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Portfolio flows, volatility and growth

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A B S T R A C T

We study the realized openness to portfolio flows of economically more-developed and less-developed countries as it affects future GDP growth. Outflows of a country's funds into U.S. securities are predictive of GDP growth, suggesting that the benefits of openness outweigh local capital flight. Both inflows and outflows of funds via local equity securities are predictive of growth, which is the evidence of the benefits of openness. For less-developed countries, the effect of inflows is especially strong. Country-specific volatility in flows does not detract from growth, and volatility in world-wide flows precedes growth. Overall, the evidence is consistent with strong benefits of realized financial integration where the availability of U.S. markets for local portfolio investment along with equity investment from the outside enhances economic growth.

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1. Introduction

The fundamental relationships between public policy, financial activity, and economic growth are subjects of central importance in economics and finance. A substantial debate concerns capital account openness and capital market integration. Finance theory posits that the integration of a country's equity markets into world markets allows for increased risk sharing, more liquidity, and perhaps a reduction in the risk-free rate of interest.[1]

The evidence is that a modest reduction in the equity risk premium is associated with capital account openness (Stulz, 1999), and also with liberalization, a discrete step toward openness (Henry,

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[1] Eichengreen (2001) summarizes the debate. Bekaert and Harvey (1995), Levine and Zervos (1998), and Henry (2000a) summarize the finance theory.

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2000b; Bekaert and Harvey, 2000). This benefit might be expected to feed through to increase private investment flows and to influence growth, and there is evidence of at least a temporary increase in investment (Henry, 2000a; Edison and Warnock, 2008).

Some observers, however, believe that the inherent volatility of capital flows, as manifest most severely in "sudden stops" (Calvo and Reinhart, 1999), "hot money" (Stiglitz, 1999) and even capital flight, leads to adverse effects, especially during economic downturns in countries with small "absorptive capacity" (Prassad et al., 2003) and weak investor protection (Lemmon and Lins, 2003). On balance, it is possible that openness and integration might even depress growth. Politicized versions of such thinking have encouraged the re-imposition of capital controls in some countries, such as Indonesia, following the crises of the late 1990s (see Edwards, 2003, for an analysis).

Direct empirical studies have not conclusively shown the relation between openness and economic growth (Prassad et al., 2003). More broadly, Wachtel (2001) comments "…it is curious how little evidence there is that relates the financial sector to economic growth and stability." Recent studies range from strong affirmation (Bekaert et al., 2005) to lukewarm acceptance (Eichengreen and Leblang, 2003) to disbelief (Rodrik, 1998) regarding a positive relationship between openness and subsequent growth.

We present evidence that helps to sort out these conflicts by focusing on the extent of a country's realized integration into world capital markets. Statutory capital account openness is a necessary but not sufficient condition for realized openness and capital market integration. Integration additionally implies the presence of actual capital flows in and/or out of a country. Integration is of focal interest because capital account openness, if it matters for growth, operates via the chain outlined above, from openness to cost of capital to investment flows to growth. Investment flows are a necessary link in the chain. Specifically, our evidence elucidates the relations between portfolio investment flows and subsequent GDP growth. Portfolio flows are central to some previous measures of liberalization, in particular Bekaert and Harvey (2000), but our experimental design is novel in that it allows portfolio flows to be incorporated as a time-varying indicator of actual integration.

With a design focused on flows as a time-varying indicator of realized openness, we can use detailed data to test for both positive and negative economic effects. We adopt the perspective that realized openness is expressed in both inflows and outflows of investment. Econometrically, openness may be both a cause and a symptom of growth, so studies should acknowledge fundamental endogeneities. For example, if only positive inflows of funds (i.e., positive on net, considering outflows also) are predictive of growth, one cannot rule out the possibility that the underlying causality runs from expected growth to inflows of funds – and that the growth might have occurred even without the inflows.

Additionally, we focus on portfolio flows, for which high-frequency data are available, and thereby we gain the ability to investigate volatility in flows. Volatility is one observable characteristic of hot money and capital flight. Portfolio flows are generally considered the most volatile component of capital flows, and they become more substantial following policy liberalizations (Kraay, 1998). Teaser and Werner (1995) show that portfolio flow volatility is greater for emerging markets.

Our evidence shows that realized portfolio flows are a strong predictor of economic growth over our sample 50 countries, whether the flows involve U.S. or local securities. The results support the proposition that the risk sharing and liquidity benefits of financial integration enhance realized growth, on balance. We also find evidence consistent with the possibility that some flows chase growth expectations. We do not find any evidence that volatility offsets the benefits of portfolio flows.

We develop this evidence in several steps. First, to establish a model for our investigation, we test for the separate effects of purchases versus sales of securities by the domestic residents of non-U.S. countries. This allows us to reject a gross flows model in which purchases and sales are both predictive of the same effect on future growth. The data are more consistent with a net flows model in which the direction of capital flow matters in addition to its absolute magnitude. Additionally, there can be differential roles for inflows versus outflows of funds.

These initial tests have additional interesting implications. Specifically, purchases of U.S. securities by domestic residents of other countries predict accelerated growth for those countries. Such purchases imply an outflow of domestic capital, implying that the growth-depressing effects of capital flight are not dominant in the data overall. Flows' volatility does not dampen this effect. Additionally, the sale of local equity securities is indicative of future growth. Taken together, the implication is that

a country, whose residents supply local equities to the outside market, while at the same time putting funds to work in U.S. securities, is poised for growth. Even these initial results hint that realized openness – rather than the only use of inflowing funds per se – that leads to growth. Since outflows of local capital and inflows of foreign capital both are predictive of growth, there is a strong indication that openness helps.

Working with a net-inflows model, we investigate further. Consistent with the initial tests, we find that outflows of funds into U.S. securities predict stronger economic growth. The result holds especially for the less-developed countries in our sample, and is strongest for country/years in which inflows of capital are strictly negative. Note that positive net sales result in cash that could be used for domestic investment, so this result is evidence for the importance of openness, not just investable funds. At the very least, the data are not dominated by situations in which capital flight from less-developed countries (via purchases of U.S. securities) depresses growth.

Also consistent with initial tests, we find that openness as indicated by local securities' flows is predictive of growth, again especially for the less-developed countries in the sample. For these countries, positive net sales that result in funds' inflows are especially strongly associated with growth, suggesting that investable funds are a key part of the growth equation. Strikingly, when we consider the separate effects of positive and negative net sales of local equities to U.S. residents, we find that *both* are predictive of increased economic growth for the more-developed countries. This is evidence that realized openness is important, beyond the availability of investable funds. Volatility in flows is not reliably predictive of lower future growth for the full sample, and even has a positive effect in some models. This evidence indicates that realized openness supports economic growth, although it is also consistent with the inflows of funds being a reflection of a forecast of higher growth.

A few other studies also find differential effects of openness across more- and less-developed countries. Klein and Olivei (2008) find that a policy of capital account openness is conducive to growth only for industrial nations. Using lower-frequency data, Durham (2004) finds no significant impact of foreign direct investment and equity portfolio flows on growth using a cross-sectional model that includes both high- and low-income countries. However, he finds some evidence that the effect of portfolio flows on growth is contingent on the country's financial and institutional development level, which is indicative of absorptive capacity. Other studies find that financial development is a cause of economic development (Levine, 1998; Rousseau and Sylla, 2005). Bonin and Wachtel (1999) emphasize the importance of banks and markets together as a basis for development. Minier (2003) finds that several measures of financial development are actually negatively related to growth for an endogenously chosen set of countries with small stock market sectors. For countries with large stock markets, she finds a strong positive relation between growth and financial development. Our findings do not change if, following Minier (2003), we split the sample using countries' financial development levels instead of economic development levels.

In contrast, some other studies suggest that integration benefits less-developed countries. Perhaps the strongest findings of a positive relation between openness and growth are in Bekaert et al. (2005) who study a broad sample, focusing on the date of official equity market liberalization. Policy liberalization is a non-decreasing dummy variable, even though actual integration can vary over time. Moreover, policy liberalization tends to coincide with other economic and political reforms to improve investor protections and total factor productivity (Klein and Olivei, 2008; Henry, 2000b; Quinn et al., 2008). Using our more focused approach to measuring flows, we find that the evidence supporting openness is different for less-developed countries. Specifically, openness is clearly associated with growth, while at the same time the inflow of funds is clearly disproportionately important for less-developed countries. Thus, our evidence helps reconcile these prior studies.

Growth regressions are notoriously fragile (Levine and Renelt, 1992), so we subject these results to a variety of robustness checks. Our findings are robust to various ways of measuring flows and flow volatility, to the presence or absence of controls for neo-classical growth model regressors and other determinants of portfolio flows, to estimation in pooled and panel regressions using country fixed effects, to alternative definitions of more- and less economically developed countries, and to the distinction between financial and economic development. Most results are also robust to the use of a more inclusive but lower-frequency source of portfolio flows' data, though volatility effects cannot be estimated with such data.

The rest of our paper proceeds as follows. Section 2 discusses the underpinnings of our empirical design, showing how to use portfolio flows in testing for the relation of openness/integration to economic growth and foreshadowing our conclusions. Section 3 describes the details of our tests and our data, and presents indicative descriptive results. Section 4 presents our main results, and provides robustness checks. Section 5 concludes.

2. Testing for the relation of growth and financial openness using portfolio flows

The early and middle 1990s saw a rough consensus that openness to capital flows has salutary effects on economic growth (Taylor, 1996). Subsequent to the Asian crisis of 1997 and the Russian crisis of 1998, the consensus unraveled. Strong and opposing views are feasible because hypothesized relationships between financial openness and future growth do not assert themselves strongly in statistics. At this point, it is not clear whether or not (and under what conditions) capital account openness and/or liberalization lead to economic growth.[2]

Openness is a continuous economic concept that has most often been measured with discrete or categorical policy variables with attendant loss of statistical power. Early studies of this issue access financial openness using a single indicator variable summarizing government policies. More recent studies have adopted measures of openness that consider richer information, such as the political environment (Quinn, 1997) and information in stock market time series (Bekaert et al., 2002). These measures retain the feature that openness is non-decreasing over time within most of the samples that have been studied.[3] For example, in Bekaert et al. (2002), the assessments of country liberalization focus on the time of a breakout in capital flows in an upward direction in determining when liberalization occurs. Baier et al. (2004) study investment and productivity before and after the establishment of a stock exchange.

Yet Montiel and Reinhart (1999) show that the intensity of actual openness to world capital markets varies over time. Taylor (1996) shows that policy openness is only one aspect of actual openness. These findings suggest that a more flexible measure might be useful. Data on cross-border investment flows are one possibility. Though Henry (2000a) shows that net investment flows are strongest on average immediately after liberalizations, there is considerable variation in the cross-section. Also, gross investment flows (i.e., inflows and outflows together) also exhibit substantial variation across countries but, on average, tend to grow slowly following liberalization. Finally, gross flows are much larger than net flows, so outflows of funds are a significant consequence of openness.

Fig. 1 illustrates the cross-sectional average of net sales and gross portfolio flows (sales plus purchases) for the less-developed countries in our sample.[4] As an example, the figure shows flows via local (home country) equity securities, measured as a percentage of GDP. Net sales peak and then decline, but not until after the second year post-liberalization. Gross flows continue to grow for more than half a decade then decline somewhat. A binary indicator of openness, especially one focused on the official liberalization date and which is never reversed in our sample period, cannot capture the full information content available in the panel of portfolio flows.[5] Our specific empirical design therefore uses portfolio flows as a time-varying indicator of realized openness.

Our design includes several methodological innovations to help us obtain inferences beyond previous studies. First, we separately incorporate portfolio flow data on both local and U.S. securities

[2] Liberalization is the term often used to describe a change in openness. Thus, openness is a level variable and liberalization is its first difference. At the level of this discussion, we use the terms interchangeably.

[3] An exception is Edison and Warnock (2003) who develop a measure of openness based on the proportion of a country's stock available for purchase by foreigners. The Edison–Warnock measure correlates closely with the Bekaert et al. (2002) measure of initial market opening, but implies that opening is neither complete nor irreversible. Bekaert et al. (2002) also present additional measures incorporating these notions.

[4] The data are described in detail in a subsequent section. We report on less-developed countries only because all the more-developed countries in our sample have official liberalization dates much earlier than the period covered by our data.

[5] One interpretation of this time-pattern is that world investors significantly re-weight their portfolios upon liberalization, eventually leading to a situation with small net flows. Gross flows remain large as new projects are funded and old projects pay off. Gross flows may, therefore, be a better indicator of openness than are net flows.

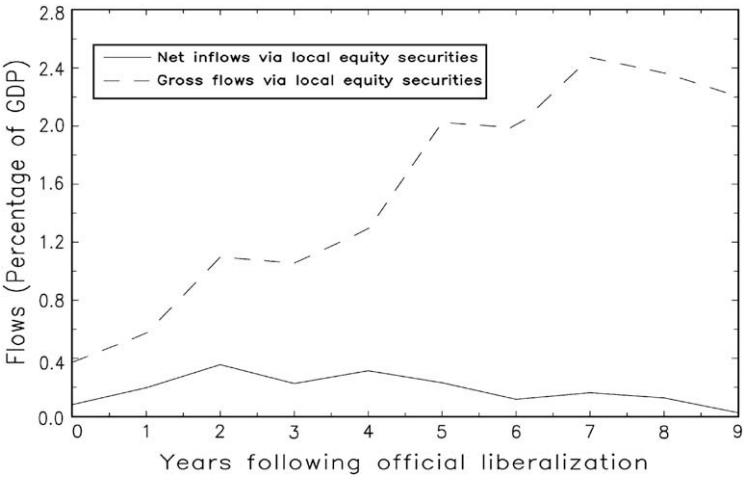

Fig. 1. The figure depicts the time path of cross-sectional averages of net/gross flows of portfolio investment for the less-developed countries in our sample (as GDP shares), relative to the official liberalization date for capital flows. These dates are obtained from Bekaert and Harvey (2000).

(i.e., net sales by a country's residents of both local and U.S. securities, respectively, to U.S. residents). Henry (2000a) suggests that the balance of flows via local's sales and purchases of non-local securities influences the local risk-free rate, and then, in logical succession, the cost of capital and the intensity of private investment. Further, as emphasized by Kim and Singal (2000), openness to inflows of investment by foreigners (as when locals sell local securities) may not entail openness to outflows of locals' funds (as when locals purchase foreign securities). In fact, flows via U.S. securities are a fairly large component of total portfolio flows for the less-developed countries in our sample. We take into account this influence when interpreting other tests, and we observe the statistical effects of outflows of funds via U.S. securities to learn about the growth effects of capital flight.

Inflows of funds via locals' sales of U.S. securities can also have growth effects. Some have suggested that openness has negative effects on growth in that fund inflows can be used for consumption rather than for investment. When a country's residents sell holdings of U.S. securities to U.S. counterparties for cash, consumption uses of cash are possible. When those residents sell local securities, especially equities, to U.S. counterparties, funds are relatively more likely to be used for investment than consumption purposes, as primary market issues and direct investment are often involved. Thus, comparing the effects of flows via locals' sales of U.S. securities *and* local securities helps us determine whether the distinction between consumption- and investment-dominated uses of inflowing funds is material for growth.

Consistent with this reasoning, we hypothesize that outward flows of local funds into U.S. securities (when locals buy U.S. securities) can be driven by openness as well as by other factors such as wealth levels and risk sharing incentives of local investors. Analogously, we hypothesize that inward flows on foreign funds into local securities can be driven by openness as well as by future growth expectations and push factors. With two measures of flow that are both related to openness, we can compare to learn how openness is important for growth.

A second innovation is to allow for the possibility of asymmetric effects of purchases versus sales, and of positive versus negative net sales of securities in a year. Sales of local securities by locals imply an inflow of funds, all else equal, while purchases imply an outflow. Purchases and sales might have separate effects, or a common net effect. Similarly, positive net sales of securities by locals in a year imply a net inflow of funds, while negative net sales imply an outflow. Distinguishing these cases aids in disentangling the effects of openness from the effects of growth expectations and pull factors. To see the usefulness, consider an example. Suppose that portfolio flows into a country are associated with subsequent strong growth and flows out of a country are associated with subsequent weak growth. It is not clear whether openness is associated with growth, or whether portfolio flows in response to growth

expectations that are, on average, realized. In contrast, if it is the case that strong growth tends to follow large portfolio flows irrespective of their direction, it is more likely that openness matters per se.

A third innovation is the inclusion of flow volatilities in the experimental design. Kraay (1998) shows that liberalizations correspond to a shift toward inflows that are usually thought of as being more volatile, such as portfolio flows versus foreign direct investment. Volatility captures the notion of "hot" or temporary money, which has been prominent in some recent reasoning about the effects of openness.

Results based on a world-wide sample of more-developed and less-developed countries can only be tentative. Most important, more-developed countries are characterized by extensively developed financial, industrial, governmental, legal and accounting institutions that are in short supply in less-developed countries. To the extent that the benefits of openness are found mainly in more-developed countries, there is reason to doubt whether openness would be dependably beneficial in less-developed countries. Additionally, to the extent that the influences of non-flow growth determinants differ across subsamples (as is very likely for socio-economic conditions such as educational level), then results are biased in ways that are difficult to untangle. Therefore, we apply a fourth innovation in estimating our models separately for more-developed versus less-developed countries to allow for the differential effects of openness.

3. Methodology and data description

3.1. Econometric framework

We estimate the effects of portfolio flows and flows' volatility on subsequent GDP growth in a regression framework. We define the annual logarithmic growth in real GDP per capita for country i between years $t-1$ and t by

$$y_{i,t} = \ln\left(\frac{\mathrm{GDP}_{i,t}}{\mathrm{POP}_{i,t}} \div \frac{\mathrm{GDP}_{i,t-1}}{\mathrm{POP}_{i,t-1}}\right), \quad i = 1, \ldots, N, \tag{1}$$

where GDP denotes constant prices' GDP, POP denotes population size and N is the number of countries in our sample. Thus, the annual average logarithmic growth in real GDP per capita between years t and $t+k$ is given by

$$y_{i,t,t+k} = \frac{1}{k}\sum_{j=1}^{k} y_{i,t+j}, \quad i = 1, \ldots, N. \tag{2}$$

Our basic empirical growth model is

$$y_{i,t,t+k} = \beta_0 + \beta_1 f_{i,t} + \beta_2 v_{i,t} + \gamma' X_{i,t} + \epsilon_{i,t,t+k}, \tag{3}$$

where $f_{i,t}$ is a measure of the level of country's i portfolio flows as a share of country's GDP, $v_{i,t}$ is a measure of country i's portfolio flow (as a share of GDP) volatility, and $X_{i,t}$ are variables suggested by a standard neo-classical growth model to control for different levels of long-run per capita GDP across countries, as well as macroeconomic correlates of portfolio flows that might directly influence growth. Below, we alternatively measure portfolio flows as *Sales* by local residents to U.S. residents, *Purchases*, and *Net Sales* = *Sales* − *Purchases*. We additionally present results considering only portfolio flows and volatility as regressors by setting $\gamma = 0$. We estimate Eq. (3) using a pooled time-series cross-sectional regression for comparison with other studies, and, alternatively, as a panel regression. In the panel regression, we include country (but not time-period) fixed effects, because the temporal dimension of financial openness is critical. We estimate all models by OLS.[6] We compute robust standard errors following Newey and West (1987).[7]

[6] There is a possibility of bias due to time-sensitive feedback effects between control and dependent variables. Arellano and Bond (1991) suggest a first-differenced regression to avoid this pitfall. However, Edison et al. (2002) find the problem to be unimportant in neo-classical growth regressions.

[7] We have verified that Hansen and Hodrick (1980)'s standard errors are similar to the ones we report.

We also estimate models that allow for asymmetric portfolio flows' effects, i.e., separate coefficients for positive and negative annual net portfolio inflows,

$$y_{i,t,t+k} = \beta_0 + \beta_1^- f_{i,t}^- + \beta_1^+ f_{i,t}^+ + \beta_2 v_{i,t} + \gamma' X_{i,t} + \epsilon_{i,t,t+k}, \tag{4}$$

where $f_{i,t}^- = f_{i,t} I_{f_{i,t}<0}$, $f_{i,t}^+ = f_{i,t} I_{f_{i,t}>0}$ and I is a dummy variable. Thus, the variable $f_{i,t}^-$ and $f_{i,t}^+$ equal *Net Sales* when they are negative and positive, respectively, and zero otherwise. For convenience and clarity, later in the paper we often refer to these as *Net Sales*− and *Net Sales*+ for a given country/year, respectively. Positive (negative) net sales imply funds flowing into (out of) a country, on balance. In the interpretation of those results, an important convention to bear in mind is that negative net inflows of funds are still signed negative in the censored versions; so $\beta_1^- < 0$ would indicate that strongly negative net sales precede growth. These measurements are applied to either flows via U.S. securities or via local equity securities, depending on the model being estimated.

Portfolio flows' (as a share of GDP) volatility is estimated using the GARCH model of Bollerslev (1986). While growth regression uses yearly series, on the other hand portfolio flows' volatility is estimated from monthly portfolio flows' series, country by country. The GARCH portfolio flows' volatility model is given by

$$v_{i,m} = \alpha_0 + \alpha_1 v_{i,m-1} + \alpha_2 \varepsilon_{i,m}^2, \tag{5}$$

where $v_{i,m}$ is portfolio flows' conditional variance of country i in month m, and $f_{i,m}$ are portfolio flows of country i in month m. The flows are assumed to have a constant conditional mean, $\epsilon_{i,m} = f_{i,m} - E_{m-1}(f_{i,m})$. Empirically, flow volatility is measured using each country's *Net Sales* data on either U.S. or local securities. Annual portfolio flows' variances are calculated by aggregating monthly variances within each year.[8]

Since our time series is necessarily brief due to the availability of flows' data, starting only in 1988, we use three-year averages of GDP annual growth ($k = 3$). The use of overlapping data more fully exploits time-series information. All exogenous variables are measured using three-year averages. We obtain similar results using other averaging schemes.

3.2. Data

Our data are from several sources and cover the period from 1988 to 2001. Country-specific economic growth rates, measured as the logarithmic real growth rate of GDP per capita, for each year are from the *World Bank Development Data Online* Database. Also from that database are socio-economic control variables, including initial GDP level as of 1987 (*Initial GDP*), and time-series cross-sectional observations on government consumption as a proportion of GDP (*Gov/GDP*), secondary school enrollment divided by size of the population age group that officially corresponds to the secondary level of education (*Enrollment*), the growth rate of total population (*Population Growth*), and life expectancy in years at birth (*Life Expectancy*). These control variables are among the standards that have long been used in estimating neo-classical growth models, and are used as control variables.

Portfolio flows are at the core of our experiment. Portfolio flows' data are from the U.S. Department of Treasury's *Treasury International Capital* (TIC) reporting system, which is published on a monthly basis.[9] The TIC data track transactions through U.S. banks, broker–dealers and other securities firms by those firms or their U.S. clients with foreigners. These data indicate long-term securities' (fixed income and equity, government and private) inflows and outflows between U.S. investors and other countries' investors. These series include more-developed and less-developed countries, but the data only cover portfolio flows to and from the U.S. Local securities are defined in the TIC data as those issued by

[8] We have obtained similar results to those we report when using 12-month rolling sample variances. Also, using standard deviations or log variance instead of variances in our specifications does not change our conclusions.

[9] Our sample period begins in 1988. The TIC system includes a longer time series for some countries, but many entries are missing. Due to the importance of time-series relations for our studies, we do not use the sparse data from earlier years.

non-U.S. issuers. The currency and location of issue are not the determining factor (Griever et al., 2001).[10] Foreign direct investment is not included nor is cross-border bank lending; these are exclusively data where intermediation has been provided by a security market.

We use the common assumption in empirical work on bilateral portfolio flows, which is that the countries the flows are attributed to are also the countries of the security's issuer, seller, or ultimate buyer. However, Warnock and Cleaver (2001) show that the bilateral portfolio flows' data are misestimated for financial centers' countries. For this reason, we exclude U.K., Hong Kong, and Singapore from our sample. In addition, we also exclude Lebanon, Liberia and Panama because they appear as severe outliers in descriptive statistics.

The resulting full sample includes 50 countries, 14 of which are classified as "developed" by MSCI as of the beginning of our sample period. For objectivity, we adopt their classification. We refer to these as the "more-developed" sample and refer to the remaining countries as "less-developed," simply to have a standard nomenclature. The countries in each classification are listed in Table 1, sorted from greatest to smallest in terms of mean per capita GDP growth rate within more-developed (Panel A) and less-developed (Panel B) subsamples. Over the 1988–2001 sample period, more-developed nations grow at a faster average rate than less developed (1.8 percent per year versus 1.4 percent per year). The cross-sectional variation among less-developed nations is also greater. The most extreme large positive and negative growth rates in the sample are for less-developed nations. China, Korea and Chile grew at average rates far in excess of those for more-developed nations, while Romania, Russia, and Congo (Dem. Rep.) experienced sharp contractions on average.

Table 1 shows that net sales of U.S. securities (i.e., by local residents to U.S. residents) are negative, on average, for all countries in the sample. That is, locals are net buyers of U.S. securities, implying an outflow of funds. In contrast, locals' net sales of local securities (bonds and equities) and local equity securities are positive for most countries, implying an inflow of investment funds from U.S. residents. As a proportion of GDP, more-developed countries are more open to outflows of funds via local net sales or purchases of U.S. securities than are less-developed countries, on average: −0.622 versus −0.428. The proportions are more similar across development subsamples when it comes to flows via local securities. Flows' volatility is higher for less-developed countries' local securities, though it is lower when only local equity securities are considered. Sudden stops and reversals, which manifest as volatile flows, may be more prominent for non-equity securities.

For both more- and less-developed nations, net inward flows via local securities are swamped by outward flows via purchases of U.S. securities by locals. This is the case for the full sample, as well as for the more-developed and less-developed subsamples. In fact, we observe very few nations with net positive inflows of portfolio funds (i.e., sum of local and U.S. securities' flows). Considering that U.S. bonds account for the largest share of these outflows (not reported in the table), the situation is most likely due to strong pull factors for the U.S. during the 1990s, and the safety of investments in U.S. Treasuries. Economically, we interpret this as the result of risk sharing when locals are free to diversify abroad.

4. The empirical relation of growth to portfolio flows

4.1. Results for all countries

In this section, we present the specific relations between growth and financial market integration for the full sample of 50 non-money-center countries via estimates of our model.

Table 2 presents overlapping pooled time-series cross-sectional regression estimates of Eq. (3) where the dependent variable is the three-year average of log GDP growth. In Panel A, the only

[10] The International Finance Corporation (IFC) of the World Bank also provides annual portfolio flows' data that does not suffer from U.S.-centrism. We do not use it because it is of too low a frequency to estimate volatility. We have, nonetheless, re-estimated our models with IFC portfolio flow data excluding volatility. The results support those reported here in that both positive and negative equity inflows tend to be significant predictors of growth. Even for the few models where this is not the case, the difference between the inflow and outflow effects is consistent with our reasoning.

Table 1
Mean GDP per capita growth rates and net sales of securities.

Country	GDP growth rate	US securities		Local securities		Local equities	
		Net sales	Net sales (SD)	Net sales	Net sales (SD)	Net sales	Net sales (SD)
Panel A: More-developed countries							
Spain	2.569	−0.661	0.790	0.047	0.221	0.000	0.150
Netherlands	2.329	−0.978	1.159	0.412	0.479	−0.061	0.229
Norway	2.130	−0.822	0.825	0.205	0.387	0.058	0.180
Austria	2.065	−0.323	0.616	−0.078	0.176	−0.047	0.055
Australia	2.063	−0.157	0.639	0.331	0.382	0.194	0.176
Finland	1.902	−0.328	0.531	0.385	0.716	0.066	0.520
Japan	1.868	−0.637	0.435	0.214	0.149	0.233	0.115
France	1.805	−0.214	0.306	0.096	0.135	0.072	0.080
Italy	1.690	−0.314	0.243	−0.001	0.141	0.028	0.107
Germany	1.569	−0.534	0.356	0.027	0.168	−0.004	0.080
Denmark	1.550	−0.696	0.825	0.146	0.543	0.137	0.274
Canada	1.514	−1.010	0.746	0.946	0.680	0.216	0.201
Sweden	1.378	−0.728	0.679	0.204	0.563	0.232	0.440
Switzerland	0.776	−1.300	1.604	0.067	0.692	0.233	0.634
Panel B: Less-developed countries							
China	7.556	−1.227	0.947	−0.052	0.093	0.022	0.036
Korea	5.296	−0.742	0.624	0.426	0.448	0.295	0.205
Chile	4.652	−1.008	0.855	0.019	0.918	0.401	0.246
Thailand	4.649	−0.430	0.936	0.112	0.226	0.051	0.073
Malaysia	4.244	−0.221	1.388	0.613	0.976	0.150	0.245
India	3.845	−0.066	0.111	0.087	0.053	0.066	0.038
Indonesia	3.344	0.062	0.636	0.210	0.232	0.100	0.121
Portugal	3.272	−0.882	0.652	0.100	0.387	0.144	0.381
Poland	3.231	−0.534	0.510	0.162	0.293	0.034	0.031
Egypt	2.293	−0.322	0.404	−0.001	0.049	0.028	0.041
Greece	2.086	−0.272	0.367	0.020	0.241	0.018	0.087
Trinidad & Tobago	1.849	−0.573	0.968	−0.321	0.322	−0.026	0.197
Pakistan	1.654	−0.014	0.027	0.068	0.079	0.033	0.098
Ghana	1.609	−0.017	2.452	0.385	1.549	0.107	0.423
Syria	1.575	0.037	0.311	0.056	0.102	0.054	0.102
Israel	1.537	−0.753	1.685	1.585	0.894	0.422	0.412
Mexico	1.465	−0.544	0.572	0.885	0.740	0.256	0.226
Uruguay	1.389	−1.325	1.578	−0.364	1.953	−0.154	0.595
Morocco	1.366	−0.012	0.184	0.037	0.090	0.008	0.021
Guatemala	1.211	−0.308	0.167	−0.103	0.101	0.004	0.088
Turkey	1.113	−0.003	0.681	0.179	0.321	0.145	0.130
Philippines	1.076	1.076	0.602	0.735	0.778	1.076	0.164
Colombia	0.897	−0.764	0.768	0.420	0.561	0.088	0.063
Hungary	0.812	−0.424	1.028	0.192	0.319	0.063	0.126
Jamaica	0.751	−1.088	1.113	−0.295	1.338	−0.049	0.252
Argentina	0.626	−0.296	0.472	0.348	0.522	0.139	0.121
Czech Republic	0.526	−0.435	0.605	−0.098	0.179	−0.096	0.174
Ecuador	0.454	−0.279	1.145	0.530	1.182	−0.006	0.025
Brazil	0.447	−0.165	0.606	0.393	0.377	0.186	0.124
South Africa	−0.135	−0.085	0.097	0.144	0.411	0.112	0.153
Bulgaria	−0.344	−0.313	0.711	−0.075	0.545	0.044	0.061
Venezuela	−0.425	−1.030	1.029	0.325	1.338	0.027	0.167
Peru	−0.958	−0.309	0.362	0.277	0.580	0.284	0.494
Romania	−1.631	−0.271	0.335	−0.018	0.015	0.001	0.013
Russia	−2.315	−0.142	0.244	0.020	0.039	0.024	0.028
Congo (Dem. Rep.)	−8.114	−0.029	0.118	−0.048	0.139	−0.003	0.073
Averages for							
Full sample	1.519	−0.482	0.699	0.199	0.476	0.091	0.182
More-developed	1.801	−0.622	0.697	0.214	0.388	0.097	0.231
Less-developed	1.408	−0.428	0.700	0.193	0.511	0.089	0.162

This table reports time-series averages of countries' annual GDP growth rates, net sales of securities of various types as a GDP share for non-money-center countries with complete data available in the Treasury International Capital (TIC) system. The table also reports the mean annual standard deviation (SD) of countries' net sales, based on a GARCH model. Net sales refers to sales of securities by a country's residents to U.S. residents. Panel A shows statistics for a sample of 14 more-developed countries, and Panel B shows statistics for a sample of 36 less-developed countries. The sample period is from 1988 to 2001. Countries are designated as more-developed or less-developed according to a classification provided by MSCI.

regressors are lagged three-year averages of *Sales* and *Purchases* of U.S. securities by local residents, and *Net Sales Volatility*. Lagged *Sales* display a significant negative relationship with GDP growth, while lagged *Purchases* display a significant positive relationship (Column (1)). *Sales* and *Purchases* coefficients are roughly equal in absolute value. Keeping in mind that sales by locals represent funds' inflows to a country and purchases represent outflows, this indicates that growth follows funds' outflows. The influence of volatility is not significantly different from zero. The initial indication, then, is that openness rather than funds' inflows is associated with economic growth.

As a benchmark, Column (2) provides estimates of a standard neo-classical growth model for our sample. The regressors in this model measure socio-economic conditions known to be correlated with growth, some of which may be correlated with our flow variables. As discussed earlier, previous studies find that openness and integration tend to coincide with other conditions that promote growth. In these benchmark regressions, the coefficients on the additional control variables are broadly consistent with the previous literature with respect to the socio-economic variables; see Barro (1997a,b), and Barro and Sala-I-Martin (1995). *Initial GDP* has a strongly significant negative coefficient, suggesting that low *Initial GDP* levels imply higher growth rates. The government size (*Gov/GDP*) and secondary school *Enrollment* have the predicted negative and positive signs, respectively, and are in general statistically significant. *Life Expectancy* has a significant positive coefficient suggesting that long life expectancy is associated with higher economic growth. *Population Growth* is not strongly statistically significant in any of the four regressions, probably because its effect is proxied by other regressors. The regression in Column (2) includes only these control variables, which, judging from the R^2, explain about 15 percent of the sample's variation in growth.

Column (3) of Panel A adds the portfolio flows' regressors to the neo-classical model, establishing that the result reported in Column (1) continues to hold when additional socio-economic variables are allowed in the model. Their influence is still about three-quarters as large as without the control regressors and strongly statistically significant. The R^2 of the regression rises about two percentage points as compared to the control-variable regression. Below, we report similar R^2 effects for other types of flow regressors.

As an alternative to controls via a specific version of the neo-classical growth model, the regression in Column (4) of Panel A is estimated as a panel regression with country fixed effect. In this variation, the results are not weakened and are at least as strong as those in the previous columns. Fixed-effects estimators effectively control for cross-sectional effects by removing country means rather than via the neo-classical growth model, leaving only the dynamic effects associated with flows' variables. The R^2s for the models with country fixed effects are substantially larger than for the pooled models with neo-classical growth regressors. The comparison indicates that the neo-classical growth regressors are not too effective as a control for cross-country variation in growth.

Panel B of Table 2 presents analogous models estimated with data for local equity securities. Lagged sales of local equities by local residents are reliably positively associated with economic growth in all models, while purchases are negatively associated with growth. Coefficients are about twice as large in absolute value, as compared to those for U.S. securities' flows. Local equities' flows appear to be disproportionately influential for growth. In contrast with our findings for U.S. securities' transactions, growth moves in the direction of funds-inflow transactions.

Given that, in both Panels, *Purchases* and *Sales* are associated with opposite-signed regression coefficients that are very similar in absolute value, a more parsimonious model may be appropriate for later tests. At the bottom of each panel of Table 2, we include hypothesis tests for a net flows model (identical-in-absolute-value coefficients of opposite sign) and a gross flows model (identical coefficients of the same sign). The data uniformly reject the gross flows model. More surprising, considering the similarity of coefficients in absolute value, the data also reject the net flows model when estimated as a panel regression with country fixed effects. Nonetheless, the model is roughly economically appropriate in that the absolute magnitudes of coefficients are similar across *Purchases* versus *Sales*. For U.S. securities, the difference is only about 9% of the *Sales* coefficient. For local equities, the difference is larger, but still only 15% of the *Sales* coefficient. In subsequent tables, we therefore present the net flows model as the most parsimonious simple model. In view of the statistical results suggesting directional effects, we also investigate whether net inflows and net outflows of funds have differential effects.

Table 2
Growth regressions for sales and purchases for all countries.

	(1)	(2)	(3)	(4)
Panel A: US securities				
Sales by local residents	−1.024		−0.713	−0.712
	(−4.137)		(−2.857)	(−3.038)
Purchases by local residents	1.039		0.701	0.776
	(4.217)		(2.843)	(3.437)
Net Sales Volatility	0.039		0.038	−0.304
	(0.340)		(0.269)	(−1.389)
log(GDP)		−1.089 (−3.109)	−0.991	
			(−2.858)	
Gov/GDP		−0.089 (−1.959)	−0.074	
			(−1.568)	
Enrollment		0.026 (2.233)	0.024	
			(2.051)	
Population Growth		0.561 (1.762)	0.582	
			(1.839)	
Life Expectancy		0.323 (3.906)	0.297	
			(3.600)	
Constant	0.887	−13.738 (−3.190)	−13.066	
	(2.751)		(−2.880)	
t-Test: net flows (*p*-value)	0.382		0.512	0.003
t-Test: gross flows (*p*-value)	0.000		0.004	0.001
R^2 (%)	5.97	15.38	17.44	52.54
Panel B: Local equities				
Sales by local residents	2.451		2.165	1.945
	(3.910)		(3.673)	(3.683)
Purchases by local residents	−2.196		−2.092	−1.644
	(−3.713)		(−3.703)	(−3.306)
Net Sales Volatility	−0.938		−0.897	0.756
	(−0.614)		(−0.636)	(0.341)
log(GDP)		−1.089	−1.120	
		(−3.109)	(−3.231)	
Gov/GDP		−0.089	−0.086	
		(−1.959)	(−1.879)	
Enrollment		0.026	0.023	
		(2.233)	(1.862)	
Population Growth		0.561	0.404	
		(1.762)	(1.244)	
Life Expectancy		0.323	0.314	
		(3.906)	(3.910)	
Constant	1.031	−13.738	−12.694	
	(3.339)	(−3.190)	(−2.960)	
t-Test: net flows (*p*-value)	0.008		0.442	0.000
t-Test: gross flows (*p*-value)	0.000		0.000	0.000
R^2 (%)	3.97	15.38	17.53	51.47

This table reports results of the OLS pooled cross-section and time-series regression of annual per capita GDP growth on lagged explanatory variables. *Sales* and *Purchases* refer to local residents' sales and purchases of securities, respectively. The regressions in Panel A use U.S. securities' *Sales* and *Purchases* as regressors, and the regressions in Panel B use local equities' *Sales* and *Purchases*. *Net Sales Volatility* is *Net Sales* annual variance estimated using a GARCH model, where *Net Sales* = *Sales* − *Purchases*. Additional regressors are the following socio-economic variables. Log *Initial GDP* is the log real per capita GDP level in 1987. *Gov/GDP* is the ratio of government consumption to GDP. *Enrollment* is the secondary school enrollment ratio. *Population Growth* is the growth rate of total population. *Life Expectancy* is the life expectancy of the total population. GDP growth and all explanatory variables are three-year averages. The sample includes 50 countries (non-money-centers) and covers the period from 1988 to 2001. Newey–West *t*-statistics are in parentheses.

Table 3 is our first table presenting net sales' models. The results are fully consistent with those from the previous table. Stated in simplest terms, we find that growth is preceded by weaker and even negative net sales of U.S. securities, and by stronger net sales of local equities. Thus, in one case outflows precede growth, and strong inflows precede growth in the other case. Openness, not the direction of flows, appears to be determinative.

Table 3
Growth regressions for net sales for all countries.

	(1)	(2)	(3)	(4)	(5)
Panel A: US securities					
Net Sales	−1.084	−0.674			
	(−4.428)	(−2.732)			
Net Sales−			−1.297	−0.627	−1.041
			(−4.310)	(−2.010)	(−4.404)
Net Sales+			0.247	−0.921	−0.201
			(0.380)	(−1.223)	(−0.192)
Net Sales Volatility	0.058	0.021	−0.017	0.037	−0.252
	(0.476)	(0.154)	(−0.148)	(0.243)	(−1.137)
log(GDP)		−1.014		−1.016	
		(−2.948)		(−2.946)	
Gov/GDP		−0.076		−0.078	
		(−1.589)		(−1.562)	
Enrollment		0.024		0.024	
		(2.043)		(2.034)	
Population Growth		0.555		0.560	
		(1.787)		(1.806)	
Life Expectancy		0.294		0.296	
		(3.612)		(3.569)	
Constant	0.935	−12.575	0.832	−12.685	
	(3.208)	(−2.969)	(2.637)	(−2.937)	
R^2 (%)	5.85	17.38	6.39	17.40	52.12
Panel B: Local equities					
Net Sales	2.330	2.105			
	(3.640)	(3.652)			
Net Sales−			−3.485	−1.764	−2.102
			(−3.586)	(−1.884)	(−2.859)
Net Sales+			3.912	3.227	2.722
			(4.696)	(4.196)	(3.861)
Net Sales Volatility	0.743	−0.524	−1.588	−1.869	1.603
	(0.503)	(−0.409)	(−1.090)	(−1.364)	(0.736)
log(GDP)		−1.110		−1.105	
		(−3.197)		(−3.174)	
Gov/GDP		−0.088		−0.083	
		(−1.946)		(−1.833)	
Enrollment		0.024		0.020	
		(1.966)		(1.702)	
Population Growth		0.430		0.364	
		(1.340)		(1.140)	
Life Expectancy		0.318		0.310	
		(4.011)		(3.934)	
Constant	1.153	−13.072	0.946	−12.441	
	(4.021)	(−3.163)	(3.043)	(−3.033)	
R^2 (%)	3.00	17.46	5.12	18.36	51.55

This table reports results of the OLS pooled cross-section and time-series regression of annual per capita GDP growth on lagged explanatory variables. *Net Sales* refers to local residents' sales of securities' net of their purchases. *Net Sales−* is annual net sales when net sales are positive, and zero otherwise. *Net Sales+* is annual net sales when net sales are positive, and zero otherwise. The regressions in Panel A use U.S. securities' *Net Sales* as regressors, and the regressions in Panel B use local equities' *Net Sales*. *Net Sales Volatility* is *Net Sales* annual variance estimated using a GARCH model. Additional regressors are lagged socio-economic variables as described in Table 2. GDP growth and all explanatory variables are three-year averages. The sample includes 50 countries (non-money-centers) and covers the period from 1988 to 2001. Newey–West *t*-statistics are in parentheses.

As with the previous table, Panel A focuses on flows via U.S. securities' sales, and Panel B on flows via local equity securities' flows. Columns (1) and (2) of each panel present pooled-regression estimates of a simple *Net Sales* model, without and with socio-economic variables, respectively. Columns (3)–(5) of each panel present a more detailed picture, separating out the effects of the net sales' regressors, depending on the sign of the net inflow for a given country/year. The regressor *Net Sales−* (*Net Sales+*) is equal to *Net Sales* when the *Net Sales* of local equities is negative (positive), and zero otherwise. The

variables retain their original signs. Therefore, a negative coefficient on *Net Sales*− indicates that negative net inflows of funds precede growth, while a positive coefficient on *Net Sales*+ indicates that positive net inflows precede growth. In our discussion below, we refer to regressions with this characteristic set-up as "asymmetric regressions." Models in Columns (3) and (4) of each panel are estimated as pooled time-series cross-sectional regression. As an alternative to controls via a specific version of the neo-classical growth model, the regressions in Column (5) are estimated as a panel regression with country fixed effects.

In Panel A, the interpretation of the *Net Sales* coefficients in Column (1) is that a one percentage point increase in the lagged average net inflow of funds (as a GDP share) into a country via net sales of U.S. securities by locals results in a reduction of subsequent GDP growth by about a percentage point. In Column (2), the analogous effect is two-thirds of a percentage point, allowing for other correlated influences. The implication is that positive flows predict *less* growth – seemingly consistent with the possibility that these funds are used disproportionately for consumption rather than investment.

In Columns (3)–(5) of Panel A, the regressor *Net Sales*−, which measures the magnitude of net funds' outflows via U.S. securities, is shown to be dominant. The associated coefficient estimate is above one in absolute value in Columns (3) and (5), and about two-thirds in Column (4). These are in the same range as the coefficient on net inflows in Column (1), with some *t*-statistics greater than four in absolute value. The coefficient on *Net Sales*+ is not statistically significant. As before, flows' volatility is not significant. The message is that negative net flows (i.e., purchases of U.S. securities by locals) are the central source of the correlation with growth.

The results for U.S. securities' flows are consistent with the notion that the openness that is necessary for such outflows of investable funds allows for more effective risk sharing by locals, and therefore more willingness to invest in growth at home. However, in itself, the result is not conclusive, for it is also possible that the results are due to a wealth effect, in which expectations of growth motivate increased investments in all securities. The results clearly do not suggest the harmful effects of capital flight or of an incipient "fire sale" of local securities by investors who hedge their wealth in anticipation of local bad times ahead (Bhagwati, 1998) – for flows into U.S. securities are strongest when good times lie ahead. We do not claim that capital flight is ruled out, only that its ill effects on growth are not one of the prominent statistical features of the data.

In Panel B, regressors are based on net sales of local equity securities. In Columns (1) and (2), we report large and strongly statistically significant positive coefficients on *Net Sales*, indicating that growth flows inflows of investment funds. The coefficients are more than twice as large as those for U.S. securities, an indication of the strong importance of such flows.

Columns (3)–(5) of Panel B present asymmetric regression estimates for flows via local equity securities. The main message is that lagged inflows of funds via local equity securities are strongly and positively linked to subsequent growth for the full sample. Most striking, funds' outflows are positive predictors of growth, as well as funds' inflows. The magnitude of the effect is similar for flows in either direction. The regression coefficients on inflows and outflows are of similar absolute value (around 3), which is even a little larger than in the regressions that do not allow for asymmetric flow effects. The positive regression coefficient on *Net Sales*+ and the negative coefficient on *Net Sales*− are both indicative of a positive relation to future growth. Strikingly, net flows in *both* directions are predictive of growth. Again, openness to flows appears to be the key, not the direction of the flow.

The result clearly points to openness as a statistical driver of growth, even beyond the importance of investable funds. If only inflows were predictive of growth, then it might be the case that foreign investors merely anticipate growth. However, even if foreign investors are selling, growth ensues – financial activity in *either direction* appears to be the key.

To sum up, in this section we find that openness to outflows of local funds into U.S. securities, and to both inflows and outflows of funds via local equity securities are associated with subsequent local growth. We find no evidence of negative effects of portfolio flows' volatility on subsequent growth. In the next section, we proceed with analyses of these results that allow for differences across more- and less-developed countries to address the possibility that openness is only helpful in the context of a fully developed set of financial, legal, and social institutions.

Table 4
Growth regressions for net sales by development status subsamples.

	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Panel A: US securities								
	Panel A.1: More-developed countries				Panel A.2: Less-developed countries			
Net Sales		−0.227				−0.929		
		(−1.329)				(−2.766)		
Net Sales−			−0.485	−0.879			−0.880	−1.226
			(−1.891)	(−3.409)			(−2.081)	(−3.818)
Net Sales+			0.836	0.886			−1.174	−0.573
			(1.273)	(1.399)			(−1.221)	(−0.441)
Net Sales Volatility		−0.182	−0.392	−0.464		0.060	0.073	−0.250
		(−1.006)	(−1.577)	(−1.551)		(0.398)	(0.451)	(−1.070)
log(GDP)	−1.012	−0.882	−0.819		−1.059	−0.969	−0.973	
	(−2.281)	(−1.800)	(−1.750)		(−2.314)	(−2.189)	(−2.190)	
Gov/GDP	−0.054	−0.059	−0.057		−0.115	−0.102	−0.105	
	(−1.055)	(−1.154)	(−1.164)		(−2.126)	(−1.764)	(−1.718)	
Enrollment	0.039	0.039	0.038		0.025	0.020	0.020	
	(4.027)	(3.981)	(4.060)		(1.376)	(1.104)	(1.105)	
Population Growth	−0.845	−0.686	−0.702		0.633	0.584	0.589	
	(−2.002)	(−1.517)	(−1.608)		(1.834)	(1.776)	(1.795)	
Life Expectancy	0.117	0.087	0.072		0.337	0.296	0.298	
	(0.655)	(0.486)	(0.404)		(3.779)	(3.395)	(3.321)	
Constant	0.070	1.117	1.559		−14.583	−12.671	−12.784	
	(0.005)	(0.078)	(0.109)		(−3.181)	(−2.763)	(−2.710)	
R^2 (%)	22.32	23.11	24.30	20.37	16.08	18.82	18.84	54.31
Panel B: Local equities								
	Panel B.1: More-developed countries				Panel B.2: Less-developed countries			
Net Sales		0.195				3.235		
		(0.401)				(3.865)		
Net Sales−			−2.302	−2.398			−0.086	−1.006
			(−3.800)	(−3.592)			(−0.039)	(−0.655)
Net Sales+			1.632	2.078			3.831	4.338
			(1.986)	(2.097)			(3.742)	(5.173)
Net Sales Volatility		−0.144	−0.923	6.056		−1.378	−2.686	−19.089
		(−0.150)	(−0.968)	(3.293)		(−0.558)	(−1.010)	(−3.635)
log(GDP)	−1.012	−1.007	−1.046		−1.059	−1.134	−1.139	
	(−2.281)	(−2.036)	(−2.109)		(−2.314)	(−2.539)	(−2.549)	
Gov/GDP	−0.054	−0.056	−0.071		−0.115	−0.111	−0.107	
	(−1.055)	(−1.094)	(−1.404)		(−2.126)	(−2.078)	(−1.969)	
Enrollment	0.039	0.039	0.036		0.025	0.020	0.018	
	(4.027)	(3.928)	(3.861)		(1.376)	(1.106)	(1.026)	

Population Growth	−0.845	−0.867	−0.957		0.633	0.439	0.417	
	(−2.002)	(−1.976)	(−2.224)		(1.834)	(1.262)	(1.195)	
Life Expectancy	0.117	0.116	0.033		0.337	0.331	0.328	
	(0.655)	(0.642)	(0.186)		(3.779)	(3.925)	(3.897)	
Constant	0.070	0.131	7.380		−14.583	−13.339	−13.085	
	(0.005)	(0.009)	(0.501)		(−3.181)	(−3.047)	(−2.973)	
R^2 (%)	22.32	22.44	26.42	36.14	16.08	19.36	19.60	54.71

Panel C: *p*-Values of *F*-tests for differences of coefficients across subsamples

	Panel C.1: US securities		Panel C.2: Local equities	
	Pooled OLS	Panel regression	Pooled OLS	Panel regression
Net Sales	0.062		0.002	
Net Sales−	0.425	0.399	0.339	0.405
Net Sales+	0.084	0.312	0.093	0.082

This table reports results of OLS regressions (in Columns (1)–(3) of Panels A and B) and fixed-effects panel regressions (in Column (4) of Panels A and B) for countries' annual per capita GDP growth on lagged explanatory variables. The key regressors for Panel A are computed from portfolio flows via U.S. securities, while the key regressors for Panel B are computed from flows via local equity securities. Separate regressions are estimated for the sample of 14 more-developed and 36 less-developed non-money-center countries over 1988–2001. *Net Sales* is local residents' sales of securities' net of their purchases. *Net Sales*− is annual net sales when net sales are positive, and zero otherwise. *Net Sales*+ is annual net sales when net sales are positive, and zero otherwise. *Net Sales Volatility* is annual variance of funds' inflows estimated from a GARCH model. Additional regressors are the same lagged socio-economic variables as in Table 2. GDP growth and all explanatory variables are three-year averages, lagged one year. Panel C shows *p*-values from some *F*-tests of differences of coefficients across the more- and less-developed countries' subsamples. Panel C.1 reports results for flows based on U.S. securities' flows, and Panel C.2 for flows based on local equities' securities. Robust Newey–West *t*-statistics are in parentheses.

Table 5
Robustness checks for net sales of local equities by development status subsamples.

Overlapping?	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Fixed effects	Pooled	Fixed	Pooled	Fixed	Pooled	Fixed	Pooled	Fixed
Volatility type	World	World	Local	Local	World	World	Local	Local
Push factors?	No	No	Yes	Yes	Yes	Yes	No	No
Panel A: More-developed countries								
Constant	11.221		5.091		12.829		7.443	
	(0.841)		(0.393)		(1.016)		(0.647)	
Net Sales	0.660	1.333	0.083	0.243	0.414	0.814	0.197	0.303
	(1.113)	(1.772)	(0.212)	(0.545)	(0.880)	(1.390)	(0.889)	(1.185)
Net Sales Volatility	364.360	594.570	−0.013	6.037	272.777	378.425	−0.671	0.922
	(2.445)	(3.900)	(−0.012)	(3.855)	(1.812)	(3.019)	(−1.515)	(0.873)
R^2 (%)	26.11	29.29	32.85	47.57	34.77	41.50	13.03	7.45
Panel B: Less-developed countries								
Constant	−12.858		−13.437		−13.136		−11.881	
	(−2.869)		(−2.737)		(−2.659)		(−3.704)	
Net Sales	3.122	2.508	3.205	3.224	3.060	2.236	1.338	0.972
	(3.730)	(3.435)	(3.627)	(4.483)	(3.528)	(2.876)	(2.343)	(1.634)
Net Sales Volatility	−118.606	23.172	−1.376	−16.832	−138.865	−17.415	−1.848	−6.653
	(−0.487)	(0.128)	(−0.560)	(−3.469)	(−0.615)	(−0.098)	(−0.808)	(−1.535)
R^2 (%)	19.38	53.10	19.36	54.50	19.40	53.25	9.24	29.71

This table reports results of pooled OLS cross-section time-series regressions and fixed-effects panel regressions for per capita GDP growth on lagged explanatory variables. The key regressors are computed from portfolio flows via local equities' securities as a share of GDP. Separate regressions are estimated for the samples of 14 more-developed (Panel A) and 36 less-developed (Panel B) non-money-center countries for which flows' data are available over 1988–2000. The focal regressors are *Net Sales*, defined as annual net sales of local equities by countries' residents, as a share of GDP; and *Net Sales Volatility*, defined as net sales' annual variance estimated using a GARCH model. Additional regressors are lagged socio-economic variables as listed in Table 2. Each column considers an alternative augmented growth model. "Overlapping" models are based on overlapping three-year averages of GDP growth and all explanatory variables. "Non-overlapping" models are based on one-year averages of GDP growth and all explanatory variables. "Model type" can be either pooled OLS or (country-specific) fixed-effects panel regressions. "Push factors," which can be included or not, are US GDP growth and US real interest rate. "Volatility type" can be local, i.e., for each country, or world-wide. Robust Newey–West *t*-statistics are in parentheses.

4.2. Comparative results for more-developed versus less-developed countries

Table 4 presents the results of estimating our growth regressions separately for the subsamples of 14 more-developed and 36 less-developed non-money-center countries in our sample.

Panel A of Table 4 contains estimates of the growth regressions using flows via U.S. securities. Sub-panel A.1 contains results for more-developed countries, while Sub-panel A.2 contains the results for less-developed countries. Three main conclusions are apparent from Panel A.

First, the predictive power of some socio-economic variables for growth differs sharply across more-developed versus less-developed countries. Column (1) of each panel contains estimated coefficients for the neo-classical growth model without any flows' regressors. Note especially that the coefficient on *Population Growth* is significantly negative for the more-developed sample, but nearly significantly positive for the less-developed sample. Conversely, *Life Expectancy* is significantly positive for the less-developed sample, but is not significant for the more-developed sample. To the extent that these socio-economic regressors are correlated with flows' regressors, biases in the flows' regressors would result from estimates of growth models using the full sample of all countries.

Second, the major features of the full-sample U.S. securities' model estimates above are mainly driven by the less-developed country sub-sample. Sub-panel A.1, for the more-developed sample, shows an insignificant coefficient on *Net Sales* (Column (2)) and insignificant positive coefficients on *Net Sales*+ in Columns (3) and (4). Further, the only significant negative coefficient on *Net Sales*− is in the panel-regression implementation of Column (4). In contrast, in Sub-panel A.2, for the less-developed sample, the coefficient on *Net Sales* is significantly negative (Column (2)), the coefficient on *Net Sales*+ is insignificant in all regressions where it is included (Columns (3) and (4)), and the coefficient on *Net Sales*− is strongly significantly significant and negative in both the pooled data and panel-regression versions (Columns (3) and (4)). These results are exactly analogous to the full sample. As before, the interpretation is, tentatively, that this sort of financial integration is conducive to growth. The other possibility, interpreting these results in isolation, would be that locals invest in U.S. securities as a side effect of expected wealth when future growth is anticipated for exogenous reasons.

As with previous models, no significant effect of flows' volatility is found on growth for the samples segregated by countries' development status in Sub-panels A.1 and A.2. This result is not supportive of recent reasoning and policy actions to isolate less-developed countries from claimed harmful effects of flows' volatility.

Panel B of Table 4 contains a similarly structured set of results for growth models where flows' regressors are based on local equity securities' transactions. Sub-panel B.1 is estimated with more-developed countries' data, and Sub-panel B.2 with less-developed countries' data. There are two main results.

First, Column (2) of each sub-panel provides a coefficient measuring the *Net Sales* to growth relation for each sub-sample (as before, Column (1) contains a benchmark regression involving only the control variables, for comparison). The relation is statistically insignificant for the more-developed countries' sub-sample. In contrast, the relation is strong and positive for the less-developed countries' sub-sample.

Columns (3) and (4) decompose this relation for each sub-sample via asymmetric regressions. For the more-developed countries' sub-sample in Panel B.1, statistically significant coefficients are reported for both *Net Sales*−, not only *Net Sales*+. These are of opposite signs and similar absolute magnitudes, explaining why the aggregated coefficient on *Net Sales* is insignificant. Openness does matter for growth in the more-developed countries' sub-sample, but the relationship is more of the nature of a gross flows model (i.e., which was roundly rejected for the full sample).

In Panel B.2, the asymmetric regression results of Columns (3) and (4) for the less-developed countries' sub-sample appear different than those for the more-developed countries. Each coefficient on *Net Sales*− is statistically insignificant, and each coefficient on *Net Sales*+ is positive and significant.

Finally, we note that the regressions in Table 4 provide little indication that flows' volatility detracts from subsequent growth. In fact, one model even suggests positive growth effects.

Table 6
Growth regressions for net sales of local equities' securities using alternative subsamples.

	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	Panel A.1: Large stock market countries				Panel A.2: Small stock market countries			
Net Sales		1.590				3.349		
		(2.585)				(2.653)		
Net Sales−			−2.100	−1.740			−1.863	−2.979
			(−2.612)	(−2.111)			(−0.932)	(−1.865)
Net Sales+			2.617	1.568			5.051	6.615
			(3.345)	(2.395)			(2.608)	(3.630)
Net Inflows		−0.161	−1.252	3.124		−3.323	−5.780	−28.160
Volatility		(−0.135)	(−1.012)	(1.649)		(−1.237)	(−1.839)	(−1.486)
R^2 (%)	5.77	9.03	11.15	40.52	35.30	37.41	38.02	56.64
	Panel B.1: Large private credit countries				Panel B.2: Small private credit countries			
Net Sales		1.435 (2.721)				2.394 (1.992)		
Net Sales−			−1.546	−1.582			−0.355	−3.243
			(−1.824)	(−2.002)			(−0.138)	(−1.863)
Net Sales+			2.413	2.028			3.007	5.580
			(3.519)	(2.914)			(1.981)	(4.541)
Net Inflows		0.036 (0.031)	−0.810	4.439		0.178 (0.068)	−1.008	−32.783
Volatility			(−0.728)	(2.517)			(−0.332)	(−5.072)
R^2 (%)	31.61	33.64	34.88	50.95	18.33	19.85	20.03	51.16
	Panel C.1: Large trade flow countries				Panel C.2: Small trade flow countries			
Net Sales		2.036 (3.279)				2.437 (1.990)		
Net Sales−			−2.367	−1.919			−0.399	−3.376
			(−2.257)	(−2.303)			(−0.201)	(−1.989)
Net Sales+			3.467	2.579			3.146	4.528
			(4.272)	(3.566)			(1.929)	(3.510)
Net Inflows		−1.380	−2.596	4.010		−1.004	−2.258	−25.826
Volatility		(−0.786)	(−1.382)	(2.246)		(−0.403)	(−0.812)	(−4.001)
R^2 (%)	8.52	11.58	13.64	40.38	34.30	35.93	36.15	61.06

This table reports results of OLS regressions (in Columns (1)–(3) of each panel) and fixed-effects panel regressions (in Column (4) of each panel) for countries' annual per capita GDP growth on lagged explanatory variables. The key regressors for Panel A are computed from portfolio flows via U.S. securities, while the key regressors for Panel B are computed from flows via local equities' securities. Separate regressions are estimated for the sample of 14 more-developed and 36 less-developed non-money-center countries over 1988–2001. *Net Sales* is local residents' sales of securities' net of their purchases. *Net Sales*− is annual net sales when net sales are positive, and zero otherwise. *Net Sales*+ is annual net sales when net sales are positive, and zero otherwise. *Net Sales Volatility* is annual variance of funds' inflows estimated from a GARCH model. Additional regressors are the same lagged socio-economic variables as in Table 2. GDP growth and all explanatory variables are three-year averages, lagged one year. Robust Newey–West *t*-statistics are in parentheses.

Our conclusion from these coefficients and hypotheses' tests is that the investable funds' inflows represented by positive net sales of local equities are important for less-developed countries' growth, in addition to the overall importance of openness.

The comparison of the coefficients on *Net Sales*+ for the more- and less-developed samples also provides some insights on the prediction of Shleifer and Wolfenzon (2002) that the net marginal product of investment will be greater in more-developed countries, as a consequence of their tendency toward stronger investor protections. The coefficient on *Net Sales*+ for more-developed countries is about 1.6–2.0, depending on the model, while the same coefficient for less-developed countries is about 3.8–4.4, depending on the model. In contrast to their prediction, positive net inflows into less-developed countries are apparently associated with more productivity (in an economy-wide sense) than those for more-developed countries. While it is outside the scope of this paper to explain this result, we note that such flows are not too disproportionately scarce for less-developing countries (according to the descriptive statistics), so the explanation does not appear to lie in a declining marginal product of investment.

In Panel C, we report the *p*-values from several *F*-tests, to indicate the level of statistical confidence that can be placed in the cross-sub-sample differences just discussed. For U.S. securities' flows, Panel C.1 shows that the *Net Sales* coefficient is significantly more negative for less-developed

countries, with a *p*-value of 0.062. The coefficients on *Net Sales*− and *Net Sales*+ are not reliably different at such a high degree of confidence, either in the pooled model or in the panel model. For flows via local equities' transactions, Panel C.2 shows that the coefficient on *Net Sales* is more positive for the less-developed countries, with a very high degree of confidence. The *F*-tests do not reject the null hypothesis that the less-developed countries' *Net Sales*− coefficients are the same as those for the more-developed countries. *F*-tests do reject the cross-sub-sample equality of *Net Sales*+ coefficients at the 10 percent level: positive net sales are disproportionately important for less-developed countries' growth.

4.3. Robustness checks

Table 5 presents results that confirm the robustness of our findings for more-developed and less-developed countries where flows via local equities' securities are concerned. In this table, we vary the structure of the growth regressions in reasonable ways, and uniformly obtain results that are similar to those presented above. For the robustness checks we focus on local equities not only because of their disproportionately large effects, but also because the results reported above are most complex for local equities. It thus seems especially important to guard against any misconceptions that might be driven by model fragility. We have also computed robustness checks using U.S. securities' flows, and find no results inconsistent with those above.

Our robustness checks are based on four variations to particular aspects of the estimation process. First, as before, we continue to consider both pooled time-series cross-sectional regressions and country-specific fixed-effects models. Second, we additionally consider whether our findings might have been induced by the use of three-year overlapping averages in the regressions. Our use of robust *t*-statistics should guard against overstating significance levels given this structure, but, to be sure, we estimate growth models using one-year non-overlapping data. Third, we additionally consider the possibility that the type of flows' volatility that has economic effects might be world-wide rather than local. This variation is suggested by the fact that volatility contagion appears to be a feature of financial crises. Finally, we consider whether the previous exclusion of "push factor" regressors, of the type that influence portfolio flows and that might also correlate with world-wide growth expectations, might have induced our results via an omitted variable bias. We consider several combinations of these individual variations to produce eight different final models, estimates of which are shown in the table.

As with previous tables, we distinguish between more-developed countries (Panel A) and less-developed countries (Panel B). For this table, all regressors are computed from *Net Sales* via local equity securities.

In Panel A, for the more-developed countries, *Net Sales* and *Net Sales Volatility* bear no statistically significant relation to future growth for any model variation. This is exactly analogous to our earlier result for more-developed countries. In Panel B, for the less-developed countries, *Net Sales* is positively correlated with subsequent growth in every model variation considered, strongly statistically significant in seven of eight variations, and is nearly significant in the eighth. Thus, the table directly shows that our *Net Sales* results are robust. To economize on space, we have not included asymmetric flows' results in this table. We have also verified that our results using *Net Sales*+ and *Net Sales*− are similarly robust to these variations in estimation set-up. Specifically, for the more-developed countries, *Net Sales*− is associated with a significant negative coefficient, and *Net Sales*+ is associated with a significant positive coefficient. For the less-developed countries, only *Net Sales*+ is associated with a significant positive coefficient.

Table 6 considers the robustness of our results to sample splits along several different dimensions. Minier (2003) finds that several measures of financial development are actually negatively related to growth for an endogenously chosen set of countries with small stock market sectors. She defines large and small stock markets according to their high or low level, respectively, of stock market capitalization to GDP. For countries with large stock markets, she finds a strong positive relation between growth and stock market size. A small stock market is taken as an indication of a financially less-developed economy. Our results so far distinguish economically more- versus less-developed economies.

Using Minier's approach, Panel A of Table 6 shows that our findings are robust when financial development level rather than economic development level is used to distinguish the subsamples. In the table, growth regression results are displayed for large versus small stock market countries. Sub-panel A.1 shows that flows are predictors of growth for large stock market countries. As before, openness is valuable for these countries. Sub-panel A.2 shows that *Net Sales* and *Net Sales+* are associated with subsequent growth for countries with small stock markets, consistent with our previous results.

Panels B and C of Table 6 similarly show that our results are robust to splitting the sample in different ways. Panel B splits the sample according to the median level of private credit, as a proportion of GDP, provided by the banking system, another measure of financial development. This is an appropriate criterion because Levine et al. (2000) have shown that growth is associated with more extensive private credit provision. Panel C splits according to the median level of trade flows (i.e., imports plus exports of goods and services), as a proportion of GDP, a measure of economic development and openness, to test whether it is financial development that is key rather than development more generally.[11] The results are very similar to those presented already, demonstrating that our conclusions are not rooted in these details of our empirical set-up.[12]

5. Conclusion

This paper examines the importance of portfolio investment flow levels and volatilities as determinants of subsequent economic growth in cross-country data. Our specific design includes several methodological innovations to allow us to interpret the results as evidence of the relation between financial market openness and growth. First, we incorporate portfolio flow data on both local and U.S. securities. Second, we include flow volatilities as a regressor. Volatility captures the notion of "hot" or temporary money, which has been prominent in some recent reasoning about the effects of openness. Third, we allow for the possibility of asymmetric effects of positive versus negative inflows of investable funds. This aids in distinguishing the effects of openness from the effects of growth expectations and other factors that influence portfolio flows. Finally, we allow for the differential effects of openness across different countries not only via the use of socio-economic control variables, but also by estimating our models separately for more-developed versus less-developed countries.

We find that openness to portfolio flows is statistically conducive to growth, in that a country's GDP grows after both positive flows of funds and also, strikingly, after some types of large *negative* flows of funds. This evidence is present for the full sample, and also for subsamples of countries defined by development status – though the specific pattern differs across the subsamples.

For flows involving U.S. securities, openness that results in outflows of local funds into U.S. securities is associated with subsequent growth. This evidence is strongest for the less-developed countries in our sample.

For flows involving local equity securities, net sales by locals are most strongly associated with growth for the less-developed countries. For these countries, the strongest source of the effect is the positive net sales' observations, which literally bring cash into the country. For the more-developed countries, flows in both directions are associated with growth (and therefore have influences that offset in the net sales' effect).

The volatility of portfolio flows is, at most, weakly and undependably related to subsequent growth; volatility does not systematically depress growth.

Overall, our results indicate that openness to flows in both directions is associated with growth, and that the portfolio flow volatility that might come with openness is not harmful for any set of countries.

[11] Data on private credit come from the World Bank database described in Beck et al. (2001). Data on trade flows come from the World Bank Development Data Online Database.

[12] Instead of splitting the sample on these criteria, we could interact financial/economic development indicators with flow data, and then use the resulting regressors in our growth models. We have done so. We obtain results consistent with those reported here, although significance levels on any one regressor tend to decrease when additional regressors are included that are correlated with it.

For less-developed countries, the results suggest that allowing for inflows of foreign capital into local equity investments, combined with the ability of locals to invest in U.S. securities, is the best recipe for future growth.

Finally, our results provide insights as to why previous studies have come to various and fragile conclusions on the relation of openness to growth. Past studies often mix together more- and less-developed country data in the same sample, and estimation methods do not allow for the rich mix of asymmetric effects that are actually associated with inflows and outflows.

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References

Arellano, M., Bond, S., 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. Review of Economic Studies 58, 277–297.
Baier, S., Dwyer, G., Tamura, R., 2004. Does opening a stock exchange increase economic growth? Journal of International Money and Finance 23, 311–331.
Barro, R., 1997a. Determinants of Economic Growth. MIT Press, Cambridge, MA.
Barro, R., 1997b. Determinants of Economic Growth: a Cross-Country Empirical Study. Discussion Paper No. 579. Harvard Institute for International Development.
Barro, R., Sala-I-Martin, X., 1995. Economic Growth. McGraw-Hill, New York, NY.
Beck, T., Demirgüç-Kunt, A., Levine, R., 2001. A new database on the structure and development of the financial sector. The World Bank Economic Review 14, 597–605.
Bekaert, G., Harvey, C., 1995. Time-varying world market integration. Journal of Finance 50, 403–444.
Bekaert, G., Harvey, C., 2000. Foreign speculators and emerging equity markets. Journal of Finance 55, 565–613.
Bekaert, G., Harvey, C., Lumsdaine, R., 2002. The dynamics of emerging market equity flows. Journal of International Money and Finance 21, 295–350.
Bekaert, G., Harvey, C., Lundblad, C., 2005. Does financial liberalization spur growth? Journal of Financial Economics 77, 3–55.
Bhagwati, J.N., 1998. The capital myth: the difference between trade in widgets and dollars. Foreign Affairs.
Bollerslev, T., 1986. Generalized autoregressive conditional heteroskedasticity. Journal of Econometrics 31, 307–327.
Bonin, J., Wachtel, P., 1999. Towards market-oriented banking in the economies in transition. In: Blejer, M., Skerb, M. (Eds.), Financial Sector Transformation. Cambridge University Press.
Calvo, G., Reinhart, C., 1999. When Capital Inflows Come to a Sudden Stop: Consequences and Policy Actions. Working Paper. University of Maryland.
Durham, J.B., 2004. Absorptive capacity and the effects of foreign direct investment and equity foreign portfolio investment on economic growth. European Economic Review 48, 285–306.
Edison, H., Warnock, F., 2003. A simple measure of the intensity of capital controls. Journal of Empirical Finance 10, 81–103.
Edison, H., Warnock, F., 2008. Cross-border listings, capital controls, and equity Q5 flows to emerging markets. Journal of International Money and Finance 27, 1013–1027.
Edison, H., Levine, R., Ricci, L., Slok, T., 2002. International financial integration and economic growth. Journal of International Money and Finance 21, 749–776.
Edwards, S., 2003. Exchange rate regimes, capital flows and crisis prevention. In: Feldstein, M. (Ed.), Economic and Financial Crises in Emerging Market Economies. NBER Conference Report Series. University of Chicago Press, Chicago and London, pp. 31–78.
Eichengreen, B., 2001. Capital account liberalization: what do the cross-country studies tell us? The World Bank Economic Review, 341–365.
Eichengreen, B., Leblang, D., 2003. Capital account liberalization and growth: was Mr. Mahathir right? International Journal of Finance and Economics 8, 205.
Griever, W., Lee, G., Warnock, F., 2001. The U.S. system for measuring cross-border investment in securities: a primer with a discussion of recent developments. Federal Reserve Bulletin 87, 633–650.
Hansen, L., Hodrick, R., 1980. Forward exchange rates as optimal predictors of future spot rates: an econometric analysis. Journal of Political Economy 88, 1029–1054.
Henry, P., 2000a. Do stock market liberalizations cause investment booms? Journal of Financial Economics 58, 301–334.
Henry, P., 2000b. Stock market liberalization, economic reform, and emerging market equity prices. Journal of Finance 55, 529–564.
Kim, E.H., Singal, V., 2000. Stock market openings: experience of emerging economies. Journal of Business 73, 25–66.
Klein, M., Olivei, G., 2008. Capital account liberalization, financial depth and economic growth. Journal of International Money and Finance 27, 861–875.
Kraay, A., 1998. In Search of the Macroeconomic Effects of Capital Account Liberalization. Working Paper. World Bank.
Lemmon, M., Lins, K., 2003. Ownership structure, corporate governance, and firm value: evidence from the East Asian financial crisis. Journal of Finance 58, 1445–1468.
Levine, R., 1998. The legal environment, banks, and long-run economic growth. Journal of Money, Credit, and Banking 30, 597–620.
Levine, R., Renelt, D., 1992. A sensitivity analysis of cross-country growth regressions. American Economic Review 82, 942–963.

Levine, R., Zervos, S., 1998. Stock markets, banks, and economic growth. American Economic Review 88, 537–558.
Levine, R., Loayza, N., Beck, T., 2000. Financial intermediation and growth: causality and causes. Journal of Monetary Economics 46, 31–77.
Minier, J., 2003. Are small stock markets different? Journal of Monetary Economics 50, 1593–1602.
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.
Newey, W., West, K., 1987. A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix. Econometrica 55, 703–708.
Prassad, E., Rogoff, K., Wei, S., Kose, M.A., 2003. Effects of Financial Globalization on Developing Countries: Some Empirical Evidence. Technical report. International Monetary Fund.
Quinn, D., 1997. The correlates of change in international financial regulation. American Political Science Review 91, 531–551.
Quinn, D., Toyoda, A.M., 2008. Does capital account liberalization lead. Review of Financial Studies 21, 1403–1449.
Rodrik, D., 1998. Who needs capital-account convertibility? In: Fischer, S. (Ed.), Should the IMF Pursue Capital-Account Convertibility?. Essays in International Finance No. 207 International Finance Section, Princeton University, Princeton, NJ.
Rousseau, P., Sylla, R., 2005. Emerging financial markets and early U.S. growth. Explorations in Economic History 42, 1–26.
Shleifer, A., Wolfenzon, D., 2002. Investor protection and equity markets. Journal of Financial Economics 66, 3–27.
Stiglitz, J., 1999. Lessons from East Asia. Journal of Policy Modeling 21, 311–330.
Stulz, R., 1999. Globalization of equity markets and the cost of capital. Journal of Applied Corporate Finance 12, 8–25.
Taylor, A.M., 1996. International Capital Mobility in History: the Saving–Investment Relationship. Working Paper. NBER.
Teaser, L., Werner, I., 1995. Home bias and high turnover. Journal of International Money and Finance 14, 467–493.
Wachtel, P., 2001. Growth and finance: what do we know and how do we know it. International Finance 4, 335–362.
Warnock, F., Cleaver, C., 2001. Financial centers and the geography of capital flows. International Finance 6, 27–59.