

Measuring De Facto Financial Openness: A New Index

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February 2018

Abstract

To evaluate the economic effects of international financial integration, its measurement is crucial. This paper introduces a new measure called private financial openness, which is the first to distinguish between private and public stocks of foreign capital. It focuses on private agents' willingness and ability to invest abroad and to incur foreign debt.

Our index builds on the measure proposed by Lane and Milesi-Ferretti (2003, 2007), who consider the sum of foreign assets and liabilities over GDP. We adjust this measure by excluding development aid received and central banks' international reserves because they do not reflect private investors' decisions. Statistically our measure differs significantly from the standard one in developing countries and in emerging markets, in the latter group especially since the 2000s. To highlight the importance of the new index, we estimate standard regressions of the relationship between financial openness and economic growth and show that measures may lead to opposing conclusions.

Keywords: Financial Openness; Official Capital Flows; Economic Growth; Panel Data Analysis.

JEL Classification Numbers: F36, F43, F65, G15, O47.

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1 Introduction

International financial integration¹ has been increasing during past decades. This development is revealed by measures of both de facto and de jure financial openness.² This process has been accompanied by a growing literature on the effects of financial liberalization and financial openness on economic variables including growth, growth volatility, productivity and crisis incidence. While econometric studies are based on various empirical definitions of de facto financial openness, measures are usually based on an aggregate of stocks or flows of international capital. In particular, they do not distinguish between private and official capital. The effects of financial openness, however, are expected to depend on the nature of the underlying capital and on the motivation of the investors.

Let us consider an example: Two countries might be characterised by the same degree of measured de facto financial openness although this openness is rooted in quite different forms of capital: Country A has a given amount of holdings of private foreign assets and liabilities towards foreign private investors. Country B holds the same amount of foreign assets in the form of international reserves at its central bank and the same amount of liabilities towards foreigners in the form of development aid received. Given that the openness of country A can be ascribed to the decisions of private investors and creditors we call it *private* financial openness. The openness of country B, in turn, is shaped by policies of official institutions. We therefore label it *official* financial openness. To some extent the missing commitment of private agents is substituted by official entities; the constraints of underdeveloped financial markets are relaxed by the intermediation of official institutions. To the best of our knowledge, this paper is the first to distinguish between private and official financial openness.

This paper makes two major contributions to the literature on international financial integration: First, we present a new index that measures de facto financial openness as it is shaped by private investors and creditors only.³ In a second step, our empirical analysis shows that the distinction between private and official financial openness is crucial when it comes to the effects of financial openness on growth. In particular, while total financial openness tends to reduce economic growth and increase growth volatility, these effects vanish if private financial openness is considered. Large official reserve holdings and inflows of development aid are often symptoms of volatile and low-growing economies. In our interpretation the negative growth effects of the overall measure stem from an endogeneity problem where policies to mitigate crises show mistakenly up as an increase in financial openness.

This paper makes reference to various strands of the literature: First, by proposing an alternative measure of financial openness we contribute to the extensive literature on measuring financial integration (see, among others, Chinn and Ito, 2006; Dreher, 2006; Edwards, 2007; Mody and

¹In this article the terms *financial integration* and *financial openness* are used as synonyms.

²De facto financial openness is commonly quantified by stocks or flows of international capital relative to GDP. De jure financial openness measures the extent to which a country imposes legal restrictions on its cross-border capital transactions.

³We will make this index available on our web page and update it on a regular basis.

Murshid, 2005; Quinn, 1997, 2003; Schindler, 2009). Second, our paper is conceptually related to a recent literature highlighting the role of official capital flows in explaining the Lucas paradox (Alfaro et al., 2014), global imbalances (Bayoumi et al., 2015) and low domestic investment (Reinhart et al., 2016). Finally, we add a new perspective to the extensive literature on the relationship between financial openness and growth by showing that the distinction between private and total financial openness is crucial (see, among others, Aizenman et al., 2013; Alesina et al., 1994; Bussière and Fratzscher, 2008; Grilli and Milesi-Ferretti, 1995; Kose et al., 2009a; Rodrik, 1998.)

This paper is organised as follows: The next section highlights the magnitude of official capital relative to private one. Section 3 defines our measure of official financial openness. Section 4 shows by statistical and econometric approaches that the distinction between private financial openness and total financial openness may lead to opposing conclusions with respect to the effects of financial openness. Concluding remarks are offered in the final section.

2 Private versus official capital: Is official capital empirically important?

The majority of the literature on international capital flows and capital stocks implicitly refers to private flows, but measures the sum of private and official ones. This section illustrates the magnitude of official relative to private capital.

Empirical approaches to international financial integration examine international capital along several dimensions: First, one has to take a decision whether to consider flows or stocks. Capital flows might finance current account transactions while stocks of foreign capital result from cumulated flows, interest income and valuation effects. A second distinction can be made with respect to net and gross positions. The empirical literature on countries' international investment position traditionally focuses on net foreign assets (NFA). More recently, the recurrence of crises related to capital flight and sudden stops of capital flows has shown that gross positions of financial assets and liabilities provide additional information (Alberola et al., 2016; Broner et al., 2013). Third, the composition of international capital is emphasised in a disaggregated analysis that examines the type of asset in which the investment takes place. The type of investment reveals important information about intention and commitment of the investor, which, in turn, are related to the volatility and reversibility of the capital flow. Finally, maturity and currency structures of international assets and liabilities may be characterised by mismatches. These mismatches make an economy more vulnerable to financial crises.

A distinction that has been widely disregarded so far concerns the type of investor.⁴ In particular, there exist private investors and official ones. Motivations for their activities on the international financial market differ fundamentally.

Private capital flows are shaped by a search for yield and risk diversification. Official investors,

⁴Avdjiev et al. (2017) show that borrower type reveals important information about the systemic risks related to capital inflows.

in turn, do not maximize expected returns in a narrow sense. Official capital flows are the by-product of other policies (e.g. exchange rate policy, self-insurance through stock of international reserves, economic cooperation through development assistance). They provide benefits that go beyond pure return considerations.

In our definition, capital flows are denominated *official* if the following two conditions are fulfilled:

1. The creditor, source of the flow, is neither a natural person nor an entity (i.e. a fund) dealing in the interest of an individual person.
2. Return and income generation are not the primary goal of the investment.

As such, capital flows resulting from central banks' reserve policies are labelled *official*. The central bank is an official entity and its reserve holdings are explained by motives other than return. Transactions undertaken by sovereign wealth funds, however, are not considered as official capital flows. While they are official entities acting in social interest, their primary investment goal consists in increasing the real value of the fund. In our definition, development aid granted by a natural person directly to the recipient - without collecting and channeling it through an official agency - is denoted a private flow. Development aid provided by official agencies or multilateral institutions, however, are considered as official flows.

Data allow us to identify two types of official capital:

1. *Development aid*: Official development aid (ODA) consists of loans made on concessional terms (net of repayments of principal) and grants, which meet the following criteria: (1) Donors are official agencies or multilateral institutions, (2) loans convey a grant element of at least 25 percent and (3) the objective of the loan or grant is to promote development and welfare in developing countries.⁵ The data provide a narrow measure of official aid flows because they do not include so-called "beyond ODA flows", which are, among other flows, private grants extended by NGOs and foundations. Moreover, they do not include non-concessional development loans granted by official entities.⁶
2. *International reserves*: The IMF (2009, p.111, paragraph 6.64) defines reserves as "external assets that are readily available to and controlled by monetary authorities for meeting balance

⁵Our empirical analysis is based on data collected by the Development Assistance Committee (DAC) of the OECD. These data contain transactions of official agencies of the members of the DAC, of multilateral institutions and of non-DAC countries. For statistical reasons, capital flows are grouped in two categories: (1) Net official development assistance and (2) official aid received. Net official development assistance covers flows to countries and territories in the DAC list of ODA recipients. The DAC maintains a list including all countries eligible to receive ODA. These consist of all low and middle income countries (according to the World Bank classification based on gross national income (GNI) per capita) and the Least Developed Countries (LDCs) as defined by the United Nations. G8 members, EU members and future EU members are excluded. Net official aid, in turn, refers to aid flows (net of repayments) provided to countries and territories in part II of the DAC list. Data is available for flows and stocks of development aid.

⁶The amount of outstanding development aid corresponds to the variable "concessional external debt stocks", which is listed in the World Bank's International Debt Statistics.

of payments financing needs, for intervention in exchange markets to affect the currency exchange rate, and for other related purposes (such as maintaining confidence in the currency and the economy, and serving as a basis for foreign borrowing).” In practice, reserves consist of gold, foreign exchange reserves and IMF-related assets like members’ reserve position in the IMF and their holdings of SDRs. There is data on stocks of reserves and - from the balance of payments - on sales and purchases of reserves (flows).

In the following subsections we use this definition to illustrate the magnitude of official relative to private capital. We first focus on capital flows and then turn to capital stocks.

2.1 Capital flows

The distinction between capital inflows and outflows is based on the residency of creditor and borrower (cf. Broner et al., 2013). Capital inflows are defined as net purchases (difference between purchases and sales) of domestic assets by non-residents. Capital outflows equal net purchases of foreign assets by domestic agents excluding the central bank. Hence, capital inflows are the sum of inflows of foreign direct investment in the domestic economy, inflows of portfolio investment liabilities and other investment liabilities. Accordingly, capital outflows are the sum of outflows of foreign direct investment abroad, changes in portfolio investment assets and changes in other investment assets. In our measures of inflows and outflows we do not include capital account transactions because they contain development grants and remittances, which both do not reflect investments in a narrow sense. Official flows are defined as net purchases of reserve assets by the central bank plus development aid received.

Figure 1 shows the magnitude of capital flows for geographic regions over the period 1970-2012. A common feature across regions is the strong increase in gross capital flows between the mid 1990s and the global financial crisis of 2008-10. To better visualize them, we present two graphs for each region that use different scales: The first up to the year 2000 (Asia 1995) and the second beginning in that same year, but using a larger scale.

Industrial countries are characterised by a strong comovement of inflows and outflows of capital. This reflects increasing financial integration and a reduction in home bias: Net purchases of domestic assets by foreigners go hand in hand with purchases of foreign assets by domestic agents. Official flows do not play a substantial role.

Compared across regions, capital flows are the lowest to and from African countries. More importantly, in Africa official flows are the dominant type of flows. In most years, official flows are larger than inflows or outflows of capital.

[Figure 1 about here.]

The graphs for Asia show similarities with industrial countries with respect to the waves of capital flows: There is a sharp increase in capital inflows in the early 1990s. The run-up to the East Asian financial crisis of 1997 is characterised by net capital inflows. The Asian financial crisis

manifests itself by capital repatriation: Both inflows and outflows turn negative, that is, domestic and foreign agents sell assets from outside their jurisdiction on a net base.

In Latin America and the Caribbean capital inflows are consistently larger than outflows. The magnitude of private outflows and official flows are comparable. The Latin American debt crisis induced foreign investors to withdraw their capital: Capital inflows turn negative in 1983 and remain so for a relatively extended period. Net capital inflows do not return before 1990.

Increasing capital flows might result from growth in world GDP. To examine whether growth in capital flows exceeds economic growth, Figure 2 scales capital flows by trend GDP. Trend GDP is calculated by smoothing the series of nominal GDP by the Hodrick-Prescott filter with a smoothing parameter of 100. We take the unweighted mean across countries and group data according to their per capita income following the classification used in the World Bank's World Development Indicators. That is, data reveal the importance of capital flows for an average country of the respective income group. While the graph on the left-hand side visualizes three types of capital flows, the right-hand side graph shows the median (across countries) of the ratio of official to private flows and the mean value of this ratio over the entire period.

[Figure 2 about here.]

For the entire sample, the average magnitude of official flows (relative to GDP) has been similar to that of private capital inflows, which are again larger than private capital outflows. An exception has been the period since the year 2000 when private flows decoupled from official ones. This enormous growth in private inflows is primarily due to flows to and from high income countries, as can be inferred from the second graph. Official flows play a marginal role in high income countries. For countries that do not belong to the high income group (see third panel of Figure 2) capital flows are substantially lower than in high income countries: The median high income country registered gross flows equal to 10.9% of trend GDP on average over the period 1970-2012, the same measure amounts to 6.45% in non-high income countries. However, in many years, official flows stand out as the largest component of capital flows in the group of non-high income countries. The importance of official flows is reflected in the average value of the median (across countries) of the ratio of official to private flows, which amounts to 0.58.

Figure 3 provides more detailed information for the group of non-high income countries by dividing them in upper middle, lower middle and low income countries. Remarkable is the finding that the magnitude of official flows relative to private inflows and outflows is the larger, the lower the income of the respective group is. This may be explained by the fact that aid flows are primarily dedicated to low income countries.

[Figure 3 about here.]

After this analysis of gross flows, we now turn to a statistical description of net capital flows. In particular, Figure 4 compares the balance of the financial account with flows in reserve assets and net flows in development aid. Flows are aggregated over the respective country group. A positive

balance of the financial account equals net lending to the rest of the world. Alike in the previous graphs, we present for each country group two graphs: The first runs until 1995, while the second starts in that year. This allows us to use a larger scale for the second period, when net flows are significantly larger.

[Figure 4 about here.]

In industrialised countries, the average financial account balance oscillated around zero until the mid 1980s and has mostly been negative since then. Reserves and aid flows play a minor role. In Africa, development aid constituted the most important net flow until the early 2000s. In midst of the global financial crisis, African countries borrowed heavily from the rest of the world. The graphs for Asia highlight increasing net borrowing in the run-up to the East Asian financial crisis of 1997/98. Since then, the financial account has been relatively balanced and reserve flows have become the most important net capital flow. The financial account balance in Latin America and the Caribbean traces the region's experience with crises: This balance fell strongly during the debt crisis in the early 1980s and in 1994, the year of the Mexican Tequila crisis. Aid and reserve flows were relatively low. Reserves have become important only recently in the 2000s when they reached a magnitude similar to that of the financial account balance.

Table 1 presents summary statistics of net capital flows, total gross capital flows, reserve flows and aid flows for different time periods and across country groups. Net capital flows have mostly been negative and their volatility - measured by the median of the standard deviation - has increased over time. Gross capital flows relative to trend GDP have been multiplied over time in all country groups. This process has gone hand in hand with an increase in their volatility. Reserve flows have also tended to rise over time. The strongest increase can be observed in low income countries. Net ODA flows reached their maximum (relative to trend GDP) in the 1980s and have been falling since then. They are concentrated towards low income countries where they constituted 9.2% of trend GDP over 1970-2012 for the average country.

[Table 1 about here.]

2.2 Capital stocks

Official capital flows have piled up to sizeable stocks of official assets and liabilities over time. Figure 5 illustrates the share of international reserves (first column), development aid (second column) and the sum of both (third column) over the sum of total foreign assets and liabilities for emerging markets and developing countries. We label this latter variable *official external position*. It shows that the share of official capital stocks is remarkable: Official capital accounts for roughly 20% of the external position in emerging markets and 30% in developing countries. While the relative magnitude of development aid has decreased in recent years, it has been compensated by rising reserve levels. It is noteworthy that the group of developing countries is characterised by a large dispersion across countries.

[Figure 5 about here.]

Figure 6 visualizes in a world map those countries and regions where official external positions are relatively large. Africa and Asia stand out as regions whose external positions are shaped by official capital.

[Figure 6 about here.]

3 Private financial openness - the index

The sum of foreign assets (FA) and foreign liabilities (FL) over GDP has been proposed as a measure of de facto financial openness by Lane and Milesi-Ferretti (2003, 2007).⁷ The use of stocks instead of flows has the advantage that stocks reflect outstanding amounts of international capital, while flows provide a snapshot, which is unable to reveal information about long-run trends. This measure weights foreign assets and liabilities equally; that is, large creditor countries and highly indebted countries may both be financially open. Typical examples of financially open economies are financial centers with large foreign assets and liabilities. These illustrations show that the measure is independent of a country's NFA position.

This measure has been applied as dependent variable (e.g. Becerra et al, 2012) and covariate in many empirical studies, e.g. to explain economic growth and growth volatility (e.g. Kose et al., 2009a), crisis incidence and crisis transmission (e.g. Joyce, 2011; Lane and Milesi-Ferretti, 2011), economic productivity (e.g. Eichengreen et al., 2011; Friedrich et al., 2013; Kose et al., 2009b) and characteristics of international capital flows and economic policies (e.g. Furceri and Zdzienicka, 2012; Spiegel, 2009).

This definition of financial openness does not distinguish whether claims are held by private agents or official agencies. Moreover, it makes no difference whether liabilities stem from foreign investors' activities in the domestic economy or from foreign agencies' development aid.

We therefore propose an alternative measure called *private financial openness*, which measures the de facto openness of an economy with respect to private capital. Following our definition of official capital in Section 2, we exclude official claims and liabilities from this measure. In this sense, private financial openness measures private agents' willingness and ability to invest abroad and to incur foreign debt. Large inflows of development aid or a central bank's accumulation of reserves do not stem from private investors' decisions and are excluded from this measure. Both do not directly affect private investors' access to foreign financial resources. In our interpretation, private financial openness refers to the extent to which expected-return-maximizing investors are active in international transactions.

Formally, private financial openness (IFIPR) is defined as:

⁷Alternatively, Obstfeld and Taylor (2003) propose the ratios of foreign assets to GDP and foreign liabilities to GDP as measures of the size of foreign investment.

$$IFIPR_{it} = \frac{(FA_{it} - IR_{it}) + (FL_{it} - DA_{it})}{GDP_{it}} \quad (1)$$

where IR is the stock of international reserves and DA the amount of outstanding development loans.

4 Does the focus on private financial openness make a difference?

We proceed by studying whether our measure of *private financial openness* differs significantly from the standard measure and whether the effects of private financial openness on economic growth and growth volatility vary from those obtained from total financial openness.

4.1 Statistical analysis

Figure 7 shows the evolution of financial openness averaged over different country groups. The standard measure follows Lane and Milesi-Ferretti (2007) and computes the share of total assets and liabilities in GDP. We then first exclude international reserves from assets and then additionally concessional external debt (development aid) from liabilities. The last measure corresponds to our definition of private financial openness.

The graph highlights two points: De facto financial openness has increased in all country groups. Industrial countries are the most open country group, while emerging and developing countries exhibit a similar level of openness. Whereas emerging markets opened up during the 2000s, financial openness in the average developing country has been relatively stable since the 1990s. Second, whether there is a significant difference between total and private financial openness depends on the country group. Official claims and liabilities in industrial countries are small relative to total ones such that the difference is only marginal. The difference between both measures is remarkable in developing countries and in emerging markets, in the latter especially since the 2000s. While in emerging markets the difference is mainly due to reserve assets, in developing countries outstanding development loans are accountable for the discrepancy between total and private financial openness. In developing countries, the average total financial openness equals 1.78 in the year 2010, while private financial openness amounts to 1.46, a difference of 18%.

[Figure 7 about here.]

Country case studies, which are presented in Figure 8, show that the difference between total and private financial openness varies a lot across countries: While it is remarkable in some countries, it is negligible in others. Each plot shows the evolution of both measures for two countries of the same geographic region. Country pairs are selected such that in one the difference between both measures seems to be unimportant, whereas it matters in the other country, both in absolute terms and relative to the other country.

The upper left panel figures South Africa and Burundi. For South Africa the difference between both measures of financial openness is marginal. For Burundi, however, it makes a large difference,

especially compared to South Africa: According to total financial openness Burundi was financially more open than South Africa from 1986 to 2008. South Africa only could catch up with Burundi after a strong increase in assets and liabilities in the late 1990s. However, if we compare both countries on the basis of private financial openness, South Africa has always been more open than Burundi.

Similar conclusions can be drawn for the country pairs in the remaining plots. In the upper right panel Mexican financial openness is not affected by the chosen measure. According to the standard measure, except for one year Honduras is financially more open than Mexico. If we consider private financial openness, in turn, Honduras and Mexico show comparable levels. Enlightening is also the comparison of China and Korea in the panel on the bottom left. For Korea the difference between both measures is relatively small. Since 1990 Chinese total financial openness is similar to that in Korea. However, if we consider private financial openness China is much more closed than Korea because private financial openness does not incorporate its large holdings of international reserves. Chinese financial openness is almost halved: In 2010 total financial openness equals 1.16 and private one 0.67.

[Figure 8 about here.]

To further examine the difference between both measures of de facto financial openness we rank countries according to them and analyse whether countries change rank when total financial openness is replaced by private one. To this end, we calculate rank correlation coefficients. Compared to the Pearson correlation coefficient, rank correlations are less sensitive to extreme values. Table 2 lists the values of Spearman's ρ and Kendall's τ in selected years and for the average value over the period 1985-2014. We consider two pairs of variables, namely the indices in levels and in first differences. Results indicate that both indices are strongly correlated, although not perfectly. Differences for individual countries might still be substantial. The hypothesis that both indices are independent can be rejected at conventional levels of significance.

[Table 2 about here.]

4.2 Econometric analysis

The difference between total and private financial openness might be important in empirical applications. As noted in Section 3 the standard measure of total financial openness by Lane and Milesi-Ferretti has been applied in a large number of econometric studies covering a wide field of research questions.

One example is the literature that examines whether financial openness spurs economic growth. Since theory suggests that financial openness improves the allocation of capital, reduces risks and lifts credit constraints, studies search for positive effects of financial openness on growth. On theoretical grounds, the relevant measure for openness would be the private one. It reflects firms access to foreign financial resources and measures the extent to which potential financial constraints

have been eased. While a large stock of reserves may indirectly raise growth through its positive effects on economic stability, reserves are not expected to enhance allocative efficiency. This section examines whether the relationship between financial openness and growth depends on the definition used.

We replicate the analysis of Kose et al. (2009a), who consider the effects of de facto financial openness - measured by the Lane and Milesi-Ferretti definition - on economic growth and growth volatility.⁸ These are Barro-type growth regressions (see Barro, 1991) on a cross section of a maximum of 87 countries, which are listed in Appendix A.⁹ Data are averaged over the period 1985-2014. Data definitions and sources are provided in Appendix B. We present results for the full sample including industrialised countries as well as for different country groups using subsamples of developing countries and emerging markets. The group of non-industrialised countries pools emerging and developing countries.

The dependent variable is the growth rate of real GDP per capita. Our set of standard control variables includes initial income, population growth, human capital measured by educational attainment (see Barro and Lee, 2013), investment defined as the share of gross capital formation in GDP and financial openness. In odd columns of the result tables, financial openness is measured as the sum of total assets and liabilities over GDP in line with Lane and Milesi-Ferretti (2003, 2007). For direct comparison, even columns present the same specification as the previous column with the only difference that financial openness is measured by our new index.

Financial openness and economic growth

The effects of financial openness on economic growth are visualized for averaged data over 1985-2011 in Figure 9. Along the lines of Kose et al. (2009a) it presents a scatter plot of the average growth rate of real per capita GDP against the average level of de facto total financial openness (upper panel), the average level of de facto private financial openness (middle panel) and the average private share in external positions (bottom panel).¹⁰ While the figures on the left-hand side show the unconditional bivariate relationship, the right-hand side figures depict the relationship after controlling for other growth determinants. While the standard measure of financial openness points to a negative association between openness and growth, this relationship does not hold for private financial openness. The effect of private financial openness is even positive, albeit insignificant.

[Figure 9 about here.]

The regression results are presented in Table 3. As expected population growth is detrimental to per capita GDP growth. The higher the investment rate, the higher real GDP growth. Total financial openness captured by the standard measure reduces economic growth in all samples except

⁸Kose et al. (2009a) do not present their regression results in a table. However, Figures 3a and 3b in their paper are based on cross-section regressions of growth on a set of exogenous variables. See also Quinn et al. (2011).

⁹Given that de facto financial openness is not a policy, this analysis is not affected by the critique of Rodrik (2012) with respect to growth regressions.

¹⁰The private share in the external position is calculated as $pr_share_{it} = 1 - \left(\frac{IR_{it} + DA_{it}}{FA_{it} + FL_{it}} \right)$.

the group of emerging markets. These effects are absent for non-industrial and developing countries if we measure financial openness by the stocks of private capital only. The private external position reduces growth in emerging markets.

[Table 3 about here.]

Change in financial openness and economic growth

Besides the level of financial openness, its change might be crucial for economic growth. Periods of financial liberalization when governments dismantle capital controls as well as periods of inflowing capital due to improving domestic investment prospects might be characterised by higher economic growth.

Figure 10 shows the country averages of the change in financial openness and growth per capita analogously to Figure 9. For the unconditional relationship there is a positive association between average GDP growth and the change in financial openness. The association turns negative and significant when private financial openness and the private foreign position are considered. These results go through even after controlling for other growth determinants.

[Figure 10 about here.]

The regression results, which are presented in Table 4, confirm the findings that population growth reduces and investment increases per capita growth. Independently of measurement, the change in financial openness reduces growth in the full sample and is insignificant in subsamples. The magnitude of this effect is smaller when private financial openness is considered. An increase in the private external position is found to be beneficial for growth.

[Table 4 about here.]

Financial openness and volatility of economic growth

To examine the question whether financial openness is associated with more pronounced swings in economic activity, we regress the volatility of economic growth - measured by the standard deviation of economic growth - on our set of control variables. The evidence presented in Table 5 suggests that financial openness increases volatility in non-industrial countries. When we focus on private financial openness this effect disappears. The private external position is not significantly associated with volatility.

[Table 5 about here.]

5 Conclusions

This paper proposes a new index of de facto financial openness which considers only private cross-border assets and liabilities. By excluding reserve assets at central banks and liabilities

stemming from development aid, our measure aims at capturing the degree to which a country is integrated in international financial markets without the help of official capital flows. This measure might better capture private agents' access to international financial resources.

To show that this distinction is fundamental, we empirically analyse the new index: First, we show that the levels of financial openness indicated by the standard and new measure differ significantly, especially in the groups of emerging and developing countries, while the difference is basically absent in industrialised countries. For individual countries, the gap between both measures is even more striking.

The comparison of both measures in regressions explaining economic growth and growth volatility shows significant differences: When concentrating on private capital, financial openness is found to be more beneficial. In the group of non-industrialised countries the negative effect on growth and the volatility-increasing effect disappear.

Future research might examine the difference between both measures for a wider array of econometric applications. Examples are the literature examining the effects of financial openness on macroeconomic stability, on domestic financial development, on income inequality and on productivity.

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Appendix

A Appendix: Sample of countries

Albania	Algeria	Argentina ^b	Australia ^a
Austria ^a	Bangladesh	Barbados	Belize
Benin	Bolivia	Botswana	Brazil ^b
Bulgaria	Burundi	Cameroon	Canada ^a
Central African Republic	Chile ^b	China ^b	Colombia
Congo, Dem. Rep.	Congo, Rep.	Costa Rica	Cote d'Ivoire
Dominican Republic	Ecuador	Egypt, Arab Rep. ^b	El Salvador
Fiji	Gabon	Gambia, The	Germany ^a
Ghana	Greece ^a	Guatemala	Honduras
India ^b	Indonesia ^b	Israel ^b	Italy ^a
Jamaica	Japan ^a	Jordan	Kenya
Lesotho	Malawi	Malaysia ^b	Mali
Mauritania	Mexico ^b	Moldova	Mongolia
Morocco	Mozambique	Namibia	Nepal
Niger	Norway ^a	Pakistan	Papua New Guinea
Paraguay	Peru ^b	Philippines ^b	Portugal ^a
Rwanda	Saudi Arabia	Senegal	Sierra Leone
South Africa ^b	Spain ^a	Sri Lanka	Sudan
Swaziland	Sweden ^a	Syrian Arab Republic	Thailand ^b
Togo	Tonga	Trinidad and Tobago	Tunisia
Turkey ^b	Uganda	United Arab Emirates	United States ^a
Uruguay	Venezuela, RB	Vietnam	Zimbabwe

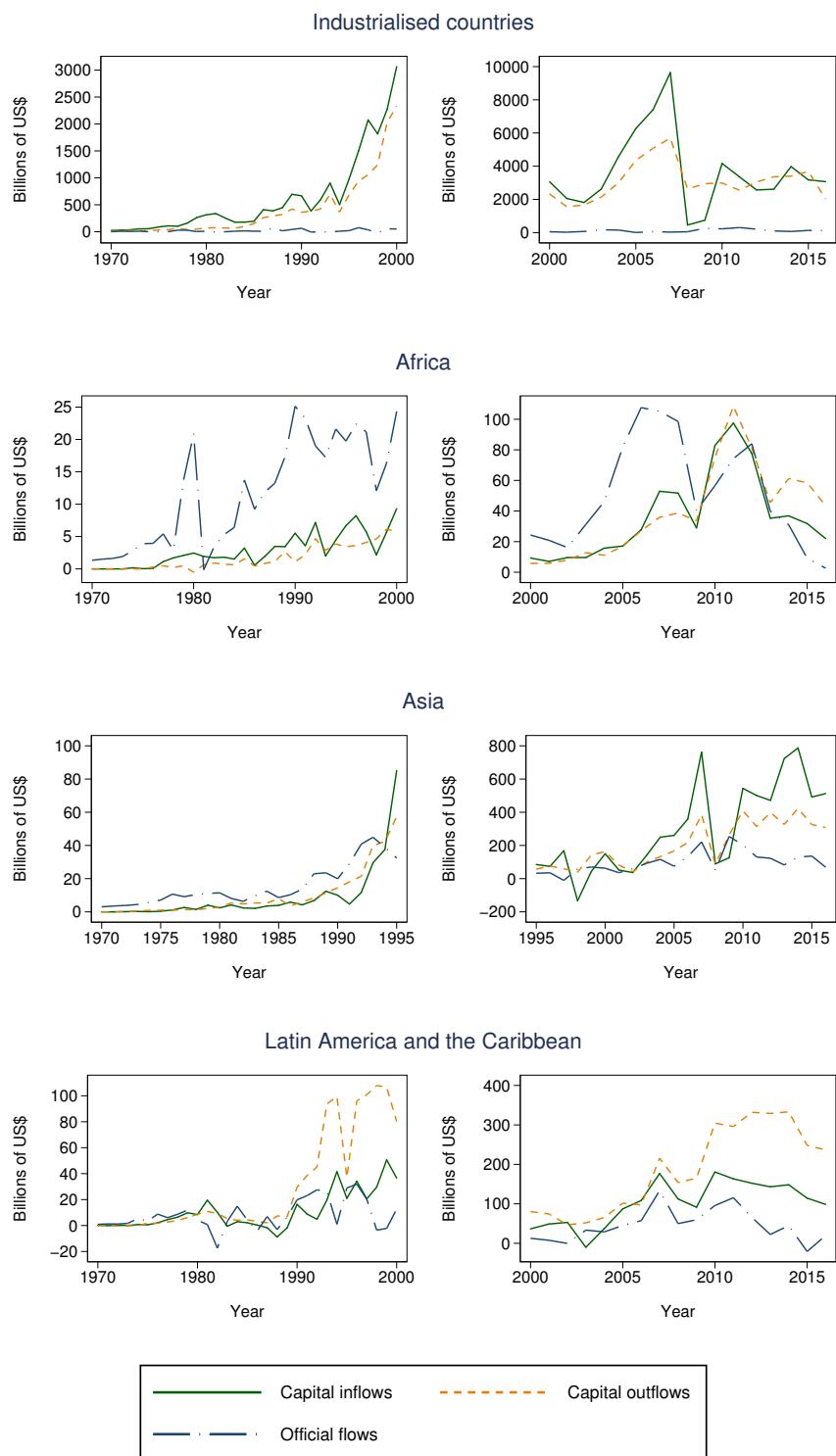
Notes: Countries that belong to the group of industrialised countries are marked by the index *a*. Classification is in line with the IMF classification in its International Financial Statistics. The group of emerging market economies is marked by the index *b*.

B List of variables and data sources

Variable	Source	Definition
Capital inflows	IFS (2013)	Net purchases (difference between purchases and sales) of domestic assets by non-residents. Sum of inflows of foreign direct investment in the domestic economy, inflows of portfolio investment liabilities and other investment liabilities.
Capital outflows	IFS (2013)	Net purchases of foreign assets by domestic agents excluding the central bank. Sum of outflows of foreign direct investment abroad, changes in portfolio investment assets and changes in other investment assets.
Reserve assets	IFS (2014), WDI (2013)	Stocks of reserves are total reserves minus gold. Net flows of reserve assets are derived from the balance of payments. Data from the Balance of Payments Manual 5 (BOPM5) are combined with those from the Balance of Payments Manual 6 (BOPM6).
Development aid	IDS (2014)	Official development aid (ODA) consists of loans made on concessional terms (net of repayments of principal) and grants, which meet the following criteria: (1) Donors are official agencies or multilateral institutions, (2) loans convey a grant element of at least 25 percent and (3) the objective of the loan or grant is to promote development and welfare in developing countries.
Foreign assets	Lane and Milesi-Ferretti (2007) and update	Total external assets
Foreign liabilities	Lane and Milesi-Ferretti (2007) and update	Total external liabilities
Real GDP per capita	PWT (2013)	Expenditure-side real GDP at chained PPPs (in mil. 2005US\$). This measure of GDP is divided by population.
Population growth	PWT(2013)	Population counts all residents regardless of legal status or citizenship.
Human capital	Barro and Lee (2013)	Index of human capital per person, based on average years of schooling for the population aged 15 and older.
Investment rate	PWT (2013)	Share of gross capital formation in GDP at current PPPs.

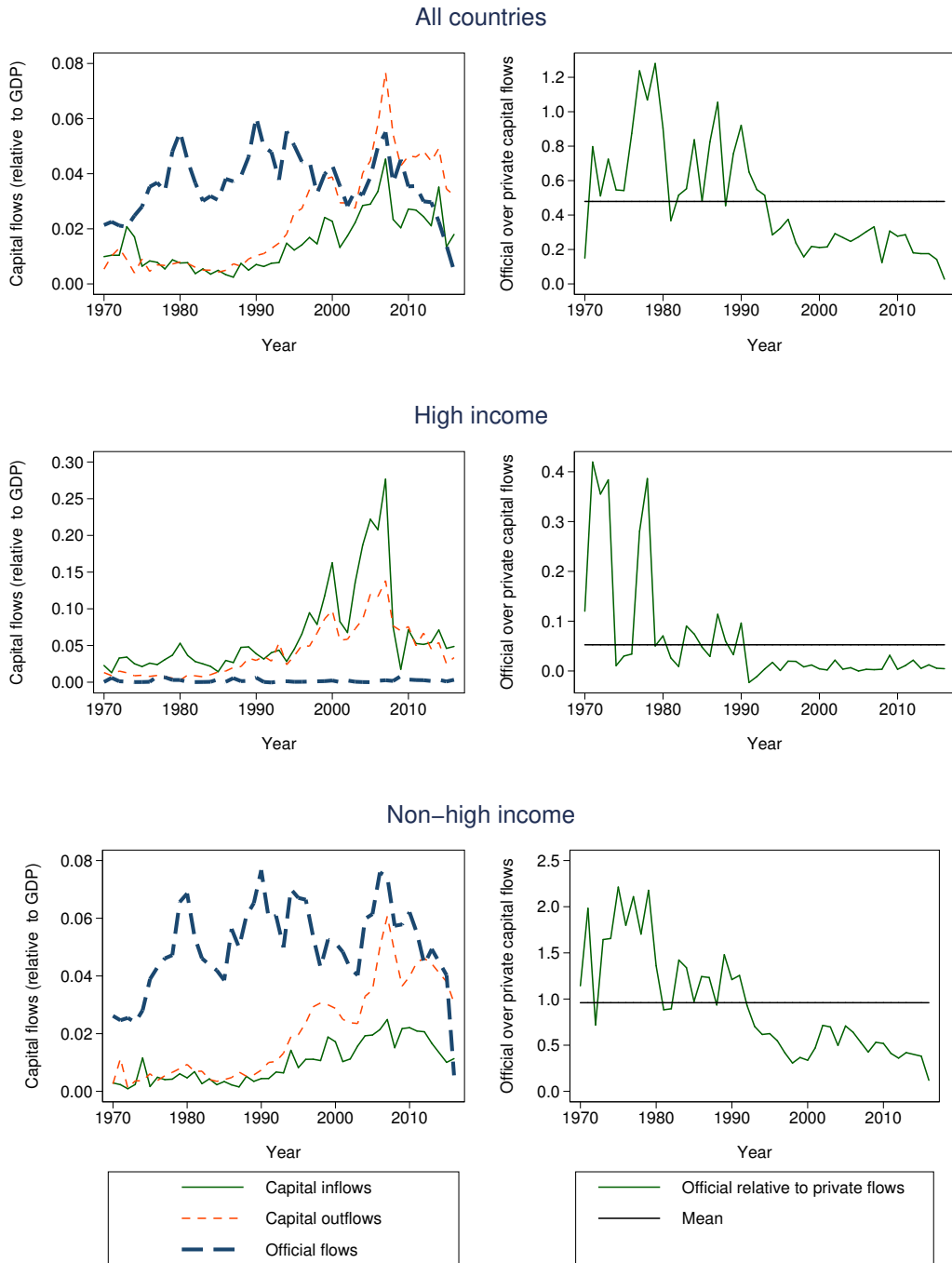
Sources: IDS: International Debt Statistics (World Bank); IFS: International Financial Statistics; PWT: Penn World Tables 8.0; WDI: World Development Indicators.

Figure 1: Capital flows (in billions of US\$)



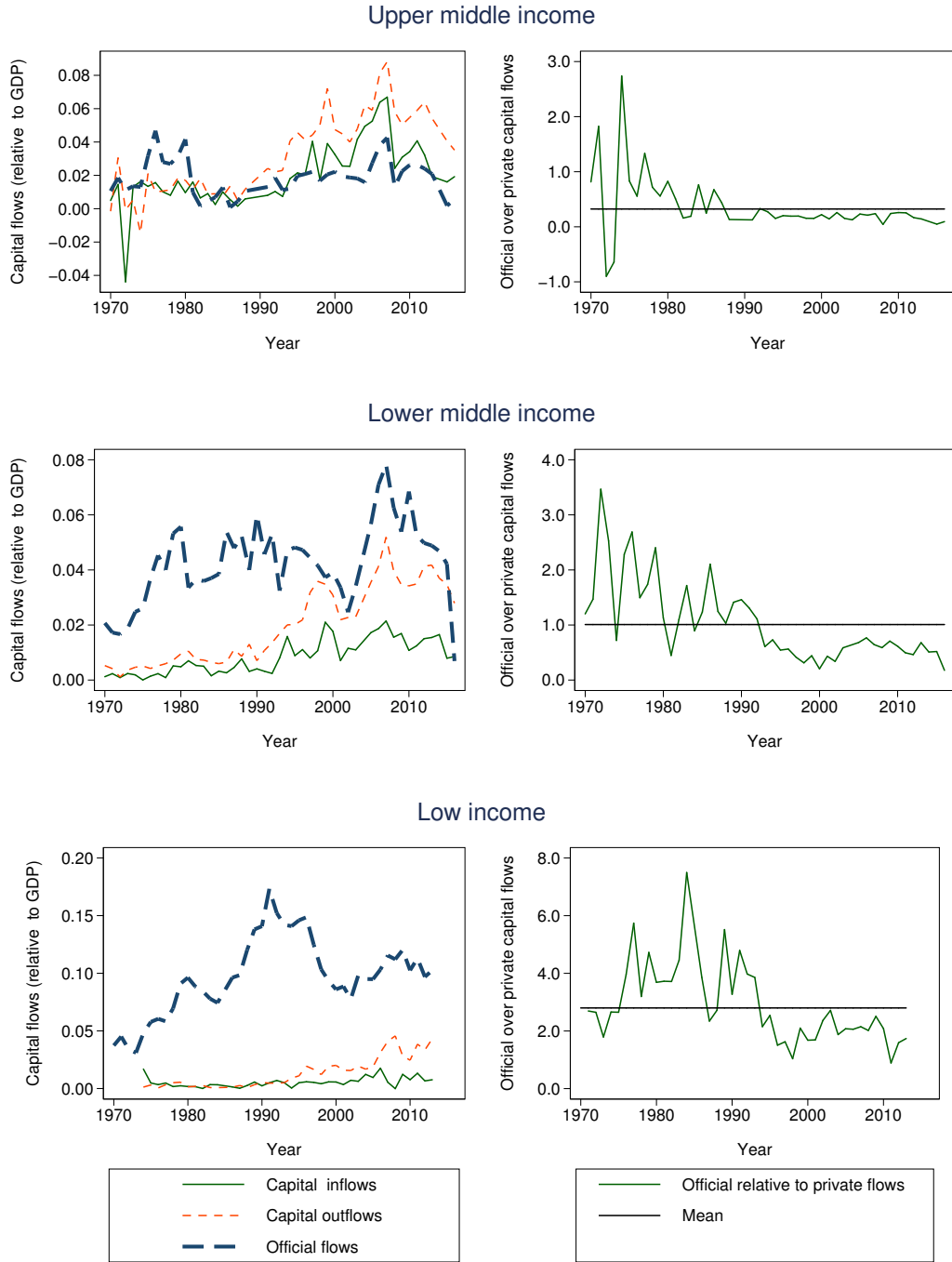
Notes: Capital inflows are net purchases of domestic assets by foreigners. Capital outflows equal net purchases of foreign assets by domestic agents. Official flows are defined as net purchases of reserve assets by the central bank plus development aid received. Data source: IMF (2013).

Figure 2: Average capital flows (relative to GDP): Coarse country classification



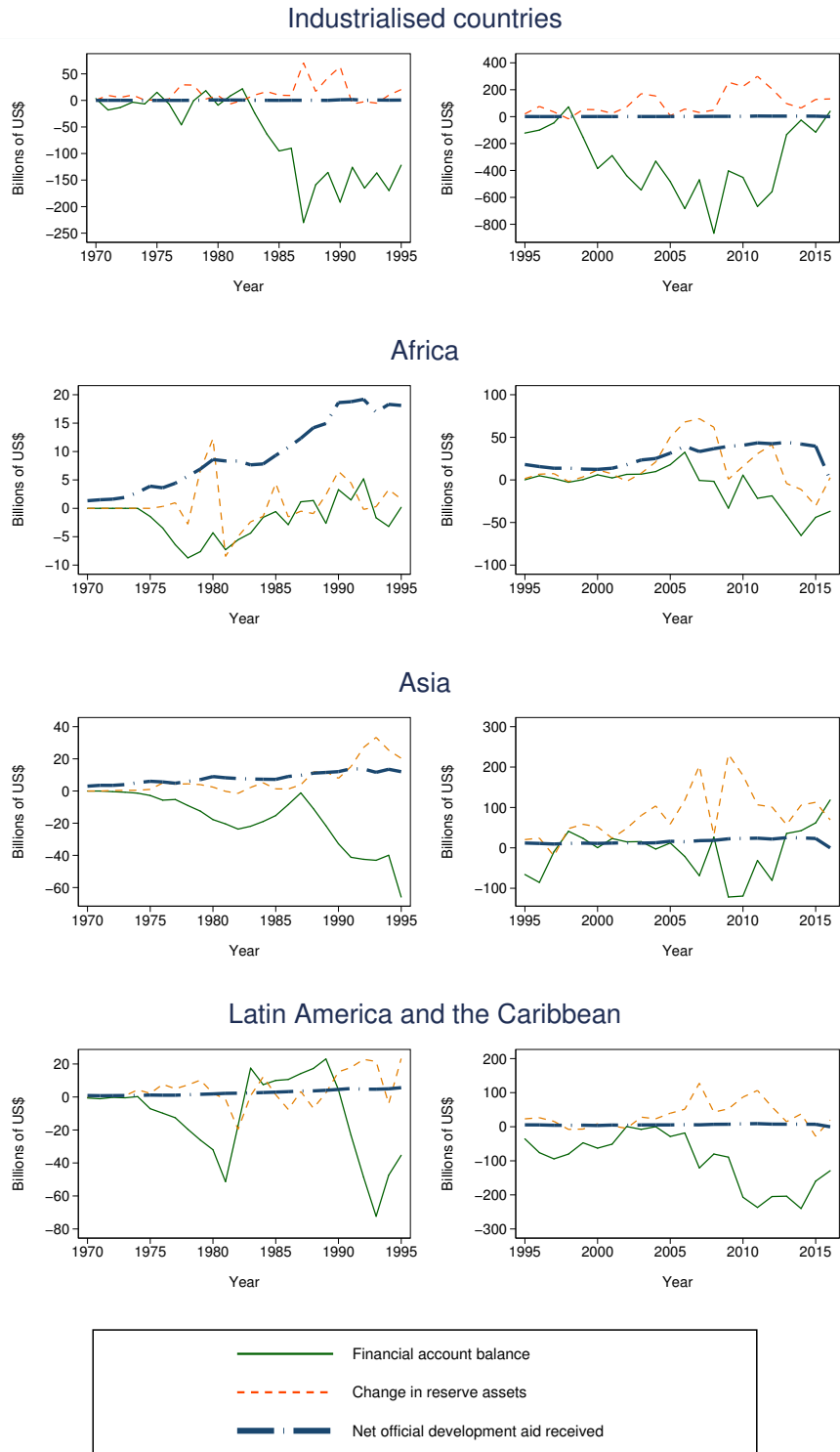
Notes: Capital inflows are net purchases of domestic assets by foreigners. Capital outflows equal net purchases of foreign assets by domestic agents. Official flows are defined as net purchases of reserve assets by the central bank plus development aid received. All capital flows are scaled by trend GDP. The right-hand panel shows the median (across countries) of the ratio of official over private flows, where private flows are defined as the sum of capital inflows and outflows. The straight line plots the average value of this ratio over time. Country groups are defined according to the World Bank classification presented in the World Development Indicators. Data sources: IMF (2013) and World Bank (2013).

Figure 3: Average capital flows (relative to GDP): Fine country classification



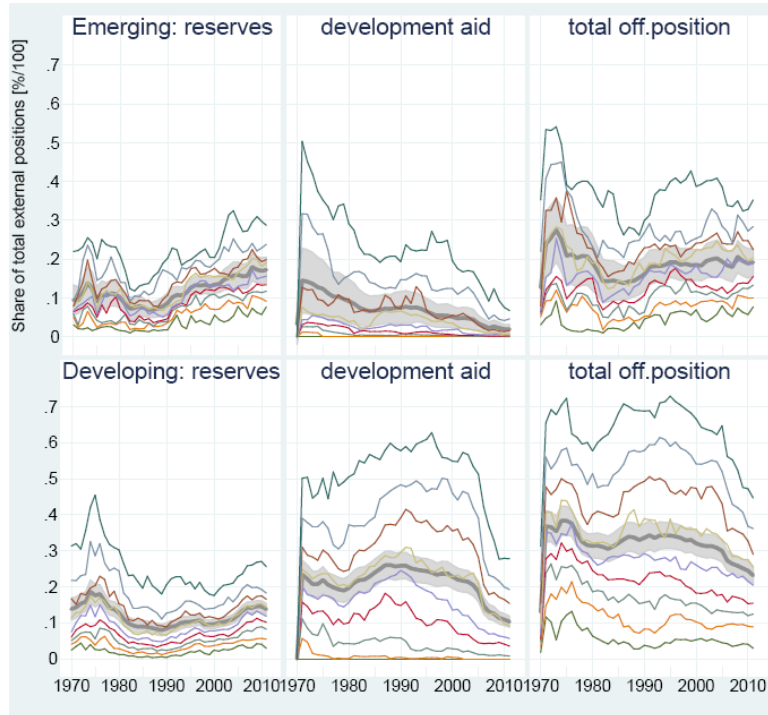
Notes: Capital inflows are net purchases of domestic assets by foreigners. Capital outflows equal net purchases of foreign assets by domestic agents. Official flows are defined as net purchases of reserve assets by the central bank plus development aid received. All capital flows are scaled by trend GDP. The right-hand panel shows the median (across countries) of the ratio of official over private flows, where private flows are defined as the sum of capital inflows and outflows. The straight line plots the average value of this ratio over time. Country groups are defined according to the World Bank classification presented in the World Development Indicators. Data sources: IMF (2013) and World Bank (2013).

Figure 4: Net capital flows



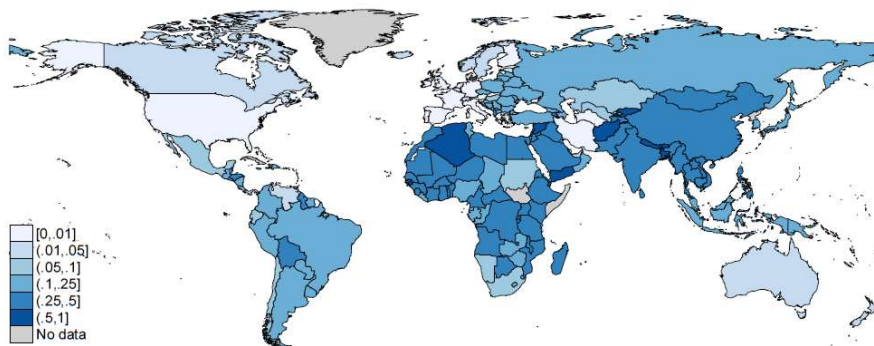
Data sources: IMF (2013) and World Bank (2013).

Figure 5: Official external positions



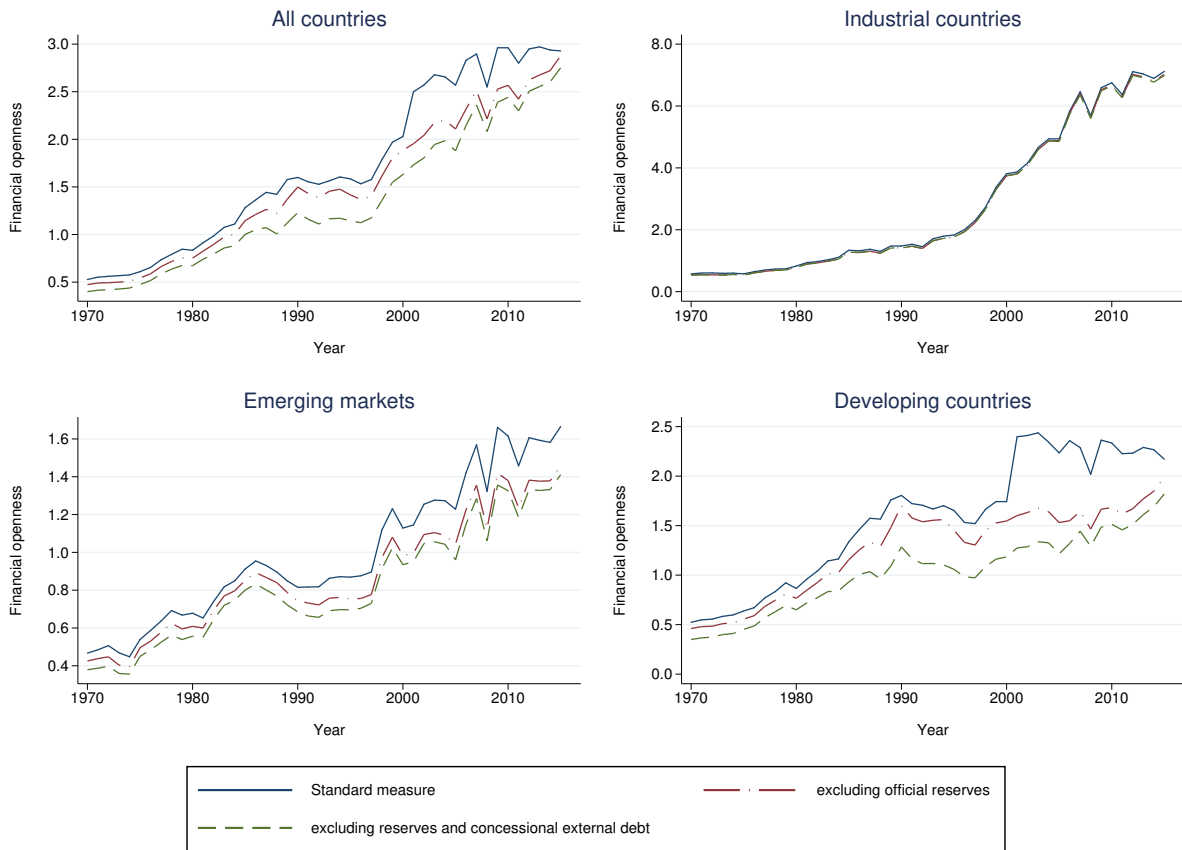
Notes: This figure depicts the share of international reserves (first column), development aid (second column) and the sum of both (third column) over the sum of total foreign assets and liabilities for emerging markets and developing countries. We label this latter variable *official external position*. Each figure displays for the respective variable the 10th, 20th, . . . , 90th percentile (colored lines). In addition, the sample mean together with its 90% confidence interval are shown (shades of gray). Data sources: Lane and Milesi-Ferretti (2007) and update and World Bank (2013).

Figure 6: Official external positions - choropleth map for 2010



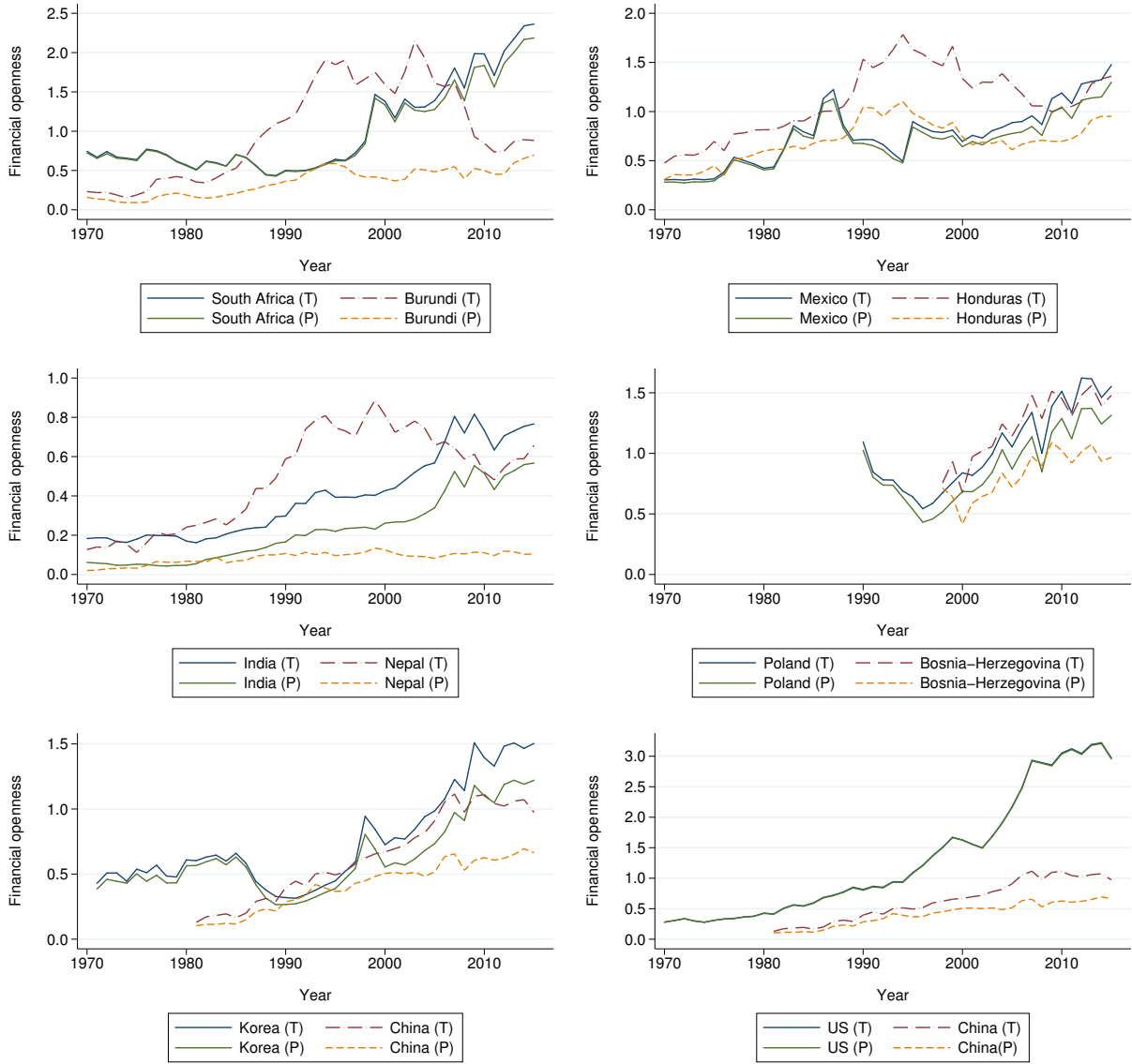
Note: The figure groups countries according to their share of official external positions defined as the sum of international reserves and development aid divided by total foreign assets and liabilities for the year 2010. Class intervals are indicated by the legend. Source: Lane and Milesi-Ferretti (2007) and update and World Bank (2013).

Figure 7: Total versus private financial openness - country groups



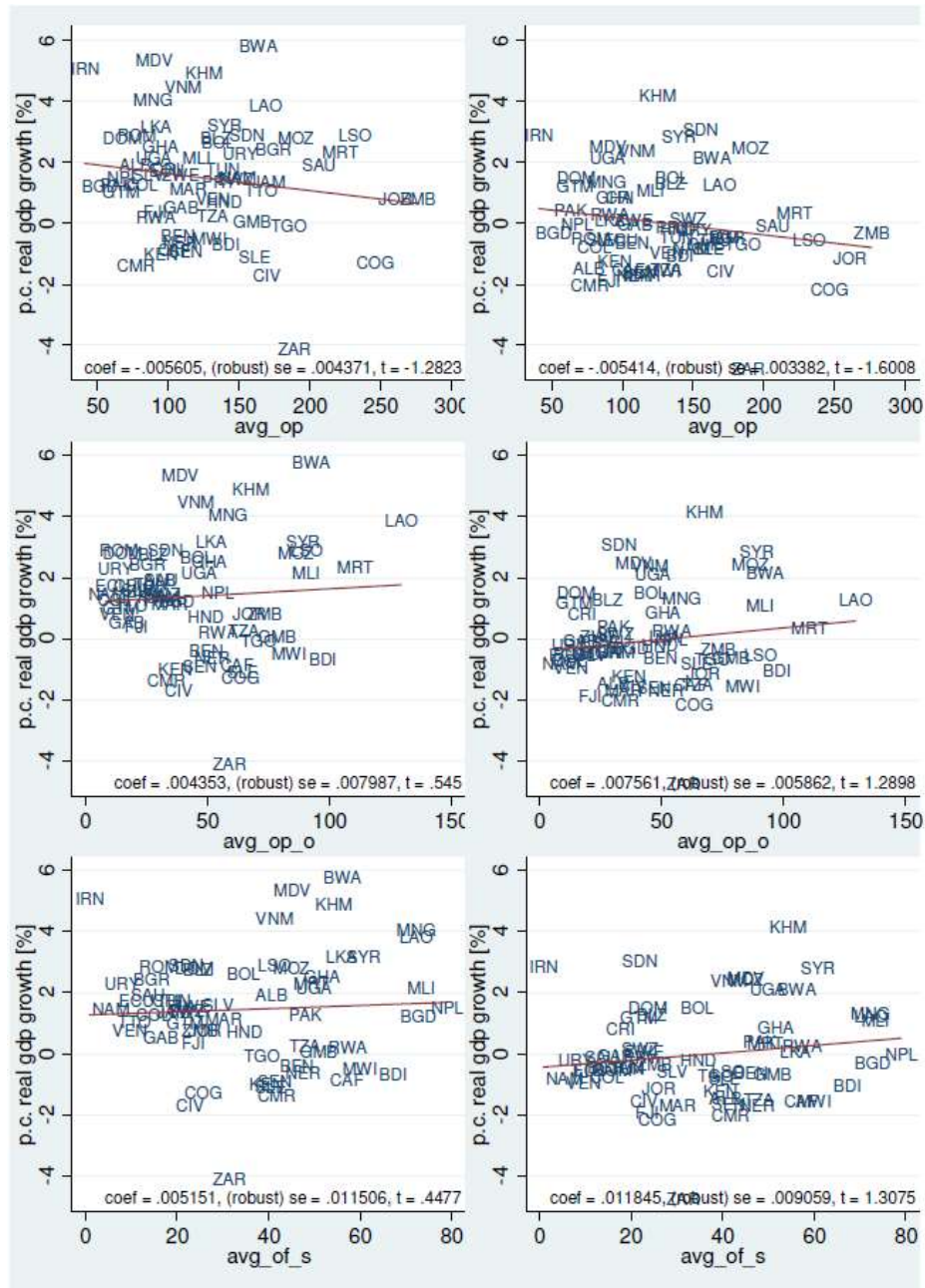
Data sources: IMF (2013) and World Bank (2013).

Figure 8: Total versus private financial openness - case studies



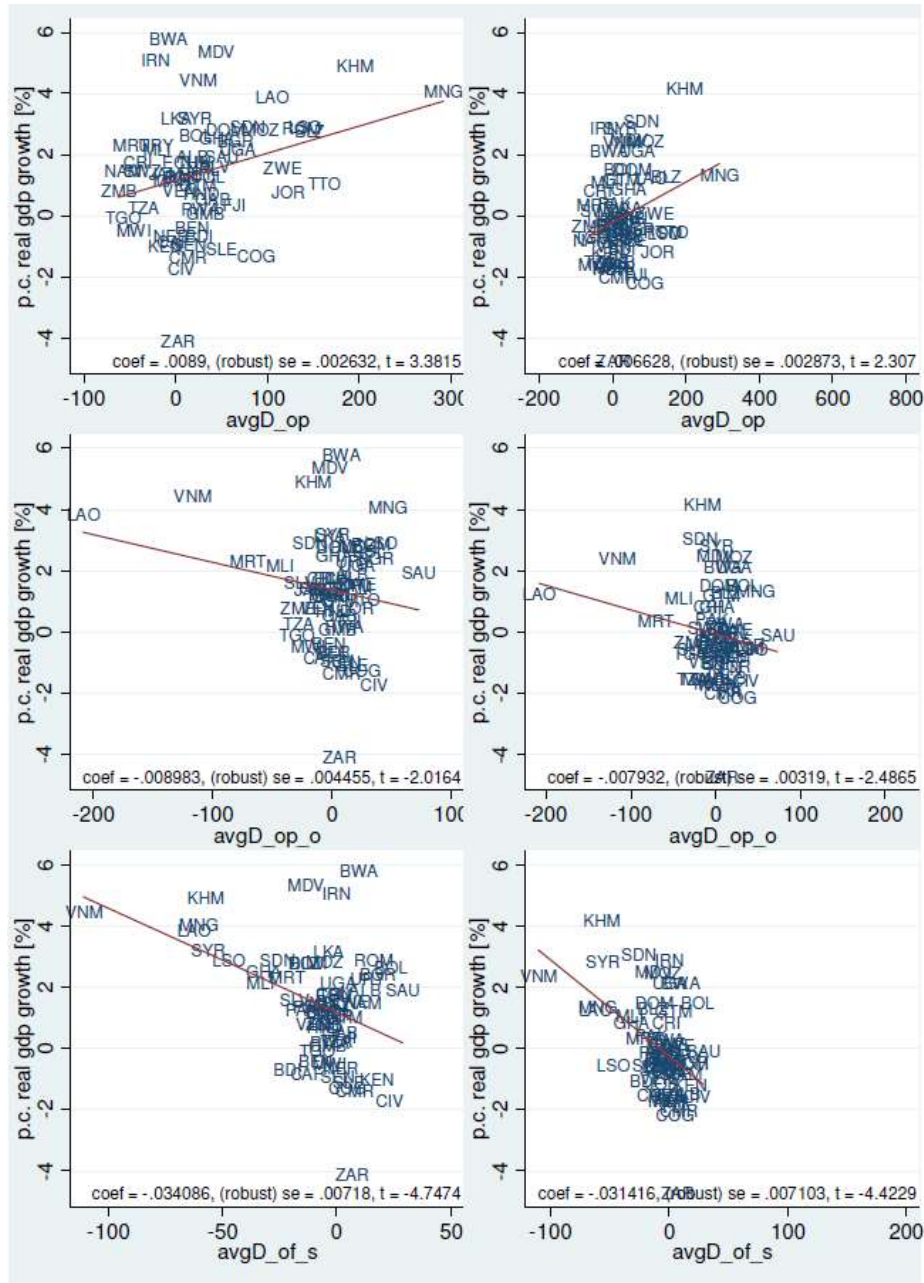
Note: (T) stands for the standard measure of total financial openness whereas (P) denotes private financial openness. Data sources: Lane and Milesi-Ferretti (2007) and update and World Bank (2013).

Figure 9: Financial openness and growth



Note: The scatter plots show for each country the average level of financial openness over time (x-coordinate) and the average rate of growth (y-coordinate). Financial openness is measured by the Lane and Miles-Ferretti-measure (upper panels), by our new index of private financial openness (middle panels) and by the private external position defined as the sum of private assets and private liabilities over total foreign assets and liabilities (bottom panels). The left-hand side figures show the unconditional bivariate relationship. The right-hand side panel in each figure uses residuals from a cross-section regression of per capita growth on initial income, population growth, human capital, and the investment rate. Data sources: Lane and Milesi-Ferretti (2007) and update and World Bank (2013).

Figure 10: Change in financial openness and growth



Note: The scatter plots show for each country the average change of financial openness over time (x-coordinate) and the average rate of growth (y-coordinate). Financial openness is measured by the Lane and Miles-Ferretti-measure (upper panels), by our new index of private financial openness (middle panels) and by the private external position defined as the sum of assets and liabilities net of international reserves and development aid over total foreign assets and liabilities (bottom panels). The left-hand side figures show the unconditional bivariate relationship. The right-hand side panel in each figure uses residuals from a cross-section regression of per capita growth on initial income, population growth, human capital, and the investment rate. Data sources: Lane and Milesi-Ferretti (2007) and update and World Bank (2013).

Table 1: Summary statistics of capital flows

	All countries		High-income countries		Middle-income countries		Low-income countries	
	Median average	Median std. dev.	Median average	Median std. dev.	Median average	Median std. dev.	Median average	Median std. dev.
<i>Net capital flows</i>								
All sample	-2.49	6.50	-0.61	4.54	-3.00	6.45	-2.28	6.82
1970s	-3.64	2.58	-0.95	1.60	-4.66	3.25	-3.44	1.94
1980s	-2.30	4.02	-1.25	2.59	-1.25	2.59	-2.26	3.86
1990s	-1.78	3.89	-0.77	3.11	-1.85	3.99	-2.17	3.61
2000s	-1.68	5.48	0.50	4.27	-3.08	5.63	0.10	6.35
<i>Total gross capital flows</i>								
All sample	6.25	8.83	10.94	13.82	6.10	8.69	4.33	7.40
1970s	2.67	3.51	3.35	2.72	3.19	4.79	1.36	2.62
1980s	3.85	4.62	7.02	3.90	7.02	3.90	3.22	4.68
1990s	5.34	5.55	8.42	4.93	5.93	5.73	3.51	3.91
2000s	10.54	8.82	16.76	15.89	10.56	8.07	6.20	6.68
<i>Reserve flows</i>								
All sample	1.12	2.74	0.39	1.59	1.23	3.03	0.92	2.53
1970s	0.62	1.80	0.45	1.45	1.03	2.12	0.07	1.53
1980s	0.28	1.90	0.38	1.25	0.38	1.25	0.09	1.79
1990s	0.98	2.35	0.39	1.24	1.24	2.38	1.16	2.27
2000s	1.43	2.68	0.61	1.43	1.47	2.87	1.74	2.66
<i>Net ODA flows</i>								
All sample	3.92	2.99	0.10	0.24	2.48	1.99	9.19	5.55
1970s	3.21	1.19	0.03	0.02	2.29	0.72	4.99	2.48
1980s	5.16	1.52	0.04	0.09	0.04	0.09	10.81	2.60
1990s	3.74	1.65	0.08	0.12	1.49	0.79	11.19	3.72
2000s	2.03	1.15	0.25	0.05	1.25	0.51	9.35	1.86

Notes: Country groups are defined according to the World Bank analytical classification as presented in the World Development Indicators (thresholds of GNI per capita define income groups). Net capital flows are the sum of the balance of the capital and financial account. Negative values denote net capital inflows. Total gross capital flows are the sum of capital inflows and capital outflows, which encompass FDI, portfolio investment and other investment flows as well as flows of reserve assets by both domestic and foreign agents. Reserve flows are net flows in reserve assets as derived from the balance of payments. Net ODA flows are the sum of net official development assistance and official aid received. All capital flows are scaled by trend GDP. We first calculate country averages and country standard deviations for the indicated time period. We then show the median value across countries for both measures. The sample dates from 1970 to 2012 and contains a maximum of 186 countries (sample size of specific values depends on data availability.) Data sources: IMF (2013) and World Bank (2013).

Table 2: Rank correlations

	Level of financial openness				Change in financial openness			
	1985	2000	2014	average	1985	2000	2014	average
Spearman	0.89	0.86	0.98	0.92	0.92	0.96	0.95	0.91
Kendall	0.76	0.71	0.89	0.78	0.79	0.86	0.85	0.82

Notes: This table displays the rank correlation coefficients according to Spearman and Kendall for the pair of total financial openness and private financial openness in given years and for the average values over 1985-2014. While columns (1) to (4) compare the ranking of both variables in levels, the remaining columns consider the ranking of the change in both variables.

Table 3: Financial openness and economic growth

	Full sample			Non-industrialised			Developing countries			Emerging markets		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Initial income	0.0283 (0.74)	0.0265 (0.67)	0.0322 (0.76)	0.0417 (1.01)	0.0414 (0.96)	0.0606 (1.30)	0.0142 (0.34)	0.0070 (0.16)	0.0173 (0.40)	0.0309 (0.77)	0.0314 (0.81)	0.0556 (1.77)
Population growth	-0.4092** (-2.28)	-0.4539*** (-2.68)	-0.4939** (-2.54)	-0.4020* (-1.85)	-0.4661** (-2.29)	-0.5622*** (-2.77)	-0.4598** (-2.11)	-0.4886** (-2.35)	-0.5770*** (-2.86)	-0.6225 (-1.20)	-0.6351 (-1.32)	-1.1087* (-2.12)
Human capital	-0.0275 (-0.36)	-0.0054 (-0.07)	-0.0686 (-0.83)	-0.0012 (-0.01)	0.0167 (0.17)	-0.0512 (-0.55)	-0.0533 (-0.53)	-0.0270 (-0.24)	-0.0615 (-0.58)	0.1720 (1.25)	0.1926 (1.34)	0.3315* (2.26)
Investment rate	0.1377*** (3.80)	0.1298*** (3.45)	0.1272*** (3.16)	0.1335*** (3.66)	0.1244*** (3.31)	0.1222*** (3.10)	0.0950*** (2.93)	0.0862*** (2.68)	0.0785** (2.31)	0.2884*** (9.28)	0.2855*** (9.77)	0.1965*** (3.62)
Total financial openness	-0.0075*** (-2.95)			-0.0084** (-2.26)			-0.0071* (-1.90)			-0.0017 (-0.19)		
Private financial openness		-0.0065** (-2.61)			-0.0064 (-1.58)			-0.0067 (-1.65)			-0.0030 (-0.29)	
Private external position			-0.0050 (-0.54)			0.0018 (0.18)			-0.0073 (-0.73)			-0.0645* (-1.91)
Observations	87	87	87	76	76	76	62	62	62	14	14	14
R-squared	0.42	0.41	0.37	0.45	0.43	0.41	0.33	0.32	0.30	0.91	0.91	0.95

Notes: The dependent variable is annual economic growth. Growth refers to average real per capita GDP growth. Robust t-statistics are reported in parentheses. Standard errors are estimated robust to heteroskedasticity. The symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Table 4: Change in financial openness and economic growth

	Full sample			Non-industrialised			Developing countries			Emerging markets		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Initial income	0.0385 (0.96)	0.0449 (1.09)	0.0257 (0.62)	0.0511 (1.19)	0.0581 (1.32)	0.0467 (1.02)	0.0218 (0.52)	0.0289 (0.67)	0.0122 (0.29)	0.0335 (1.01)	0.0351 (1.04)	0.0173 (0.50)
Population growth	-0.5320*** (-3.03)	-0.5059*** (-2.81)	-0.4691** (-2.31)	-0.5545*** (-2.86)	-0.5436*** (-2.73)	-0.5504*** (-2.69)	-0.5740*** (-2.86)	-0.5686*** (-2.76)	-0.5699*** (-2.77)	-0.5805 (-1.37)	-0.5800 (-1.27)	-0.8381* (-2.24)
Human capital	-0.0268 (-0.32)	-0.0406 (-0.52)	-0.0691 (-1.00)	-0.0243 (-0.26)	-0.0316 (-0.37)	-0.0166 (-0.21)	-0.0680 (-0.61)	-0.0768 (-0.76)	-0.0611 (-0.69)	0.1454 (1.17)	0.1387 (1.07)	0.2548* (2.03)
Investment rate	0.1415*** (3.69)	0.1343*** (3.54)	0.1235*** (3.12)	0.1336*** (3.43)	0.1265*** (3.30)	0.1143*** (2.93)	0.0924*** (2.82)	0.0857** (2.65)	0.0734** (2.36)	0.2981*** (9.66)	0.2933*** (9.59)	0.2690*** (7.59)
Total financial openness	-0.0037** (-2.28)			-0.0028 (-1.02)			-0.0023 (-0.71)			-0.0040 (-1.75)		
Private financial openness		-0.0029** (-2.16)			-0.0019 (-1.01)			-0.0012 (-0.59)			-0.0037 (-1.44)	
Private external position			0.0141** (2.00)			0.0156** (2.34)			0.0185*** (3.59)			0.0306 (1.42)
Observations	87	87	87	76	76	76	62	62	62	14	14	14
R-squared	0.41	0.40	0.39	0.42	0.41	0.44	0.30	0.30	0.35	0.92	0.92	0.93

Notes: The dependent variable is annual economic growth. Growth refers to average real per capita GDP growth. Robust t-statistics are reported in parentheses. Standard errors are estimated robust to heteroskedasticity. The symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Table 5: Financial openness and volatility of economic growth

	Full sample			Non-industrialised			Developing countries			Emerging markets		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Initial income	-0.1275** (-2.21)	-0.1336** (-2.28)	-0.1511** (-2.43)	-0.0940* (-1.71)	-0.1022* (-1.73)	-0.1315** (-2.06)	-0.0976 (-1.44)	-0.1058 (-1.43)	-0.1449* (-1.72)	-0.1259* (-1.96)	-0.1304* (-2.20)	-0.1092 (-1.60)
Population growth	-0.1485 (-0.47)	-0.1191 (-0.36)	-0.1563 (-0.44)	-0.3601 (-0.99)	-0.2461 (-0.70)	-0.1900 (-0.49)	-0.3216 (-0.85)	-0.2175 (-0.58)	-0.1670 (-0.41)	-1.6562** (-3.08)	-1.6555** (-3.11)	-2.0518** (-2.51)
Human capital	-0.1645 (-1.62)	-0.1165 (-1.21)	-0.0510 (-0.56)	-0.1294 (-1.07)	-0.1174 (-1.07)	-0.0169 (-0.16)	-0.1137 (-0.80)	-0.0994 (-0.77)	-0.0105 (-0.08)	0.1332 (0.68)	0.2342 (0.87)	0.3256 (1.26)
Investment rate	-0.0245 (-0.55)	-0.0230 (-0.53)	-0.0344 (-0.77)	-0.0410 (-0.91)	-0.0301 (-0.68)	-0.0361 (-0.80)	-0.0436 (-0.80)	-0.0294 (-0.56)	-0.0379 (-0.70)	-0.0212 (-0.37)	-0.0198 (-0.33)	-0.0944 (-0.88)
Total financial openness	0.0013 (0.38)			0.0086* (1.82)			0.0083 (1.44)			0.0020 (0.19)		
Private financial openness		-0.0028 (-0.76)			0.0034 (0.58)			0.0028 (0.42)			-0.0041 (-0.29)	
Private external position			-0.0231 (-1.24)			-0.0176 (-0.89)			-0.0182 (-0.79)			-0.0544 (-0.89)
Observations	87	87	87	76	76	76	62	62	62	14	14	14
R-squared	0.10	0.10	0.12	0.09	0.06	0.07	0.07	0.05	0.06	0.44	0.45	0.51

Notes: The dependent variable is the standard deviation of economic growth. Robust t-statistics are reported in parentheses. Standard errors are estimated robust to heteroskedasticity. The symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.