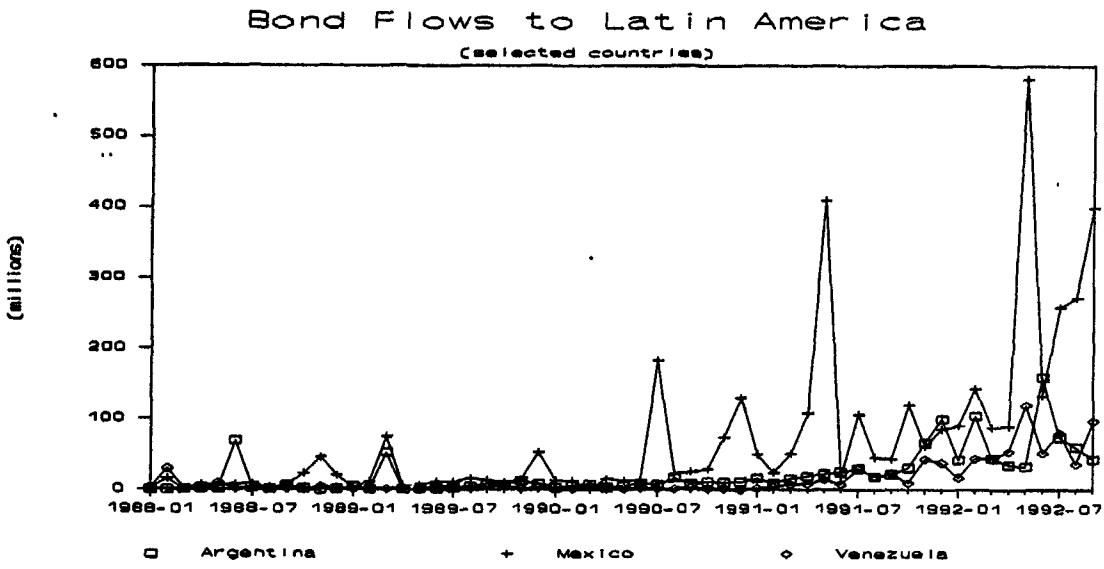

Figure 1

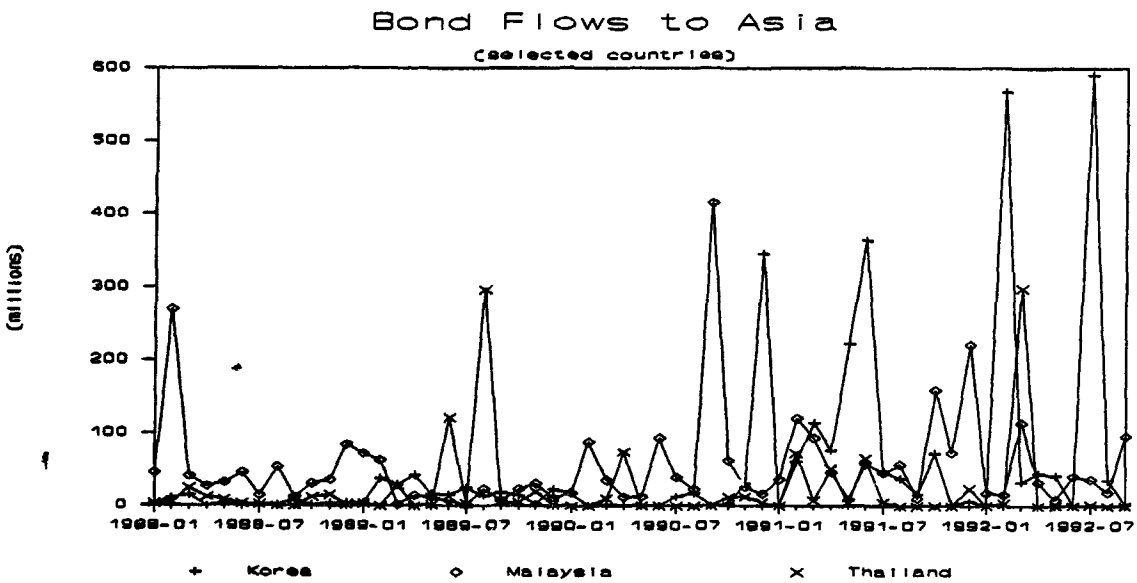

Figure 2

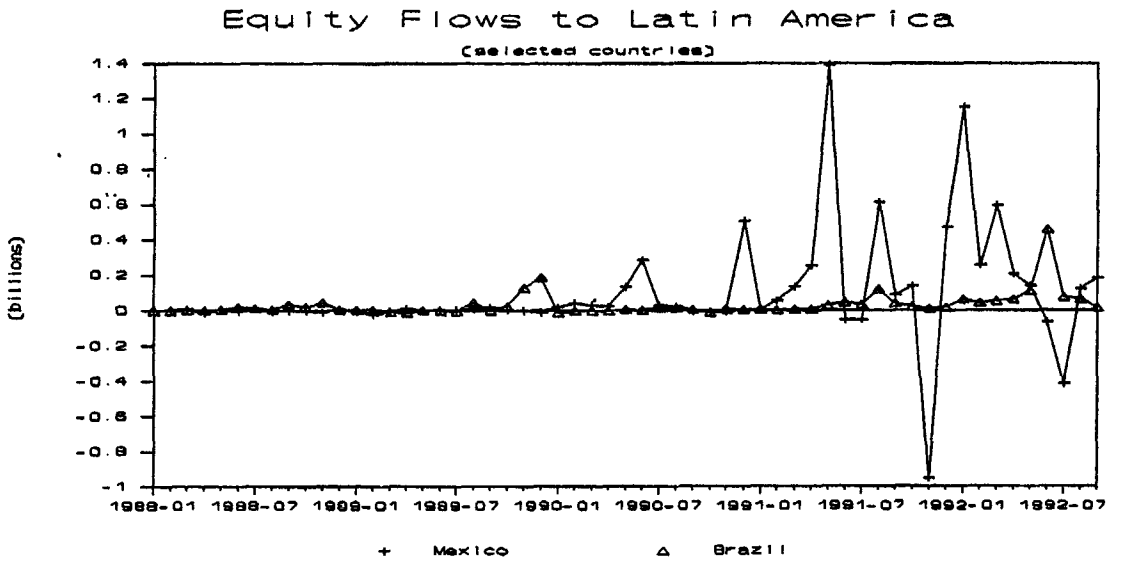

Figure 3

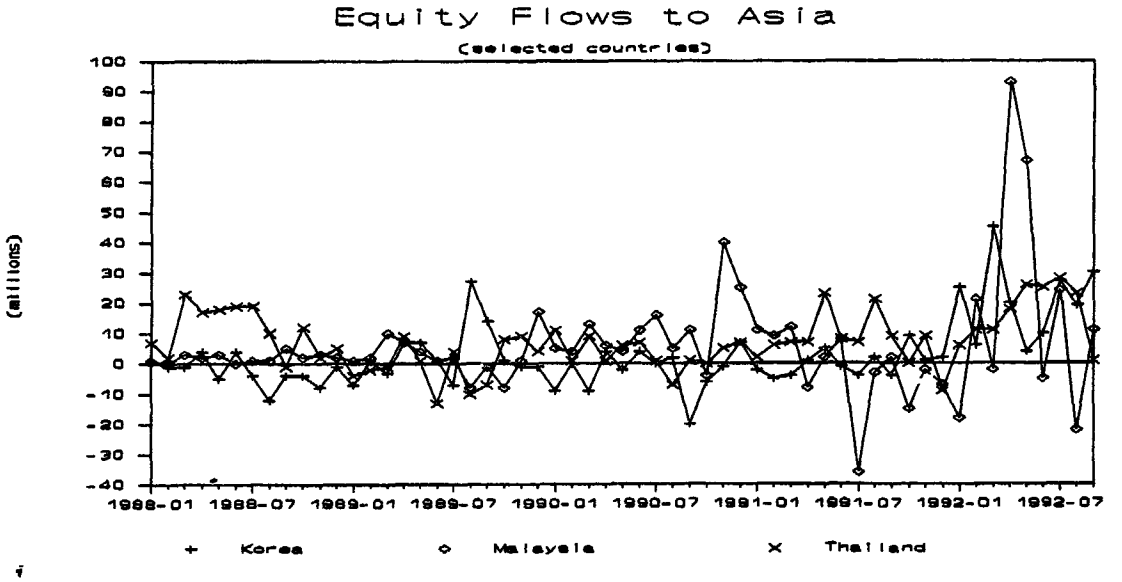

Figure 4

Table 2. Some Statistics for Net Equity Flows and Gross Bond Flows (millions of dollars, on annual basis, 1988 - 1992)

		Latin America			Asia	
		Net Equity	Gross Bonds	Gross Bonds (without Brady)	Net Equity	Gross Bonds
1988	Sum	177.000	658.000	388.000	132.000	2239.000
	Average	19.667	73.111	43.111	14.667	248.778
1989	Sum	376.000	567.000	567.000	61.000	2920.000
	Average	41.778	63.000	63.000	6.778	324.444
1990	Sum	1206.000	9673.000	829.000	192.000	2890.000
	Average	134.000	1074.778	92.111	21.333	321.111
1991	Sum	2343.000	2870.000	2306.000	220.000	3985.000
	Average	260.333	318.889	256.222	24.444	442.778
1992	Sum	3170.000	4011.000	4011.000	740.000	3837.000
	Average	352.222	445.667	445.667	82.222	426.000
Adjusted	Sum	4226.667	5348.000	5348.000	986.667	5116.000
1992	Average	469.630	594.222	594.222	109.630	568.444
	SUM	7272.000	17779.00	8101.000	1345.000	15871.00
	MEAN	1530.947	3742.947	1705.474	283.158	3341.263
	St. D	1328.517	2956.418	1589.646	279.622	775.669
	CV	0.868	0.790	0.932	0.987	0.232

Note: Fourth Column: Gross bond flows without Brady; Sum: annual sum for all the countries for a particular year; Average: Sum divided by the number of countries; Adjusted 1992: the nine months of 1992 grossed to a yearly basis; SUM: the sum for the whole period; MEAN = (SUM*12)/57; CV: Coefficient of Variation = standard deviation/ MEAN.

Country-Specific Variables. The study employs several domestic equity, credit, and exchange market variables as explanatory factors. The two equity market variables-- price earnings ratios and rates of return on domestic stock markets--are from the IFC's Emerging Markets Data Base. The country credit variable was constructed by using Institutional Investor's semi-annual country credit rating. Secondary market debt prices are from Salomon Brothers

(Figures 5 and 6).[10] Black market exchange rate premiums are dervied from data on black market exchange rates in the World Currency Yearbook and the official exchange rates presented in the IFS (Figures 7 and 8).[11]

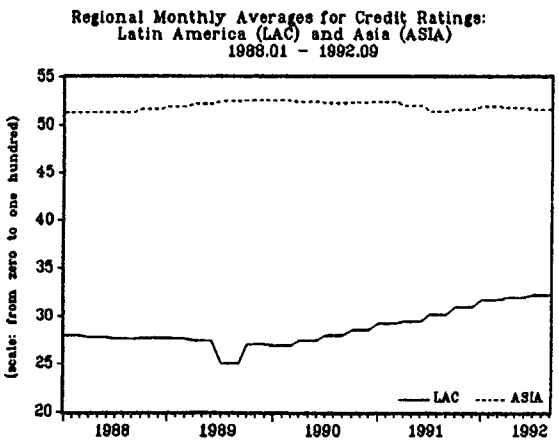

Figure 5

Figure 6

[10]The credit ratings are available on a semi-annual basis. For intermittent months, the semi-annual ratings are kept at their latest value. The secondary market prices are end-of-month prices. Prices are not corrected for the fact that some of the claims are collateralized with risk-free assets, assets whose prices themselves depend on interest rates. Secondary market prices are not available for Asia (debt trades in general at par, except for the Philippines). Individual country credit ratings and secondary market prices are used in estimations.

[11]The premiums are occasionally negative as there is some non-synchroneity between the black market rates and the official exchange rates, as well as excess supply in the black market itself.

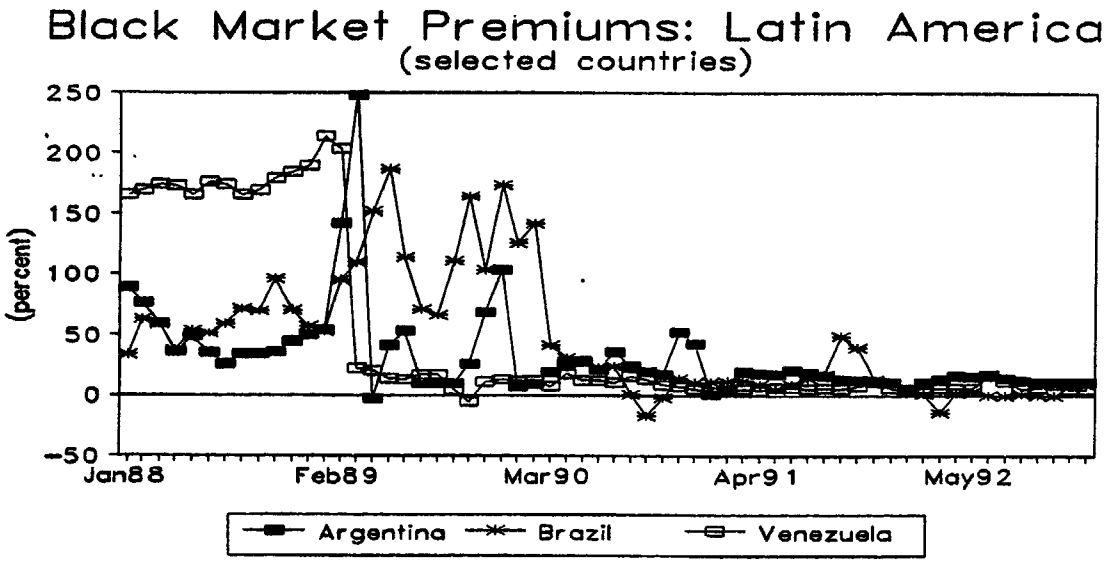

Figure 7

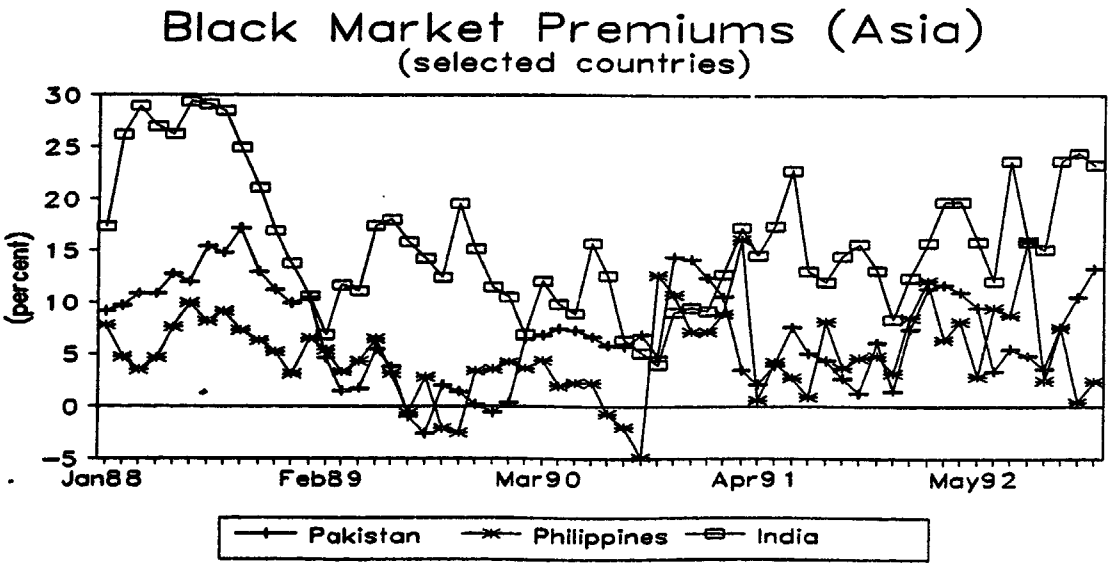

Figure 8

Global Variables. The key global variables are US interest rates and US industrial production. We employ three short-term nominal interest rates (including LIBOR on 6-month US dollar deposits (Figure 9), line 60ldd in IFS), one medium-term and one long-term nominal interest rate, as well as the first principal component of the these five interest rates. Real interest rate series are constructed by subtracting the past twelve month US CPI rate (line 64 in IFS) from the nominal interest rates. The US industrial activity variable (US INP) is constructed as the deviation of the US industrial production index (line 66..c in IFS) from a time trend (Figure 10).

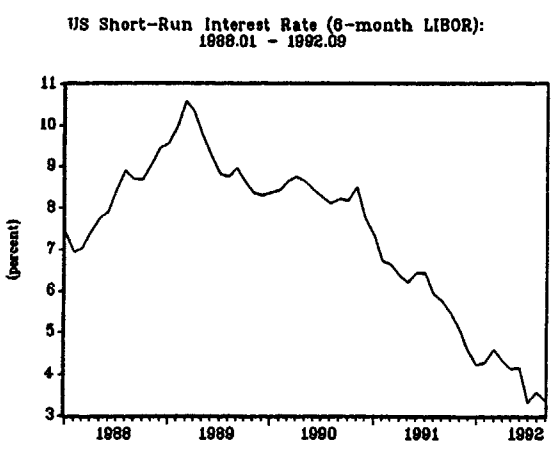

Figure 9

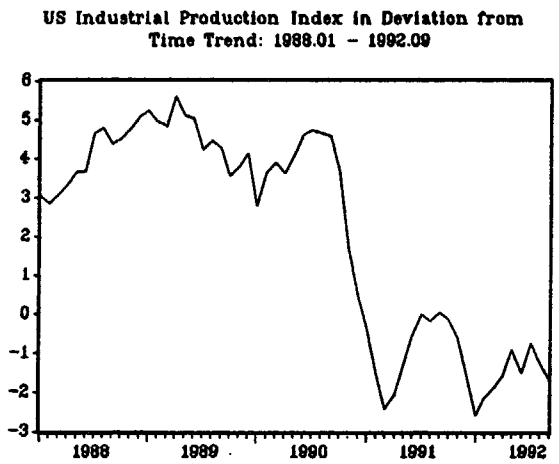

Figure 10

Correlations between flows and explanatory variables. Table 3 reports the panel data correlation coefficients between gross bond flows and net equity flows and the independent variables. The correlations are presented by region and for both nominal and real interest rates. Most correlation coefficients correspond to our priors: negative between US interest rates and flows, US industrial production variable and flows, and black market premiums and flows; and positive between credit ratings and flows, and secondary market prices and flows.

Table 3. Panel Data Correlations: 1988.01 - 1992.09

	Latin America				Asia			
	Net Equity	Net Equity (with real interest rates)	Gross Bond	Gross Bond (with real interest rates)	Net Equity	Net Equity (with real interest rates)	Gross Bond	Gross Bond (with real interest rates)
Credit	0.1_4		0.253		0.052		0.334	
Second.	0.029		0.142		N.A.		N.A.	
US INP	-0.129		-0.282		-0.222		-0.12[illegible]	
Black	-0.054		-0.134		-0.083		0.141	
USAT	-0.094	-0.094	-0.324	-0.273	-0.253	-0.221	-0.117	-0.143
USAC	-0.099	-0.103	-0.329	-0.295	-0.256	-0.235	-0.122	-0.147
USAG	-0.092	-0.024	-0.315	-0.006	-0.211	0.016	-0.119	-0.071
USAL	-0.100	-0.102	-0.332	-0.295	-0.253	-0.229	-0.128	-0.153
USA3i	-0.092	-0.075	-0.336	-0.219	-0.234	-0.141	-0.123	-0.135
PCi	-0.098	-0.093	-0.336	-0.260	-0.248	-0.195	-0.125	-0.148

Sources: International Financial Statistics, IMF, US Treasury, Salomon Brothers Institutional Investors, and World Currency Year book.
Note: USAT, USAC, USAG, USAL and USA3i interest rates are US Treasury bill rate (IFS line 66c), certificate of deposit rate (IFS line 60lc), long term rate (ten-year: IFS line 61), LIBOR (three-month: IFS line 60ldd) and medium term rate (three-year: IFS line 61a), respectively. PCi stands for the first principal component of the five interest rates (it explains 95% of the variance of these (nominal) interest rates).[12] Brady bonds have been taken out of gross bond flows for Latin America (the results are very different with Brady bonds incorporated). N.A. denotes not available.

Table 4 reports the correlation coefficients among the explanatory variables by region. As expected, the various interest rates are highly correlated. The correlation between these interest rates and the industrial production variable is likewise high. There is also a significant (negative) correlation between secondary market prices and interest rates (and the industrial production variable). As interest rates declined over much of this period, secondary market

[12]When using real interest rates, the first principal component explains equally well the individual real interest rates, except for the long-term (ten-year) real interest rate, where only 51% is explained by the first principal component.

prices increased, especially prices of fixed-interest-rate bonds.[13] In the case of Latin America, a significant (negative) correlation is also registered between interest rates and country credit rating. Black market premiums are significantly related with the secondary market prices (available for Latin America only) and the industrial production variable.

Table 4: Panel Data Correlations among Explanatory Variables
1988.01 - 1992.09

	Credit Rating	Second. Market Price	US Industrial Product.	Black Market Premium	USAT	USAG	PCi
			Latin America				
Credit	1.000						
Second.	0.703	1.000					
US INP	-0.210	-0.357	1.000				
Black	-0.060	-0.179	0.300	1.000			
USAT	-0.224	-0.407	0.873	0.237	1.000		
USAG	-0.180	-0.313	0.799	0.313	0.816	1.000	
PCi	-0.219	-0.391	0.887	0.286	0.976	0.912	1.000
			Asia				
Credit	1.000						
Second.	NA	1.000					
US INP	0.003	N.A.	1.000				
Black	0.048	N.A.	0.070	1.000			
USAT	0.012	N.A.	0.873	0.085	1.000		
USAG	-0.001	N.A.	0.799	0.049	0.816	1.000	
PCi	0.007	N.A.	0.887	0.076	0.976	0.912	1.000

Sources: See Table 3.
Note: See Table 3 for the acronyms used. The lowest correlation between pairs of interest rates is 0.816 (between USAG and USAT). N.A. denotes not available.

[13]When interest rates fall prices of collateralized bonds will increase because the present value of collateral increases. Prices of uncollateralized, variable interest rate bonds can also be expected to rise when interest rates fall when payments on the bonds are to some degree independent of the payment obligation, and in general, as the solvency of the country (discounted present value of future trade and/or fiscal balances) rises as interest rates fall.

IV. Methodology and Results

Methodology. We use a panel data approach to analyze capital flows to Latin America and Asia. This approach is employed for several reasons. First, the panel data estimation method is among the most efficient techniques to analyze the impact of a common set of global factors across a diverse group of countries. Second, this structure acknowledges that each country can have its own characteristics (country-specific effects), which can be correlated or uncorrelated with some or all the explanatory variables. Third, it is an appropriate method to alleviate the effects of omitted (missing and/or unobserved) time-invariant variables that are correlated with the explanatory variables. Fourth, the panel data technique solves or reduces some econometric problems by increasing the data points (increasing the degrees of freedom) and decreasing the collinearity among explanatory variables.

We investigate both gross and net flows. For reasons indicated above, we only discuss gross bond flows and net equity flows here. The model that we estimate is of the following type:

$$Y_{it} = \alpha_i + X_{it}\beta + u_{it} \qquad (1)$$

where $i=1,2,\ldots,N$ is a country index, $t=1,2,\ldots,T$ is a time index, Y_{it} is the explained variable (either net equity or gross bond flows), α_i is the country specific constant which can be either fixed or random, X_{it} is a set of explanatory variables, β is a vector of slope parameters, and u_{it} is the usual random disturbance. Model (1) states that the slope of each explanatory variable is the same across all the countries and the differences among the countries are captured by the latent variable α_i. The model can be rewritten as follows:

$$Y_{it} = \alpha_i + x_{it}\delta + z_i\gamma + u_{it} \qquad (2)$$

where x_{it} is a set of country-specific factors (e.g., credit rating, secondary market price, price earnings ratio, and black market premium) and z_i is a set of time-invariant variables which capture global factors (e.g., US interest rates and US industrial activity).

The appropriate estimation technique for model (1) or (2) crucially depends, among other factors, on the nature of the latent variable α_i. If α_i is fixed, i.e. correlated with some of the explanatory variables, and the model is over identified, then the two-stage least squares method (2SLS) à la Hausman-Taylor (1981) provides efficient estimates of δ ad γ. If α_i is fixed and the model is just identified, then 2SLS and within-estimator are equally efficient. If α_i is random, that is uncorrelated with all the explanatory variables, then the generalized least square estimator, a weighted average of between-group and within-group estimators, is the appropriate technique.

Thus, prior to using any particular estimation technique, we test for the hypothesis that H_0: $E(\alpha_i \mid x_{it}, z_i) = 0$ against H_1: $E(\alpha_i \mid x_{it}, z_i) \neq 0$. The relevant χ^2 test statistic (see Hausman and Taylor (1981, pp. 1382-1383) is:

$$\chi^2_{\chi} = \hat{q}V^{-1}\hat{q} \qquad (3)$$

where $\hat{q}=\hat{\beta}_w-\hat{\beta}_{GLS}$, *and* $\hat{\beta}_w$, $\hat{\beta}_{GLS}$ stand for within and GLS estimators, respectively, $V=cov(\hat{q})=cov(\hat{\beta}_w)-cov(\hat{\beta}_{GLS})$ and k, the number of parameters of interest, is the degree of freedom. The acceptance of H_0 means that α_i is random. Before reporting the results, we point out that in many cases the models passed the F-test of whether "to pool or not to pool."

Although the panel data approach is designed to reduce the problem of multicollinearity, we also use principal components of explanatory variables to further attenuate this problem (multicollinearity is manifested in the form of large standard errors or wrong coefficient signs as seen in several tables in Annex 2).[14] We regroup variables which are both highly correlated and which are believed to exert a similar qualitative influence on flows. A case in point is the first principal component of a country's credit rating and its secondary market price. We interpret this first principal component as an index of country-specific credit standing (PCS).[15] A first principal component of five US interest rates and the US industrial production variable is also constructed and is viewed as an index of global factors (PII).

Results. Our findings support the importance of both country-specific and global factors in explaining capital flows to emerging countries in Latin America and Asia. There is some variation in the results by region and by type of flow, however. In addition, there is also some variation in results across models arising from the use of nominal versus real interest rates, particularly for Latin America. The adjusted R^2 in the different models are high for Latin America and low for Asia. The high level of the statistic in Latin America is mainly explained by the dummies which capture the privatization (Telmex) phenomenon for equity flows and the Brady Plan for bond flows.[16] In fact, a lower R^2 is generally expected for these types of models. Table 5 and 6 present the panel data estimates for bond and equity flows to all Latin American (9) and Asian (9) countries in our sample. Tables 7 and 8 present these same results for a slightly smaller groups (6 and 7 countries, respectively) for which data on price-earnings ratios and rates of return on domestic stock markets were available .

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[14] To detect multicollinearity, one should primarily look at the variance of residuals of the model, the R^2, and the different R^2_i (R^2 from the regression of one explanatory variable on the other explanatory variables (Maddala 1988, p. 223-249)).

[15] Although the two variables are not the only country-specific factors, in these models they seem to be the most important ones. Note that their index is not derived for Asia for lack of availability of secondary market prices data.

[16] In fact, if we adjust for these dummies, the slope coefficients of the explanatory variables are not affected, but a much lower R^2 results (i.e., for bonds, it drops from .98 to 0.16).

Table 5: Panel Data Estimates: Equity Flows, 1988.01-1992.09
Latin America (9 countries) - Asia (9 countries).

	Latin America		Asia	
	Nominal interest rates	Real interest rates	Nominal interest rates	Real interest rates
Method	GLS	GLS	Within	Within
Credit rating			.396** (0.131)	0.359** (0.017)
PCS	-1.367 (5.377)	2.458 (4.626)		
PII	-10.539* (5.339)	-6.505° (4.587)	-2.347** (0.380)	-1.924** (0.385)
Adjusted R^2	0.292	0.289	0.065	0.042
χ^2_1	-0.025	-0.032	6.976 (0.008)	5.595 (0.018)
NOBS	513	513	513	513

Note: Method: estimation technique; PII: first principal component of the five types of interest rates and US industrial production (it explains 93% of the variance of these variables if nominal interest rates are used and 79% if real interest rates are used); PCS: first principal component of country's credit rating and secondary market prices obtained by stacking the corresponding individual first principal components (the least explained PCS is 85%); figures in parentheses are standard errors of coefficients or p-value for χ^2, which tests for independence of either PCS or credit rating with the latent variable; columns 2 and 4 use nominal interest rates; column 3 and 5 use real interest rates; NOBS: number of observations; "o", "*", and "**": significant at the 10%, 5% and 1% level, respectively; and for Latin America, 3 dummies are used for equity flows to capture the privatization phenomenon (Telmex).
The choice of estimation technique depends on the value of χ^2 in the following way: if p < level of significance (1% or 5%), we refect H_o and use either 2SLS or within-estiamtor. If χ^2 is negative or p ≥ level of significance, we use GLS.

Table 6: Panel Data Estimates: Bond Flows, 1988.01-1992.09
Latin America (9 countries) - Asia (9 countries).

	Latin America		Asia	
	Nominal interest rates	Real interest rates	Nominal interest rates	real interest rates
Method	GLS	GLS	GLS	GLS
Credit rating			1.318###	1.304###
			(0.281)	(0.281)
PCS	3.893o	8.329###		
	(2.431)	(2.114)		
PII	-13.094###	-8.737###	-8.37o###	-9.563**
	(2.413)	(2.104)	(2.628)	(2.620)
Adjusted R^2	0.982	0.982	0.041	0.047
χ^2_1	-0.0381	-0.0002	0.0003	0.0181
			(0.9871)	(0.8930)
NOBS	513	513	513	513

Note: See Table 5. Three dummies are used for Latin America to capture the Brady Plan effect. One dummy is eliminated because with 4 dummies the algorithm for GLS breaks down (square root of negative element). "#", "o", "*", and "**": significant at the 15%, 10%, 5% and 1% levels, respectively.

Table 7: Panel Data Estimates: Equity Flows, 1988.01-1992.09
Latin America (6 countries) - Asia (7 countries).

	Latin America		Asia	
	Nominal interest rates	Real interest rates	Nominal interest rates	Real interest rates
Method	GLS	GLS	GLS	GLS
Credit rating			0.108*	0.106*
			(0.051)	(0.052)
PCS	1.690	7.278		
	(8.174)	(7.480)		
Return	-0.039	-0.061	0.002°	0.002°
	(0.316)	(0.316)	0.001	0.001
Price-Earning Ratio	-0.985#	-0.654	-0.182**	-0.185**
	(0.928)	(0.894)	(0.065)	(0.066)
PII	-18.141*	-11.066°	-2.007**	-1.564**
	(8.212)	(6.913)	(0.479)	(0.485)
Adjusted R^2	0.292	0.290	0.053	0.036
χ^2_1	-0.430	-3.633	0.976	0.000
			(0.323)	(0.994)
NOBS	342	342	399	399

Note: See Table 5.
Latin America: Argentina, Brazil, Chile, Colombia, Mexico and Venezuela. Asia: India, Korea, Malaysia, Philippines, Pakistan, Taiwan and Thailand. Return: differential of rates of return (rates of return of domestic stock markets - US rates of return). As in Table 5, three dummies are used for equity flows in Latin America. "#", "o", "*", and "**":significant at the 15%, 10%, 5% and 1% levels, respectively.

Table 8: Panel Data Estimates: Bond Flows, 1988.01-1992.09
Latin America (6 countries) - Asia (7 countries).

	Latin America		Asia	
	Nominal interest rates	Real interest rates	Nominal interest rates	Real interest rates
Method	GLS	GLS	GLS	GLS
Credit rating			1.643**	1.599**
			(0.318)	(0.315)
PCS	7.374*	12.708**		
	(3.534)	(3.328)		
Return	-0.046	-0.067	0.003	0.003
	(0.137)	(0.139)	0.009	0.009
Price-Earning Ratio	-0.860*	-0.501°	-1.171**	-1.101**
	(0.412)	(0.406)	(0.426)	(0.428)
PII	-20.316**	-13.406**	-10.001**	-10.494**
	(3.567)	(3.052)	(3.205)	(3.218)
Adjusted R^2	0.984	0.983	0.075	0.078
χ^2_1	-0.016	-0.037	0.035	0.040
			(0.851)	(0.842)
NOBS	342	342	399	399

Note: See Table 7. Two dummies are used for Latin America to capture the Brady Plan.

The impact of country-specific factors varies by type of flow and by region. For bond flows, the importance of the credit rating variable (in Asian countries) or the first principal component of credit rating and secondary market price (in Latin American countries) appears to be clearly established (see Table 6 and 8 as well as Table A5 and A7 in Annex 2), but not for equity flows. Indeed, the "t" statistics of the first principal component of credit rating and secondary market prices are not significantly different from zero (at the 15% level of significance) for equity flows to Latin America. In fact, the big standard errors for this country-specific factor emphasize that multicollinearity is still a problem here.[17] Among other country-specific factors, the price-earning ratios are consistently significant across models, but the domestic stock market return variable behaves differently for Asia and Latin America. The

[17] This is confirmed, for example by using Klein's rule ($R^2 < R^2_i$: 0.309 < 0.440) in Table 8 (first regression). Note that multicollinearity does not affect the index of global factors because the latter has big coefficients.

latter has both the right sign and is some times significant for Asia, but it is wrongly signed and insignificant for Latin America. The lack of significance of this variable is mainly explained by the fact that these rates of return are ex-post measured rates and tend to be volatile. Obviously, ex-ante measures would be more useful, but this would require a full fledged asset-pricing model.[18] The black market premium is not a significant explanatory variable in our model, even though this variable has been found to be a useful indicator for the degree of (exchange rate) distortions in developing countries (World Bank, 1991). The lack of explanatory power of this variable probably stems form the fact that few developing countries in the sample maintained significant black market premiums during this period as many countries unified their exchange rates.

Our results confirm the importance of global factors. The first principal component of US interest rates and US industrial production is always significant and exerts a negative influence on flows. When the first principal component is replaced by the underlying interest rates and the industrial production variable, the impact of the individual variables is not clear cut in many instances. This ambiguity arises from multicollinearity among these variables (Annex tables A1 to A4). Nevertheless, we can tentatively assert that the effect of US interest rates is more important than that of US industrial production. We should, however, point out that the five interest rates do not necessarily display the same behavior.

Standardized Coefficients and Elasticities. In order to interpret the relative importance of various explanatory factors within each regression, we compute standardized slope coefficients (the coefficients multiplied by the standard deviation of the independent variable) (Table 9). The absolute values of the relevant standardized coefficients can be summed to obtain the importance of all global and all country-specific factors.

[18]Another reason for the weak performance of this variable could be that the IFC's total return indexes do not reflect returns on domestic stocks that are actually accessible to foreign investors. In this context, the IFC's new investable index (just released) might be more appropriate for measuring domestic stock market returns.

Table 9: Standardized Slope Coefficients (based on Tables 7 and 8)

	Equity		Bond	
	Nominal interest rates	Real interest rates	Nominal interest rates	Real interest rates
		Latin America		
PCS	1.678[ns]	6.816[ns]	7.320	12.614
Return	NS	NS	NS	NS
Price-earning ratios	-8.598	-5.764	-7.506	-4.375
PII	-18.141	-11.066	-20.316	-13.406
		Asia		
Credit rating	1.974	1.937	30.030	29.230
Return	1.180	1.180	1.570	1.638
Price-earning ratios	-1.916	-1.948	-12.334	-11.596
PII	-2.007	-1.564	-10.001	-10.494

Notes: Variables other than the principal components have been standardized; PCS: first principal component of credit rating and secondary market prices (see notes for Table 5); PII: first principal component of interest rates and US industrial production index; NS: not significant.

The results vary by region and type of flows (and whether real or nominal interest rates are used). For Latin America, the sums of the absolute value of the standardized coefficients for PCS, return, and price-earnings ratio are about the same as the coefficients for the global factor (PII). The implication for this region is that global variables are as important as domestic variables in explaining both bond and equity flows. For Asia, the country-specific variables are three to four times more important than the global variables in explaining both equity and bond flows. The credit rating variable is particularly important in explaining bond flows (a standardized coefficient of about 30) to this region.

The standardized coefficients do not allow us to compare the relative sensitivities across regions and by type of flows because the absolute levels of the flows are very different (see Table 2). For this purpose, we compute elasticities (Table 10).[19] As expected, equity flows are more sensitive to a country's price-earnings ratio (with a negative sign) and rates of return on domestic stock markets (relative to the U.S.) than are bond flows. The elasticities also reveal some other interesting differences. The most important is that the elasticities for equity flows with respect to global factors are consistently higher than for bonds flows for both regions. This could be interpreted as a sign of some credit rationing in the fixed-income market. The effect of credit rationing (which characterized Latin America) would be to make bond flows less interest sensitive--the supply curve would bend backward. This is not likely to happen for equity flows as these flows are not associated with a fixed payment obligation and, consequently, are not susceptible to (this type of) credit rationing. We would, therefore, expect equity flows to be more interest rate sensitive. Further evidence of this effect is found in the fact that credit rating is (marginally) more important for bond flows to Asia than for equity flows to that region.[20]

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[19]The slope coefficients divided by the mean of the dependent variable and multiplied by the mean of the independent variable. For the principal components, we use the maximum values to calculate elasticities instead of the mean which is zero. Note that the elasticities vary depending on whether the equation is estimated using real or nominal interest rates.

[20]These results should, however, be interpreted carefully as equity flows from the US to Asia are very small (only 1/20th of the bond flows to that region).

Table 10: Elasticities
(Based on Tables 7 and 8)

	Equity		Bond	
	Nominal interest rates	Real interest rates	Nominal interest rates	Real interest rates
		Latin America		
PCS	0.171[ns]	0.739[ns]	0.311	0.571
Return	NS	NS	NS	NS
Price-earning ratios	-0.581	-0.586	-0.225	-0.131
PII	-1.331	-0.848	-0.660	-0.455
		Asia		
Credit rating	2.085	2.046	2.739	2.718
Return	0.507	0.507	NS	NS
Price-earning ratios	-1.516	-1.587	-0.884	-0.832
PII	-1.168	-0.954	-0.514	-0.563

Notes: Variables are defined as in Tables 7 and 8; elasticity = coefficient times (x/y) where x and y stand for the mean of the independent variable and that of the dependent variable, respectively; for the first principal components, we use the maximum value of the variable instead of the mean because the latter is zero. NS: not significant.

V. Conclusions

Rather than repeating our conclusions, which are contained in the Introduction, we would like to indicate several directions for further research in this area. On the data side, it would be useful to increase the sample of developing countries, e.g., include Africa or the Middle-East. Some countries in these regions (e.g., Egypt) have also received large flows in recent years and it would be useful to see if these flows are motivated by the same factors. Second, industrial country (e.g., G-7) factors could be added to model the tradeoff for US investors between investing in various markets. This exercise would require including flows from the US to these industrial countries (and vice-versa) in the panel estimations. If it were found that flows from the US to all countries (developing as well as industrial) increased, then our result on the importance of country-specific factors in attracting these flows would be weakened.

Turning to methodology, a simultaneous equation error component model could be used in order to account for possible simultaneity among variables (e.g., interest rates could influence secondary market prices and the creditworthiness of a country; the latter two variables could be related; and capital inflows themselves could affect rates of return on stock markets). Further, if forecasting is one of the research objectives, then a "VAR-panel" approach could be employed.[21]

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[21]See Husain and Jun (1992) and Fry (1993) for a simultaneous equation approach of modelling the interactions between capital flows, on the one hand, and aggregate savings and growth on the other hand.

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Annex I: Relationship between Capital Flows and Reserves

We investigate the association between capital inflows and reserves figures to determine whether the latter can be used as a proxy for the former. We do this by examining some correlations between the two types of variables under various frameworks. A high correlation with a correct expected sign is, in our view, a necessary condition for a good proxy of one variable for another.[22]

On a monthly basis, there is surprisingly little association between gross flows and reserves on the one hand, and net flows and reserves on the other hand (Tables A1 and A2). Indeed, Table A1, which provides correlations between the two types of variables at the country level, shows that the correlations are generally low and often insignificant and negative. The negativity of some correlation coefficients is particularly troubling. Furthermore, it is also worth pointing out that the few high correlations registered are spurious (see below for explanations).

The correlations between the first principal components of reserves and capital inflows are reasonably high at 0.383 to 0.777, but the first principal component of reserves is also a poor proxy of capital inflows. This result follows from the fact that the first principal component of capital flows explains little of the cross-country variation in flows. For example, for Latin America the first principal component explains only 25 percent of the variance in net equity flows and 24 percent of the variance in gross bond flows. Consequently, while the first component of reserves may be a reasonable proxy for the common factor in capital flows, it explains little of the total cross-country variation in capital flows.

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[22] Note that we use the concept of proxy variable here not as a variable which replaces an unobservable explanatory variable, but rather as an observable dependent variable which is supposed to replace another observable dependent variable unavailable to a researcher in a particular time period. There is a parallel between this notion of proxy variable and that of instrumental variables.

Table A1. Contemporaneous Correlations between Reserves and Capital Inflows

	Net Equity Flows	Gross Bond Flows	Net Equity Flows (no outliers)	Gross Bond Fl. (without Brady bonds or outliers)
Latin America: 1988.01 - 1991.12				
Argentina	0.48**	0.53**	0.55**	
Brazil	0.18	0.17	0.19^	-----
Chile	-0.32	-0.09	-0.51	-----
Colombia	-0.13	0.07	---	-----
Ecuador	0.11	-0.07	---	-----
Jamaica	-0.01	0.02	-0.10	-----
Mexico	0.06	-0.15	0.25*	0.30*
Uruguay	0.07	-0.14	0.14	-0.49
Venezuela	-0.20	-0.20	0.13	0.64**
Asia: 1988.01 - 1992.09				
China	-0.17	-0.02	-0.03	-0.13
India	-0.06	-0.03	-0.09	-0.05
Indonesia	0.62**	-0.09	0.63**	
Korea	0.22*	0.11	---	---
Malaysia	0.21^	0.11	---	---
Pakistan	0.37**	0.02	0.36**	0.14
Philippines	0.51**	-0.14	---	---
Taiwan	0.02	0.56**	---	0.44**
Thailand	0.22*	0.04	---	---

Sources: See Table 3 in the main text.

Note: Entries are correlation coefficients (r) between reserves and capital inflows. "^", "*" and "**" mean significant at the 10%, 5%, and 1% levels, respectively using a t-statistic. Because a positive sign is expected, negative values are considered insignificant. Net equity flows are corrected for outliers (if applicable) in column 4. Gross bond flows are corrected both for Brady (if applicable) for Latin America and for outliers (if applicable) for Asia in column 5. Because of lack of availability of some reserves series, a reduced sample size (1988.01 - 1991.12) was used for Latin America.

Table A2. Contemporaneous Correlations among First Principal Component of Reserves and Capital Flows

	Reserves	Net Equity Flows	Net Bond Flows	Gross Equity Flows	Gross Bond Flows
			Latin America: 1988.01 - 1991.12		
Reserves	1.000				
Net Equity	0.383	1.000			
Net Bond	0.505	-0.039	1.000		
Gross Equity	0.749	0.422	0.544	1.000	
Gross Bond	0.657	0.103	0.643	0.587	1.000
			Asia: 1988.01 - 1992.09		
Reserves	1.000				
Net Equity	0.146	1.000			
Net Bond	0.052	0.103	1.000		
Gross Equity	0.777	0.151	0.127	1.000	
Gross Bond	-0.602	-0.033	0.286	-0.360	1.000

Sources: See Table 3 in the main text.

Note: "Reserves" means the first principal component (PC) of individual reserves; "Net equity flows" means the first principal component of individual net equity flows and so on. The variance of the variable of interest explained by the first principal component is as follows for Latin America and Asia, respectively: 59% and 61% for reserves; 25% and 27% for net equity flows; 23% and 24% for net bond flows; 26% and 37% for gross equity flows; and finally, 24% and 26% for gross bond flows.

Table A3 reports panel data correlations between reserves and capital inflows. The results again confirm the earlier conclusion that using reserves may be a poor proxy for capital inflows. The correlations between reserves and other flows are below 0.20 for Latin America. And even though the correlation between reserves and gross bonds reaches 0.29 for Asia, the correlation coefficient between reserves and net equity is negative for this region.

Two factors appear to be particularly relevant in explaining why reserves figures are such a poor proxy for the capital inflows used in this study. First, the two variables are different in nature: reserves are a stock variable and capital inflows are a flow variable. It is well know that stock and flow variables can behave differently, for example, in the context of aggregation over time (e.g., see Wei (1990)). Second, in this data set, while most of the reserves series contain a unit root (fourteen out of eighteen series), the flow series are highly stationary. In other words, most of the correlations obtained so far are spurious. Although this argument is merely concerned with time series data, it is also likely to influence the panel data results because in each data set seven countries out of nine exhibit a unit root in the reserves series.

Using the first differences of reserves (i.e., measuring the flow) further lowers the correlations between capital inflows and reserves, again providing little support for using reserves as a proxy for bond and equity flows. For example, for Asia the correlations between reserves and net equity flows and between reserves and gross bond flows become -0.042 and 0.230, respectively.[23] For Indonesia, these numbers become 0.142 and -0.046. For Venezuela, they are 0.095 and 0.081. For Mexico, they are -0.21 and 0.21. To sum up, reserves both in levels as well as in first differences are poor proxies for capital inflows for the countries we study.

Table A3. Panel Data Correlations: Reserves and Capital Inflows

	Reserves	Net Equity	Net Bond	Gross Equity	Gross Bond
		Latin America: 1988.01 - 1991.12			
Reserves	1.0000				
Net Equity	0.1689	1.0000			
Net Bond	0.0363	0.0456	1.0000		
Gross Equity	0.0491	0.5205	0.0393	1.0000	
Gross Bond	0.0633	0.0563	0.9986	0.0621	1.0000
		Asia: 1988.01 - 1992.09			
Reserves	1.0000				
Net Equity	-0.0771	1.0000			
Net Bond	-0.3153	-0.0808	1.0000		
Gross Equity	0.1132	0.6536	0.0346	1.0000	
Gross Bond	0.2883	0.0010	0.4929	0.0967	1.0000

Sources: See Table 3 in the main text.
Notes: After adjusting for the issuance of the Brady bonds in the gross bond flows numbers for Latin America, the correlation between reserves and gross bond flows becomes 0.2692.

[23]These correlations use the first principal component of the first differences of reserves.

Annex II: Results Using Explanatory Variables Directly

Table A4. Panel Data Estimates: Equity Flows, 1988.01 - 1992.09
Latin America (9 countries) and Asia (9 countries)

	Latin America		Asia	
	Nominal interest rate	Real interest rates	Nominal interest rates	Real interest rates
Method	GLS	GLS	Within	Within
Credit rating	2.425**	2.467**	0.399**	0.376**
	(1.030)	(1.029)	(0.131)	(0.132)
Secondary Market price	-0.730	-0.749		
	(0.406)	(0.396)		
US Production	-4.136°	-6.565**	0.003	-0.687**
	(3.220)	(2.708)	(0.307)	(0.244)
Principal component interest rate	-1.158	6.699	-2.360**	-0.294
	(8.942)	(6.807)	(0.825)	(0.656)
Adjusted R^2	0.299	0.300	0.064	0.049
χ^2_k	0.134	0.149	7.065	6.170
	(0.935)	(0.928)	(0.008)	(0.013)
NOBS	513	513	513	513

Note: Nominal interest rates are used in columns 2 and 4; Real interest rates are used in columns 3 and 5; Principal component: first Principal component of the five types of interest rates (it explains 94.8% and 80.6% of the variance of nominal and real interest rates, respectively; χ^2_k : k = 2 for Latin America (credit rating and secondary market prices) and k = 1 for Asia (credit rating)
"#", "o", "*", and "**": significant at the 15%, 10%, 5% and 1% level, respectively; (.) : standard errors of coefficients or p-values of χ^2 statistic. Dummies are used for Latin America, to capture the privatization phenomenon (Telmex) in equity flows.

Table A5. Panel Data Estimates: Bonds Flows, 1988.01 - 1992.09
Latin America (9 countries) and Asia (9 countries)

	Latin America		Asia	
	Nominal interest rates	Real interest rates	Nominal interest rates	Real interest rates
Method	GLS	GLS	GLS	GLS
Credit rating	1.950**	1.810**	1.316**	1.304**
	(0.623)	(0.639)	(0.281)	(0.225)
Secondary Market price	-0.073	0.326°		
	(0.243)	(0.236)		
US Production	2.212	-1.245	-1.929	-0.779
	(1.455)	(1.314)	(2.120)	(1.668)
Principal component interest rates	-18.456**	-4.905**	-3.622	-7.775**
	(4.162)	(3.128)	(5.695)	(4.480)
Adjusted R^2	0.983	0.982	0.040	0.045
χ^2_k	2.869	6.903	0.001	0.019
	(0.238)	(0.031)	(0.991)	(0.890)
NOBS	513	513	513	513

Note: see Table A1.
Dummies are used to capture the Brady Plan for bonds flows to Latin America.

Table A6. Panel Data Estimates: Equity Flows, 1988.01 - 1992.09
Latin America (6 countries) and Asia (7 countries)

	Latin America		Asia	
	Nominal interest rates	Real interest rates	Nominal interest rates	Real interest rates
Method	GLS	GLS	GLS	GLS
Credit rating	3.388*	3.485*	0.110*	0.108**
	(1.854)	(1.852)	(0.052)	(0.052)
Secondary Market price	-1.122	-0.147		
	(0.661)	(0.653)		
Return	-0.032	-0.062	0.002°	0.002°
	(0.317)	(0.315)	(0.001)	(0.001)
Price-earning ratios	-0.983#	-0.910#	-0.183**	-0.188**
	(0.835)	(0.843)	(0.065)	(0.066)
US Production	-5.915#	-11.105**	0.222	-0.523*
	(4.884)	(4.212)	(0.378)	(0.301)
Principal component interest rate	-5.810	11.277	-2.563**	-0.319
	(13.932)	(4.212)	(1.019)	(0.815)
Adjusted R^2	0.300	0.302	0.052	0.037
χ^2_k	0.402	2.162	0.500	0.036
	(0.301)	(0.339)	(0.479)	(0.850)
NOBS	342	342	399	399

Note: see Table A1.
For the names of the countries, see Table 7.
Dummies are used for equity flows to Latin America to capture the privatization phenomenon (Telmex).

Table A7. Panel Data Estimates: Bonds Flows, 1988.01 - 1992.09
Latin America (6 countries) and Asia (9 countries)

	Latin America		Asia	
	Nominal interest rates	Real interest rates	Nominal interest rates	Real interest rates
Method	Within	GLS	GLS	GLS
Credit rating	1.398°	1.108°	1.640**	1.603**
	(0.894)	(0.907)	(0.318)	(0.316)
Secondary Market price	0.563°	0.757*		
	(0.361)	(0.366)		
Return	-0.024	-0.070	0.003	0.003
	(0.135)	(0.366)	(0.009)	(0.009)
Price-earning ratios	-0.871*	-0.426#	-1.167**	-1.108**
	(0.401)	(0.399)	(0.427)	(0.429)
US Production	2.336	-2.462#	-1.526	-1.518
	(2.082)	(1.954)	(2.537)	(2.000)
Principal component interest rates	-23.555##	-6.682**	-6.260	-6.951##
	(6.221)	(4.582)	(6.835)	(5.418)
Adjusted R^2	0.984	0.983	0.073	0.076
χ^2_k	112.931	2.179	0.022	0.022
	(0.000)	(0.336)	(0.882)	(0.882)
NOBS	342	342	399	399

Note: see Table A2.
Dummies are used for bonds flows to Latin America (Brady Plan).

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