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International Financial Integration and Economic Growth: New Evidence on Threshold Effects*

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Preliminary version

Abstract

Recent research highlights that countries differ with respect to their experience with capital flows and do not systematically gain from capital account liberalization. This paper is related to the empirical literature that investigates the particular conditions under which international financial integration (IFI) is growth-enhancing. Relying on non-linear panel techniques, we find that countries that are able to reap the benefits of IFI satisfy certain threshold conditions regarding the level of economic, institutional and financial development, and the inflation rate. Our results also reveal a differentiated behaviour of foreign direct investment and portfolio liabilities compared to debt liabilities.

Keywords: International financial integration; Economic growth; Panel threshold regression model

JEL classification: F3; F4; O4

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1 Introduction

The last three decades have witnessed a massive increase in cross-border capital flows, following the rapid decline in capital controls that occurred in industrial countries in the 1980s and in developing countries since the early 1990s. During that period, international capital transactions between countries rose from about 5% of world GDP to over 20%. Intensification of the financial globalization (FG) process has inevitably drawn the attention of economists and policymakers on the actual macroeconomic implications of unfettered capital flows. In particular, their real benefits for long-term economic growth remain highly controversial (Obstfeld, 2009). Although capital flows are presumably beneficial for receiving countries as they gain access to cheaper financing, the history of international financial integration (IFI) has not been inherently smooth nor risk-free. In the context of developing countries, surges in capital inflows can pose critical challenges such as strong currency appreciation pressures, asset price bubbles or rapid credit growth that induce fragilities in the financial sector. The financial crises of the 1980s and 1990s in Latin America and Southeast Asian also sorely illustrated the disrupting effects of large swings in capital flows. More recently, the financial turmoil undergone by developed countries has led economists to adopt an even more wary stance towards financial globalization. The difference, this time, was that the crisis originated in the mature financial systems of rich economies, considered before as highly resilient, and emphasized the vulnerabilities of the international monetary and financial system as a whole. True also, the phenomenon of global current account imbalances - with capital flowing "uphill" from emerging markets and oil-exporting countries to the developed world, especially the US - played a major role in laying the conditions for the crisis. Rodrik and Subramanian (2008) observe that: "it does not seem to matter how capital flows. That it flows in sufficiently large quantities across borders - the celebrated phenomenon of financial globalization - seems to spell trouble", and recommend that international flows of capital should be curbed. Against this backdrop, even the International Monetary Fund has recently endorsed the legitimacy of capital controls as a part of a policy toolkit to help countries manage large inflows of capital (see Ostry et al., 2011; Moghadam, 2011). Although the institution remains a fervent advocate of the positive role of international finance in promoting global economic efficiency, it increasingly recognizes that the process of financial globalization bears potential adverse effects if let go adrift.

On research ground, neither the theoretical nor the empirical studies could provide a consensus to reconcile the controversy over the desirability of liberalizing capital flows. On

one hand, standard neoclassical theory asserts that gains from IFI are straightforward and work mainly through three channels to stimulate growth. First, IFI improves global allocative efficiency as it allows financial resources to flow to their most productive uses. Specifically, it can provide capital-scarce countries with the resources they need to grow faster. Second, IFI facilitates international risk-sharing and risk-diversification across countries, leading to a re-composition of portfolio in favor of riskier assets offering higher returns (Obstfeld, 1994). Moreover, it helps promoting domestic financial development (Levine, 2001): for instance, IFI enhances stock market liquidity and the presence of foreign banks tends to improve the functioning of the domestic banking system and the provision of financial services (see also Levine, 1996; Klein and Olivei, 2008).

On the other hand, second-best theories predict that eliminating the distorting effects of capital controls may actually amplify the negative effects of other pre-existing distortions, resulting in welfare loss. Martin and Rey (2006) show that the propensity of financial crash is higher in economies which liberalize trade in financial assets before trade in goods. Stiglitz (2000) argues that information asymmetries are intrinsic to financial transactions, and views IFI as hazardous and potentially exacerbating problems of bad resource allocations and excessive borrowings. Ju and Wei (2007) find that institutions affect the patterns of international capital flows: weak domestic institutions, especially weak property rights, can reduce the profit opportunities of both domestic and foreign firms. Thus, some theories suggest the existence of pre-requisites conditioning the gains from IFI and the need to sequence reforms when devising growth strategies (McKinnon, 1991).

Like theoretical studies, the vast empirical literature fails to provides robust evidence of a positive link between IFI and economic development either.[1] Moreover, recent studies tend to emphasize the negative correlation between capital flows and economic growth, either by showing that countries grow more rapidly when they rely less on external financing (Prasad et al., 2007), or by observing that foreign capital tend to flow, paradoxically, to countries with low productivity growth (Gourinchas and Jeanne, 2007). Concurrently, there has been a revival of the threshold research agenda, with the aim to rationalize the potential benefits of IFI. Kose et al. (2006), for instance, maintain that "various threshold effects play an important role in shaping the macroeconomic outcomes of financial globalization". However, empirical evidence have so far yielded conflicting conclusions. Edison et al. (2002)

[1] Prasad et al. (2003); Rogoff et al. (2004); Kose et al. (2006, 2009) provide detailed reviews of the empirical literature.

find some evidence that IFI interact with institutional factors, but not with the degree of financial development or macroeconomic policies. In contrast, Kose et al. (2010) stress the key role of domestic financial development in improving the cost-benefits trade-off from capital flows.

This paper re-examines the IFI-growth nexus, focusing on the presence of contingency effects in the relationship. The difference from previous financial globalization literature lies in the use of non-linear panel estimation techniques. To our best knowledge, this paper is the first to apply panel threshold regression (PTR) model, developed by Hansen (1999), to assess the relationship between IFI and economic growth, using various and complementary indicators of financial integration. This empirical strategy allows us to investigate the threshold effects of the IFI-growth link in a more adequate and flexible way than previous studies. First, the PTR methodology provides endogenous identification of threshold levels, which we believe may bring new insights into the issue compared to *ad hoc* methods of sample-splitting or linear modeling with interaction terms. Second, it allows to determine whether the threshold effect is statistically significant and the non-linear specification validated. The alternative variables selected as threshold are country characteristics deemed to be pre-requisites allowing IFI to be growth-enhancing.

We find evidence that countries capable of reaping the benefits of IFI satisfy certain threshold conditions in these variables. In particular, the level of institutional and financial development, and the pace of inflation appear as significant thresholds. Our results also reveal a differentiated behavior of foreign direct investment and portfolio liabilities compared to debt liabilities.

The paper proceeds as follows. In the next section, we describe the dataset and detail (i) how we measure IFI, and (ii) the choice of threshold variables. In section 3, the empirical methodology, consisting in a panel threshold regression (PTR) model, is presented. Results are discussed in section 4; and the final section concludes.

2 Data and measurement issues

Our empirical study is based on a standard growth regression model, as traditionally implemented in the literature (e.g. Barro and Sala-I-Martin, 2003). We build an annual panel dataset consisting of 80 countries observed over the 1984-2007 period. The dependent

variable is the real per capita GDP growth.[2] Control variables are selected in accordance with robustness results highlighted in influential past studies (e.g., Levine and Renelt, 1992; Sala-I-Martin, 1997; Sala-I-Martin et al., 2004). They include the initial income - to control for conditional convergence -, a proxy for the initial stock of human capital, the investment rate, and the growth rate of population. We also test an alternative specification where, besides the initial conditions, we control for macroeconomic policies by including government spending (expressed as a ratio of GDP) and inflation. The underlying motivation is derived from endogenous growth theory, which enables economic policies to have permanent effects on economic growth (Easterly, 2005).

Starting with one of these baseline models, we adopt a sequential strategy and run successive regressions, using both different IFI indicators and alternative threshold variables (one equation is estimated for each pair of IFI indicator and threshold). In what follows, we justify our approach to select IFI and threshold variables, and discuss some key conceptual and measurement issues.

2.1 Data on international financial integration

2.1.1 Measuring IFI

The empirical literature has been inexorably confronted with the difficulty of identifying and measuring financial integration in a consistent manner, both over time and across countries (Edison et al., 2004). The different approaches considered so far have brought about two main types of indicators with different informational contents.

De jure indicators place an emphasis on government policies and identify the presence of regulatory measures restricting capital account transactions. They are designed using official information reported in the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* (AREAER), or, in some cases, the data contained in the OECD's *Code of Liberalization of Capital Movement*. The basic *de jure* measure is a simple binary variable indicating the years where some kind of capital controls were active. Quinn (1997), Montiel and Reinhart (1999), Miniane (2004), Magud and Reinhart (2007), Chinn and Ito (2008) and Schindler (2009) developed methodologies beyond this on/off indicator and proposed more informative and disaggregated measures.

De facto indicators differ from the latter in that they intend to assess a country's actual

[2]See Appendix Table A.2 for data description and sources.

exposure to international capital flows. These quantitative indicators, based on the direct observation of existing types of cross-border transactions, are therefore likely to be more objective and less prone to measurement errors than rule-based indicators. Empirical applications examining the macroeconomic implications of financial integration have commonly used either gross measures of capital inflows and outflows, or stock measures of foreign assets and liabilities accumulated over time.

In this paper, we chose to rely on the second aspect of financial openness because *de jure* indicators have several well-known drawbacks that make them unsuitable for our analysis. First of all, these indicators tend to be highly persistent, while our panel threshold approach rules out the possibility of using variables that are time invariant. Secondly, measures of legal restrictions may not reliably reflect actual financial openness. Some authors have, for instance, highlighted the fact that *de jure* indicators are poorly correlated to the amount of external financing received in developing countries (e.g. Prasad et al., 2003; Edison et al., 2004; Edwards, 2007); this reveals the usual limited capacity of governments to enforce capital controls effectively. Certain types of restrictions may influence the composition of capital flows (Edwards, 1999; Montiel and Reinhart, 1999; Magud and Reinhart, 2007; Binici et al., 2010), yet their effect on volumes remains debatable. In any case, *de jure* indicators fail to capture accurately the intensity and efficacy of government restrictions.

Hence, for the purpose of our analysis, it seems more relevant to focus on *de facto* financial openness; arguably, the theoretical growth-benefits will hinge on the amount of capital flows experienced by a country. One major shortcoming, however, is that *de facto* measures may be affected by the same range of factors influencing economic growth - such as macroeconomic policies or political circumstances -, while growth outcomes may, in turn, drive capital flows (Eichengreen, 2001). Therefore, we will have to account explicitly for this potential endogeneity bias in assessing the growth-IFI relationship.[3]

We examine four measures of financial integration drawn from Lane and Milesi-Ferretti (2007)' database. These authors computed the accumulated stocks of foreign assets and liabilities for an extensive sample of countries. Their data provide more accurate IFI indicators than capital flow measures at least for two reasons: (i) stock measures are generally less sensitive to short-run factors and, thus, less volatile than flow measures; (ii) Lane and Milesi-Ferretti (2007) also carefully corrected the gross stocks for price and ex-

[3] *De jure* measures are not completely exogenous either as capital controls tend to be imposed by weak government. See Eichengreen (2001) for a discussion.

change rate fluctuations. We consider both the sum of total stocks of external assets and liabilities (as a share of GDP) and the total stocks of liabilities. In order to account for a potential composition effect, we also break down the accumulated stocks of liabilities into FDI plus portfolio equity liabilities, and debt liabilities.

2.1.2 Trends in IFI and stylized facts

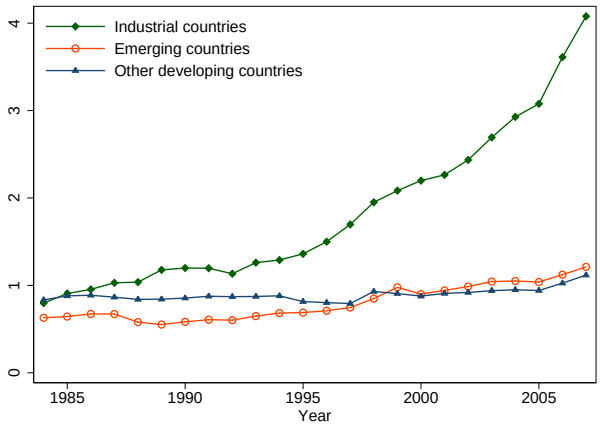
Even though financial globalization appears as one of the most irresistible phenomena of our days, it remains unevenly spread among countries and its benefits for growth are hard to detect in the data. Figure 1 pictures the evolution of the different measures of IFI in countries grouped into industrial (23), emerging (20) and other developing countries (37).[4] Figure 2 presents the simple correlations between economic growth and IFI. The period covered is 1984-2007. Several key points emerge from these figures.

First, industrial countries are, by all measures, the most financially opened and receive the lion's share of cross-border capital flows. As shown in Figure 1, Panel (a), their average total stocks of external assets and liabilities rose dramatically from 80% of GDP in 1984 to over 400% in 2007. Panel (b) also indicates that these countries are by far the most important recipient of external financing. Comparing Panel (c) and Panel (d) reveals, however, that the composition of inward capital flows has been strongly biased towards debt liabilities, which represent on average 130% of industrial countries' GDP in 2007, while FDI and portfolio equity liabilities add up to only 65% of GDP.

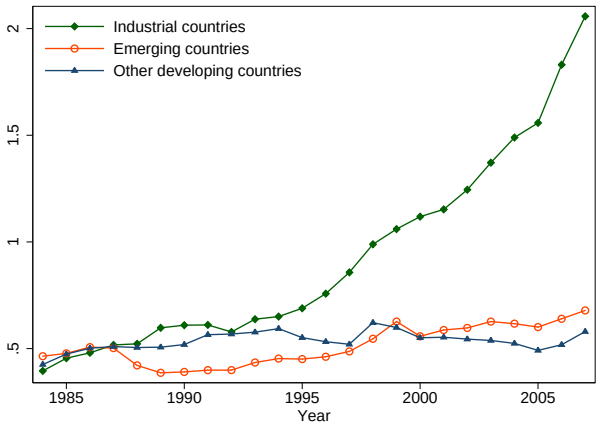
Second, the progression of *de facto* financial integration has been more contained in emerging and other developing countries. These economies also exhibit a very different pattern of capital flows compared to rich economies. Indeed, Figure 1, Panel (b) and Panel (c) show that they have relied relatively more on FDI and portfolio equity flows and reduced gradually their amount of debt liabilities in recent years. This suggests the importance of examining various components of capital flows when assessing the growth-impact of IFI. Finally, emerging economies have attracted more FDI and portfolio equity investments, on average, than other developing economies. However, with a ratio of FDI and portfolio equity inflows to GDP of 40%, they still fall far behind industrial countries.

Third, in Figure 2, Panel (a) and Panel (b), where IFI is captured by the two more aggregated indicators - namely, total stocks and total liabilities -, its correlation with real per capita GDP growth turns out to be rather weak. However, there is a more apparent

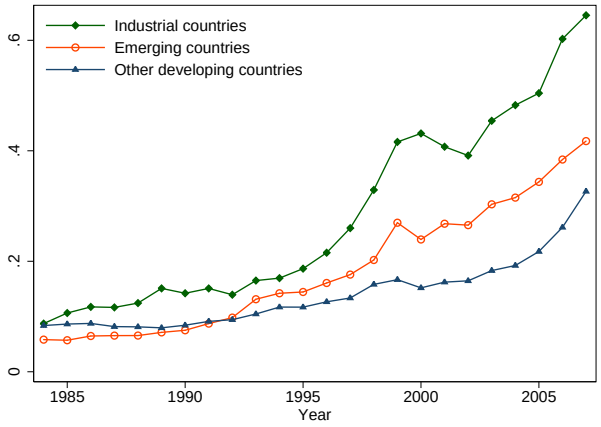
[4] Appendix Table A.1 details the country sample.



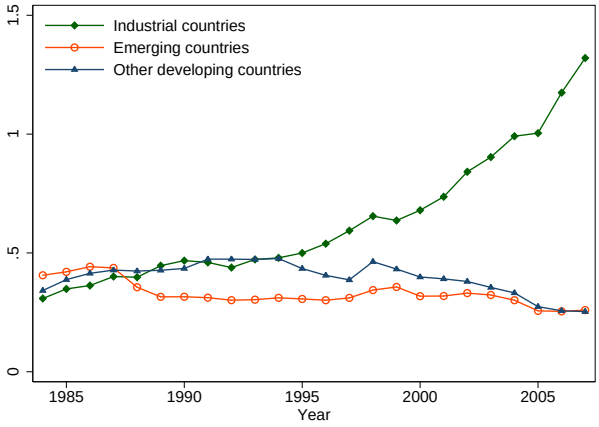
(a) Total stocks of external assets and liabilities



(b) Stock of external liabilities

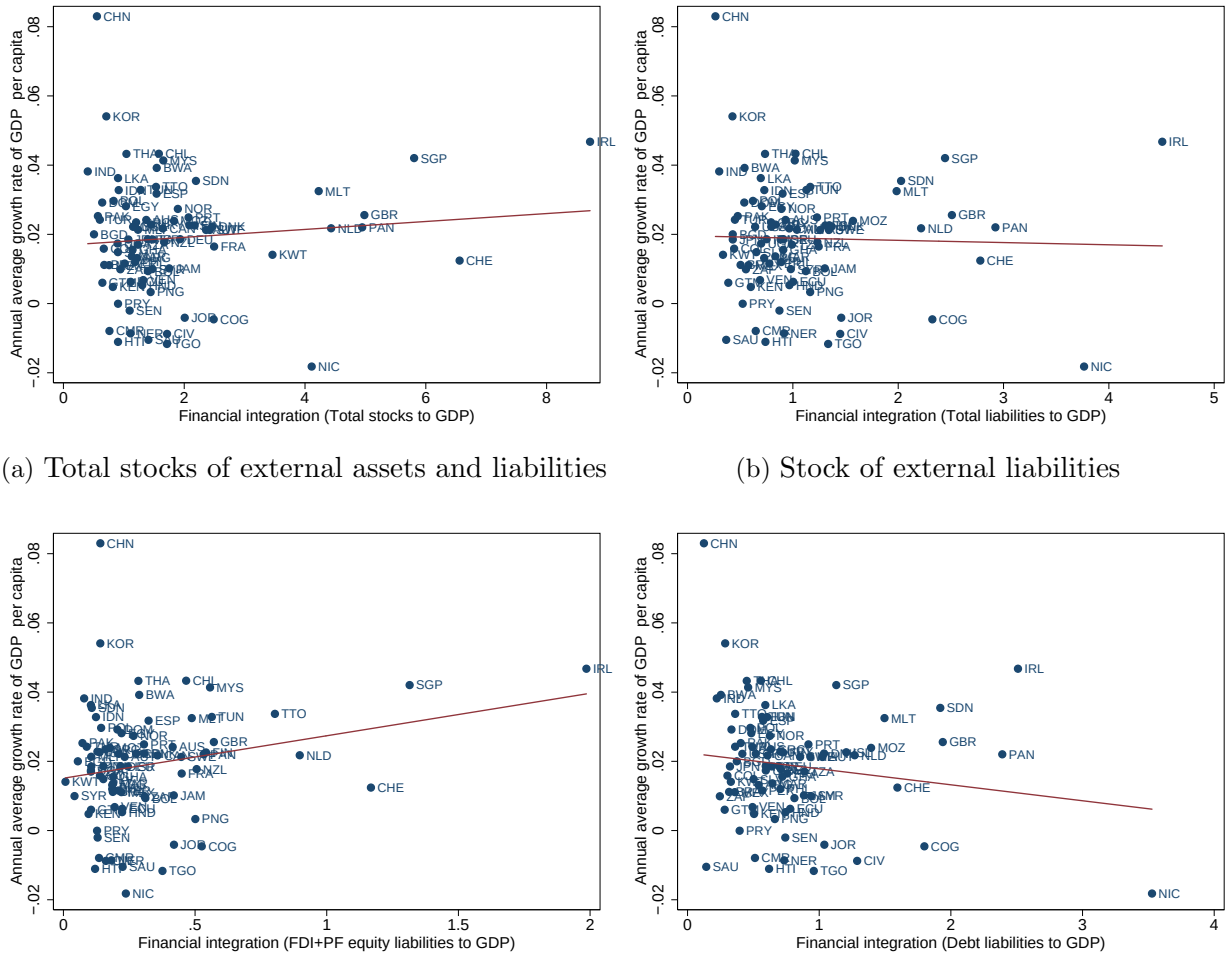


(c) Stock of external FDI and portfolio equity liabilities



(d) Stock of external debt liabilities

Figure 1: Stock measures of financial integration (by group)



(a) Total stocks of external assets and liabilities

(b) Stock of external liabilities

(c) Stock of external FDI and portfolio equity liabilities

(d) Stock of external debt liabilities

Figure 2: IFI-growth correlations

relationship between growth and subcomponents of capital flows. Panel (c) shows that FDI and portfolio equity liabilities are positively related to growth, while Panel (d) indicates a negative association between debts and growth. Once again, Figure 2 highlights the value of considering the different nature of capital flows. In this study, we intend to elicit further the great heterogeneity observed among countries by combining this composition of flow hypothesis with the determination of threshold effects.

2.2 Data on threshold variables

This paper examines the existence of contingency effects in the IFI-growth relationship and assesses whether it is potentially intermediated by some third factors. These factors are country characteristics that, as suggested by some economic theories and emerging evidence, work as pre-requisites for IFI to be growth-promoting.[5] In particular, we look at the level of income, the degree of trade openness, the quality of the institutional setting, the soundness of macroeconomic policies and the level of financial development. Kose et al. (2010) summarize these variables influencing the IFI-growth nexus as a set of "threshold" conditions.

We begin by investigating the IFI-growth relationship in different country income groups. The succession of crises experienced by emerging countries in the 1990s has given reasons to think that the effects of capital account liberalization may vary with domestic structural conditions, such as the level of financial and institutional development. While these characteristics are often difficult to capture and disentangle, they are generally considered better developed in high-income countries. Therefore, some authors have proposed to assess how a country's overall level of economic development interacts with its degree of financial openness. Their results provide mixed evidence.

On the one hand, Alesina et al. (1993) find evidence of a small positive association between capital account liberalization and growth with a sample of 20 high-income countries, while Grilli and Milesi-Ferretti (1995) find a negative link in a sample dominated by developing countries. Considering a broader cross-country dataset including six regions and more than 400 countries in the world, Edwards (2001) finds opposite and significant effects of capital account liberalization on growth in high and low-income countries, although the significance of his results are sensitive to the choice of indicator for capital account openness.

[5]Some authors focus on the absorptive capacity of host countries, which could be affected by these pre-conditions, to explain the weak or scant evidence of FDI-growth relationship (see Crespo and Fontoura (2007) for a survey of this branch of literature.).

On the other hand, Arteta et al. (2001) only report scant evidence of a stronger growth-effect in high-income countries. Relying on the results of a counter-factual study assuming that the Great Depression did not take place, Bordo and Eichengreen (1998) infer that freer capital mobility in the wake of World War II would have had little effect on economic growth in advanced industrial countries, but that it would have permitted a more efficient allocation of resources in the developing world, accelerating at least slightly the process of economic growth and development there. Here, rather than dividing our sample into high-income and low-income countries or including a dummy variable interacted with IFI, we use the *initial income*, measured by the lagged value of logarithm of real per capita GDP, as a threshold variable.

The degree of financial openness as well as the effect of IFI on growth may also depend on a country's degree of trade openness. On the one hand, Aizenman (2008) argue that trade opening will inevitably lead to financial opening due, notably, to a public finance linkage between them. Aizenman and Noy (2009) investigate the relative magnitudes in the directions of causality between trade and financial openness and conclude that in an era of rapidly growing trade integration, countries cannot choose financial openness independently of their degree of trade integration. One the other hand, financial integration without trade openness could lead to a misallocation of resources when foreign capital flows into non-competitive domestic industries (Brecher and Alejandro, 1977). Here we use *trade openness* as one of the pre-conditions and rely on a conventional indicator, which equals the sum of exports and imports of goods and services divided by GDP. As in the case of financial openness, *de jure* indicators have also been developed to measure trade openness policy (Wacziarg and Welch, 2008), but, once again, they are less informative and time-variant than indicators of *de facto* trade openness.[6]

Not only have institutions been argued as a fundamental source of long run growth (Acemoglu et al., 2003), they are also assumed to influence economic outcomes by providing the right incentives for a country to allocate resources efficiently. Moreover, economists have especially emphasized the importance of institutional arrangements that establish the security of private property, the enforceability of contracts and an effective legal system (Mishkin, 2008), all of which could affect the role of IFI on economic growth. However,

[6]See, e.g., Barro and Lee (1994), Sachs and Warner (1995) and Hall and Jones (1999) for this kind of binary index. To measure the trade integration, Bachellerie et al. (2010) group 58 countries using the major existing regional trade agreements (RTAs), which cover various degrees ("steps") of the Balassa (1961)s classification of economic integration.

institutional features (or quality) are the most complex variables to quantify. In this paper we rely on the *International Country Risk Guide* (ICRG) database to derive a proxy for the quality of institutions because it provides the most complete database available with the longest time span.[7] The political risk rating monitored in ICRG covers fundamental aspects of institutional quality such as law and order, corruption, the quality of the bureaucracy, government stability, democratic accountability, investment conditions and socio-economic context. We construct a composite index (a simple annual average) of five political risk components: corruption, democratic accountability, investment conditions, law and order, and socio-economic context. This index ranges from 0 to 58, with higher values indicating better institutional quality. These data are available on an annual basis starting from 1984.[8]

Literature on reform sequencing underscores the importance of achieving macroeconomic stability and strengthening domestic financial institutions before liberalizing capital markets (Echeverria et al., 1997). Macroeconomic policies aimed at preserving sustainable macroeconomic balance may be necessary to avoid sharp reversals in capital inflows (sudden stops) which increase the risk of crisis. Using the black market premium as an indicator of macroeconomic imbalances, Arteta et al. (2001) report evidence of threshold effects of financial openness on the growth, which depend on macroeconomic policies. However, few empirical studies (see, e.g., Edison et al., 2002; Kose et al., 2010) look at the role of monetary and fiscal policies in generating the contingency effects of IFI on the growth. In order to asses the relevance of macroeconomic policies, we introduce as threshold variables the ratio of *government expenditure* to GDP (proxy for fiscal policy) and the *inflation rate* calculated as the logarithmic first difference of the consumer price index (proxy for monetary policy).[9]

Some authors maintain that capital flows are determined by the efficiency of a country's financial sector. Potential benefits derived from financial integration, in the context of emerging and developing countries, will thus depend on the advancement of their financial systems. Using a model with domestic and international borrowing constraints, Aoki et al. (2006) show that capital account liberalization is not necessarily beneficial when the domes-

[7] Other existing indicators of institutional quality include Hall-Jones index (Hall and Jones, 1999), the index of economic freedom of Fraser Institute (Gwartney et al., 2006) and the World Bank Governance Indicators (WBGI).

[8] Arteta et al. (2001) took the index of law and order of this database as the proxy of institutional strength; Chinn and Ito (2007) use this database to assess the effect of legal and institutional environment development.

[9] We follow Edison et al. (2002) and calculate inflation using consumer price index, while Kose et al. (2010) use the first difference of inflation as the measure of monetary policy.

tic financial system is underdeveloped.[10] In the empirical literature, one common practice for measuring financial development is to focus on *financial depth* and compute the size of the formal intermediary sector relative to the size of the economy. Our proxy for financial depth equals the ratio of private credit (claims on the non financial private sector) to GDP. We are aware that this is a narrow measure which only partially reflects the level of financial development in an economy as it does not account for financial services provided outside the banking system, i.e. on financial markets. There are two reasons for focusing on the banking sector to investigate the role of financial development (Azman-Saini et al., 2010): first, bank credits are the only feasible sources of financing for the majority of developing countries in our sample; second, the number of available observations for equity market indicators are insufficient to conduct panel threshold regression.

3 Panel threshold regression (PTR) model

This study is based on the assumption that IFI will impact growth in a nonlinear way. We follow the methodology developed by Hansen (1999) to test for the existence of threshold effects in the growth-IFI relationship. First considering one potential threshold, the PTR model takes the form:

$$y_{it} = \mu_i + \beta_1^{'} x_{it} \boldsymbol{I}(q_{it} \leq \gamma) + \beta_2^{'} x_{it} \boldsymbol{I}(q_{it} > \gamma) + e_{it} \tag{1}$$

where the subscript i indexes the individual and the subscript t indexes the time period. The dependent variable y_{it} is regressed on an individual-specific fixed effect μ_i, and a vector of controls x_{it}, which slope coefficients switch between regimes depending on the value of an observable variable q_{it}. The indicator function, $\boldsymbol{I}(.)$, which equals 0 when q_{it} is below the threshold parameter γ and 1 in the other case, generates an abrupt transition mechanism between two extreme regimes. An alternative way to present this mechanism is to write:

$$y_{it} = \begin{cases} \mu_i + \beta_1^{'} x_{it} + e_{it} & q_{it} \leq \gamma, \\ \mu_i + \beta_2^{'} x_{it} + e_{it} & q_{it} > \gamma. \end{cases} \tag{2}$$

In this specification, observations fall into two discrete classes and respond to distinct regression functions, where the vector of slope parameters is either β_1 or β_2. The PTR model

[10] Because total factor productivity stagnates in the long-run or employment decreases in the short-run.

provides an homogeneous transition mechanism for all the individuals in the sample but still allows each of them to switch between regimes, depending on the threshold condition that is satisfied at a given date. In this way, the PTR approach solves the heterogeneity and time variability issues by allowing the model parameters to vary both across individuals and over time.

The main appeal of the PTR methodology lies, however, in the endogenous determination of the threshold value. Hansen (1999) proposed a sequential procedure for estimating the threshold parameter. After a first preliminary step consisting in removing the individual-specific effects, equation (1) is successively estimated by ordinary least squares (OLS) with all possible values of γ.[11] The least square estimate of the threshold parameter $\hat{\gamma}$ is then selected as to minimize the sum of squared residuals obtained previously. Once $\hat{\gamma}$ is identified, the slope coefficient estimates are simply $\hat{\beta}_1(\hat{\gamma})$ and $\hat{\beta}_2(\hat{\gamma})$, yielded from OLS estimations in each regime separated by $\hat{\gamma}$. In other words, the PTR model is a piece-wise linear one.

The final issue to be addressed is the statistical significance of the estimated threshold parameter. Since γ is not identified under the null hypothesis of no threshold, Hansen (1999) suggests a non-standard inference strategy based on bootstrap simulations of the asymptotic distribution of the likelihood ratio test.[12]

The methodology can be generalized to account for multiple thresholds. In our analysis, we start by considering the following double-threshold regression model with three potential regimes:

$$\begin{aligned} GROWTH_{it} &= \mu_i + X'_{it}\theta + \beta_1 IFI_{i,t-1}\boldsymbol{I}(q_{it} \leq \gamma_1) + \beta_2 IFI_{i,t-1}\boldsymbol{I}(\gamma_1 < q_{it} \leq \gamma_2) \\ &\quad + \beta_3 IFI_{i,t-1}\boldsymbol{I}(\gamma_2 < q_{it}) + e_{it} \end{aligned} \tag{3}$$

where the dependent variable, $GROWTH$, is the change in real per capital GDP (in log). We use the lag of the IFI indicator to circumvent the potential reverse causality problem posed by this variable.[13] In equation (3), only the slope coefficient on $IFI_{i,t-1}$ switches

[11] In practice, the search over values of γ may be limited to specific quantiles. It is also recommended to eliminate a minimum percentage of extreme values to ensure that the results are not driven by potential outliers.

[12] The properties and validity of this bootstrap procedure are also discussed in Hansen (1996) and Hansen (2000).

[13] Besides, some authors argue that non-linear modeling strategies can mitigate endogeneity issues (Bereau et al., 2011; Omay and znur Kan, 2010; Fouqau, 2008). Arguably, our threshold model captures the contrasting growth effects of IFI at different levels of the threshold variable and reduces the potential endogeneity bias in the same way as the presence of interaction terms in a linear model (see Aghion et al., 2009).

between regimes depending on the value of an observable threshold variable q_{it}, while the slope coefficients on the other controls, X_{it}, are constrained to remain invariant.[14] In this way, we isolate the variable of interest and concentrate the analysis on the contingency effects in the IFI-growth relationship. The growth-enhancing - or debasing - effects of IFI will vary with the threshold condition.

4 Empirical results

Equation (3) is estimated for each selected threshold variable and measure of IFI. As we focus on long term growth, a timespan of twenty-four years seems sufficiently large to characterize the long period, taking into account the data availability. Empirical studies dealing with growth regressions have traditionally averaged observations over fixed-length intervals (typically, 3 or 5-years intervals) to eliminate business-cycle fluctuations. However, while averaging clearly induces a loss of information, it is not obvious that ad hoc methods of period averaging effectively remove cyclical effects. In order to save useful information to implement a more flexible model that allows for some parameter heterogeneity, we estimate the PTR with annual data.[15]

The regressions results are shown in Table 1 to Table 6. For each selected threshold variable, we report in columns [1] the estimation results associated with the different measures of IFI.[16] The upper panels in Table 1 to Table 6 show the coefficients and test statistics for the growth determinants, and the inferior panels display the threshold estimates along with their confidence intervals, test statistics and bootstrap pvalues. For robustness checks,[17] we also run regressions where we include the threshold variable among the initial explanatory variables and report the results in columns [2] of Tables 2 to 6. The underlying motivation is that the variable used as threshold may, in fact, also have a effect on growth - besides the

[14] Restricting the coefficients of some variables to be constant has no effect on the asymptotic distribution theory for threshold parameters and regression slopes (Hansen, 1999).

[15] For instance, Khan and Senhadji (2001); Omay and znur Kan (2010); Lopez-Villavicencio and Mignon (2011) use annual data to study the non-linearities in the relationship between growth and inflation. Bereau et al. (2011) assess the non-linear growth effects of currency misalignments.

[16] We did not report the results for the alternative regression model where we controlled directly for government spending and inflation as the estimated coefficients were unstable across different IFI indicators.

[17] Another robustness check consisted in changing the trimming parameters from 10% to 5 or 15%. Only the threshold estimate for institutions, in the regression using the measure of total stocks, was slightly affected. Since we obtained the same estimates for the slope parameters and threshold variable in all the remaining cases, we did not report the results.

threshold effect -, and not controlling explicitly for it may affect the results.[18]

First, consistent with the conditional convergence hypothesis, we find a negative coefficient for the initial income. The other explanatory variables also have the expected signs. As predicted by theory, human capital and investment facilitate growth, whereas population growth has the opposite - although not significant - effect.

Second, in every estimated regressions, we find at most a single threshold in the conditioning variables - i.e. the null hypothesis of a single threshold cannot be rejected at 5% significance level.[19] Interestingly, the results highlight the existence of a composition effect in capital flows: the threshold estimates vary significantly across the four measures of IFI, irrespective of the conditioning variable considered. Like in similar previous studies (e.g. Edwards, 2001; Edison et al., 2002; Kose et al., 2010), the estimated coefficients on IFI tend to be smaller (in absolute terms) than the ones on core growth determinants. As capital accumulation is a major channel through which IFI increases growth, controlling directly for the volume of domestic investment in the regressions should logically result in lowering the estimated impact of IFI. Moreover, the fact that FDI and portfolio liabilities are found to have larger growth-enhancing effects suggests, indirectly, that the channel of influence for FDI effect on growth may also be through transfers of technology and knowledge, and efficiency gains (Borensztein et al., 1998). This also seems to support the hypothesis that capital flows exhibit different properties.

In Table 1, the results for the tests of threshold indicate that the income level influences the relationship between IFI and growth in half the cases. The threshold values obtained endogenously with the PTR modeling approach are 8.2 (i.e. about 3600 US dollars) when we measure IFI as the stock of total liabilities, and 10.2 (26,000 US dollar) when we use FDI plus portfolio equity liabilities. The associated bootstrap p-values are respectively 0.06 and 0.04. By contrast, non-linearity is rejected for total stocks and debt liabilities. The PTR model implies asymmetric responses of output growth to IFI when it takes the form of total liabilities. In the lower regime, where income level is below the estimated threshold, IFI has a negative and significant effect on growth; and in the higher regime, its effect becomes significantly positive. The results obtained with FDI and portfolio equity liabilities are markedly different. While the estimated threshold of income level is much higher than in the

[18] In various studies, threshold values tend to decrease significantly as new explanatory variables are introduces (Omay and znur Kan, 2010)

[19] In Appendix figure A.1, we report how the panel observation are distributed relative to the estimated thresholds

precedent case, the slope coefficient on IFI, measured by FDI plus portfolio equity liabilities, is always positive and significant. However, it decreases when we move from the low to the high regime. From the viewpoint of the receiving economy, this means that external liabilities are all the more beneficial than they are composed of FDI and portfolio equities, although the marginal gains in terms of output growth will decrease as the economy catches up with rich countries.

In Table 2, two specifications are tested for each IFI indicator. In model [1], where trade openness is introduced only as the threshold variable, the results show the existence of two differentiated regimes for all measures of IFI, except for FDI and portfolio liabilities. The threshold estimates indicate a trade openness ratio of 67 to 69% of GDP. Below this threshold value, IFI has a negative impact on growth, although it is significant only for debt liabilities. Once the trade openness ratio rises above the estimated threshold, the coefficient on IFI becomes positive and significant. In model [2], we include trade openness in the set of explanatory variables and observe that, in most cases, this change of specification does not modify the threshold estimates and only marginally alters the slope coefficients in the different regimes. However, the results for the tests of threshold are severely affected as none of the threshold estimates is now found significant. Thus, we do not find evidence that trade integration is a pre-requisite for financial integration.

Evidence from Table 3 strongly points to a sample-split based on the quality of institutions. Interestingly, the institutional quality threshold interacts homogeneously with the stock measures of total assets plus liabilities, total liabilities and debt liabilities. For these three IFI indicators, the results show a positive and significant effect of IFI conditioned by a threshold value of 18.4 in the institutional quality index. This seem to confirm that good institutions are fundamental to provide the right incentives so that external financial resources can generate social value and be earmarked to high-profitability projects. However, when moving to specification [2], the significance of the threshold estimate only holds for the measure of debt liabilities. Finally, worth noticing is the differentiated behavior of FDI and portfolio equity liabilities compared to the others IFI indicators. Indeed, FDI & portfolio investments brings higher growth-benefits to more institutionally challenged countries, and overall, their positive effects are larger than for the other types of capital flows.

In Table 4, we test the relevance of financial development as a threshold in the IFI-growth relationship. Threshold estimates are found significant in regressions using the stock of total assets and liabilities, and the stock of FDI plus portfolio equity liabilities; these values equal

45.7% and 47.2%, respectively, and remain invariant when private credit enters the set of controls. The results also suggest that, while IFI is positively related to growth, an increase in IFI leads to higher additional output growth in financially under-developed economies relative to financially developed ones. Thus, contrary to some theories and past empirical studies, we do not find evidence that a well-functioning financial system is crucial in the IFI-growth nexus. The 2007-2009 financial turmoil shows that the level of financial depth seems more immaterial than complementary to the financial globalization process.

Finally, we find that sound macroeconomic policies also play a role in conditioning the direct benefits of IFI. However, maintaining a low inflation appears more important than containing government spending. In Table 5, practically all the tests of threshold conclude in favor of a non-linear relationship between IFI and growth, although the confidence intervals are sometimes too large for policy relevance. This time, FDI and portfolio equity liabilities exhibit the same asymmetric dynamics as the other IFI measures; in low inflation regime, IFI has a positive growth effect, whereas in high inflation regime, this effect becomes negative - although not significant in most cases. By contrast, non-linearity is strongly rejected when the level of government spending is used as a threshold variable (Table 6).

5 Concluding Remarks

Relying on non-linear panel techniques, we estimate the relationship between IFI and economic growth and provide new evidence that financial integration could facilitate economic growth in countries satisfying certain threshold conditions, regarding institutional quality, private credit, inflation, and to a lesser extent trade openness. Moreover, we were able to determine these threshold levels endogenously by taking advantage of the PTR modeling approach and test the validity of the non-linear structure of the IFI-growth relationship. Previous studies do not permit to establish such conclusions. In sum, the PTR methodology offers a strategy to deal with the cross-country heterogeneity regarding their experience with capital flows and allows to isolate the particular conditions under which IFI is statistically related to economic growth. However, one limit we see in the PTR approach is that it does not permit to investigate how one threshold condition can substitute to another. So far, we do not have knowledge of studies examining this question. Finally, our results also point to the existence of a composition effect in capital flows: (i) threshold values vary across different measures of IFI; (ii) debt inflows induce an asymmetric response of output growth

compared to FDI inflows which impact remains positive but decreases from low regimes to high regimes.

Since the beneficial effects of financial integration for a country depend on the prior development of third economic and social characteristics, a haste financial liberalization without considering these pre-requisites will bring more harms than benefits. On the other hand, delaying financial openness until the country meets these conditions could lead it to miss some opportunities to develop. An oriented, selective and progressive capital account opening, with priority given to help the country satisfy the aforementioned economic and social conditions, would help it to find the path to growth. However, as highlighted by many authors, the conditions for IFI to be successful are fundamentally the same as the ones needed to promote growth in general.

Table 1: Threshold regression using initial income

Variable	**Total stocks**	**Total liabilities**	**FDI + PF equity**	**Debt liabilities**
Initial Income	-0.057	-0.054	-0.057	-0.052
	(-5.551)	(-5.620)	(-5.966)	(-5.448)
Schooling	0.054	0.052	0.037	0.051
	(5.207)	(5.071)	(3.626)	(4.956)
Investment rate	0.227	0.236	0.232	0.224
	(5.34)	(5.391)	(5.448)	(5.127)
Population growth	-0.070	-0.082	-0.078	-0.081
	(-0.603)	(-0.695)	(-0.662)	(-0.685)
IFI slope parameters				
Low regime (INCOME$\leq \gamma$)	-0.002	-0.002	0.048	-0.002
	(-1.875)	(-2.456)	(6.155)	(-2.307)
High regime (INCOME$> \gamma$)	0.004	0.008	0.020	0.011
	(3.562)	(4.013)	(5.055)	(3.399)
Threshold estimate	9.213	8.176	10.197	9.213
95% confidence interval	[7.715, 10.122]	[7.802, 9.789]	[10.094, 10.382]	[7.802, 10.352]
Test of Threshold	14.104	18.558	17.687	11.338
Boostrap p-values	0.117	0.058*	0.042**	0.230
Number of countries	80	80	80	80
Number of observations	1760	1760	1760	1760

Notes: t-statistic derived using robust standard errors are in parentheses. P-values are bootstrapped with 1000 replications and 10% trimming percentage; significance at 10%, 5% and 1% are denoted by *, **, and ***, respectively.

Table 2: Threshold regression using trade openness

Variable	**Total stocks**		**Total liabilities**		**FDI + PF equity**		**Debt liabilities**	
	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
Initial Income	-0.051	-0.056	-0.051	-0.057	-0.059	-0.064	-0.047	-0.054
	(-5.328)	(-6.118)	(-5.567)	(-6.283)	(-6.148)	(-6.874)	(-5.354)	(-6.324)
Schooling	0.051	0.033	0.049	0.033	0.043	0.025	0.049	0.031
	(4.989)	(3.051)	(4.844)	(2.992)	(4.279)	(2.383)	(4.812)	(2.933)
Investment rate	0.230	0.214	0.231	0.214	0.229	0.212	0.226	0.214
	(5.321)	(6.123)	(5.281)	(6.113)	(5.382)	(6.234)	(5.112)	(6.11)
Population growth	-0.070	-0.073	-0.080	-0.077	-0.079	-0.075	-0.080	-0.077
	(-0.6)	(-0.604)	(-0.677)	(-0.64)	(-0.674)	(-0.625)	(-0.675)	(-0.639)
Openness		0.050		0.049		0.051		0.058
		(4.099)		(3.865)		(4.179)		(5.051)
IFI slope parameters								
Low regime (OPEN$\leq \gamma$)	-0.001	-0.001	-0.001	-0.001	0.036	0.032	-0.002	0.006
	(-1.997)	(-1.547)	(-1.665)	(-1.388)	(5.730)	(5.096)	(-2.149)	(1.502)
High regime (OPEN$> \gamma$)	0.004	0.002	0.007	0.003	0.018	0.008	0.009	-0.001
	(3.464)	(1.900)	(4.221)	(1.991)	(4.065)	(2.015)	(3.190)	(-1.720)
Threshold estimate	0.688	0.688	0.672	0.672	1.154	1.154	0.688	0.405
95% confidence interval	[0.486,	[0.309,	[0.629,	[0.309,	[0.217,	[0.771,	[0.651,	[0.309,
	0.743]	1.154]	0.740]	1.154]	1.439]	1.154]	0.747]	1.154]
Test of Threshold	16.041	4.516	20.655	4.950	7.538	12.308	15.710	3.214
Bootstrap p-values	0.064*	0.618	0.047**	0.564	0.418	0.139	0.071*	0.834
Number of countries	80	80	80	80	80	80	80	80
Number of observations	1760	1760	1760	1760	1760	1760	1760	1760

Notes: t-statistic derived using robust standard errors are in parentheses. P-values are bootstrapped with 1000 replications and 10% trimming percentage; significance at 10%, 5% and 1% are denoted by *, **, and ***, respectively..

Table 3: Threshold regression using institutional quality

Variable	**Total stocks**		**Total liabilities**		**FDI + PF equity**		**Debt liabilities**	
	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
Initial Income	-0.057	-0.062	-0.055	-0.060	-0.058	-0.068	-0.048	-0.055
	(-5.933)	(-6.394)	(-5.776)	(-6.328)	(-6.103)	(-6.932)	(-5.434)	(-6.242)
Schooling	0.048	0.043	0.046	0.042	0.034	0.024	0.047	0.042
	(4.670)	(4.145)	(4.628)	(4.115)	(3.350)	(2.317)	(4.670)	(4.089)
Investment rate	0.226	0.208	0.222	0.205	0.240	0.212	0.220	0.201
	(4.783)	(4.064)	(5.018)	(4.137)	(5.725)	(4.378)	(4.907)	(4.004)
Population growth	-0.067	-0.072	-0.082	-0.082	-0.078	-0.078	-0.082	-0.082
	(-0.594)	(-0.622)	(-0.699)	(-0.698)	(-0.665)	(-0.658)	(-0.699)	(-0.694)
Institutions		0.001		0.001		0.002		0.001
		(3.218)		(2.506)		(4.045)		(2.844)
IFI slope parameters								
Low regime (INSTI$\leq \gamma$)	-0.002	-0.001	-0.002	-0.001	0.053	0.053	-0.002	-0.001
	(-1.024)	(-0.365)	(-1.609)	(-0.908)	(7.346)	(7.476)	(-1.751)	(-1.358)
High regime (INSTI$> \gamma$)	0.005	0.004	0.009	0.006	0.019	0.015	0.010	0.006
	(4.452)	(3.301)	(4.584)	(3.020)	(5.189)	(3.891)	(3.483)	(1.903)
Threshold estimate	18.417	18.417	18.417	18.417	33.875	33.833	18.417	18.417
95% confidence interval	[18.083,	[13.500,	[17.958,	[17.458,	[33.167,	[33.167,	[17.583,	[13.500,
	20.917]	36.375]	20.000]	20.917]	34.500]	34.500]	20.000]	34.917]
Test of Threshold	28.176	9.754	34.884	13.865	33.094	44.059	25.152	7.607
Bootstrap p-value	0.006***	0.168	0.001***	0.086*	0.001***	0.000***	0.018**	0.312
Number of countries	80	80	80	80	80	80	80	80
Number of observations	1760	1760	1760	1760	1760	1760	1760	1760

Notes: t-statistic derived using robust standard errors are in parentheses. P-values are bootstrapped with 1000 replications and 10% trimming percentage; significance at 10%, 5% and 1% are denoted by *, **, and ***, respectively.

Table 4: Threshold regression using private credit

Variable	**Total stocks**		**Total liabilities**		**FDI + PF equity**		**Debt liabilities**	
	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
Initial Income	-0.051	-0.047	-0.047	-0.048	-0.061	-0.055	-0.041	-0.036
	(-4.682)	(-4.073)	(-4.572)	(-4.283)	(-5.887)	(-4.983)	(-4.131)	(-3.389)
Schooling	0.044	0.045	0.046	0.052	0.032	0.032	0.047	0.047
	(4.153)	(4.165)	(4.221)	(4.706)	(2.849)	(2.923)	(4.317)	(4.296)
Investment rate	0.241	0.242	0.235	0.230	0.221	0.223	0.228	0.230
	(5.246)	(5.273)	(5.060)	(4.905)	(4.931)	(4.959)	(4.795)	(4.823)
Population growth	-0.014	-0.020	-0.066	-0.068	-0.060	-0.060	-0.066	-0.067
	(-0.131)	(-0.184)	(-0.548)	(-0.582)	(-0.486)	(-0.499)	(-0.544)	(-0.565)
Private Credit		-0.015		-0.027		-0.014		-0.015
		(-2.240)		(-3.618)		(-1.858)		(-1.933)
IFI slope parameters								
Low regime (PRIVY$\leq \gamma$)	0.013	0.012	0.014	-0.0001	0.078	0.073	0.009	0.009
	(3.818)	(3.488)	(3.911)	(-0.055)	(5.511)	(5.060)	(2.693)	(2.674)
High regime (PRIVY$> \gamma$)	0.003	0.003	0.003	0.009	0.018	0.020	-0.002	0.001
	(2.462)	(2.943)	(1.782)	(4.454)	(4.304)	(4.600)	(-0.740)	(0.222)
Threshold estimate	0.457	0.457	0.459	0.204	0.472	0.472	0.472	0.472
95% confidence interval	[0.380, 0.472]	[0.365, 0.767]	[0.380, 1.086]	[0.117, 1.147]	[0.444, 0.489]	[0.431, 0.489]	[0.300, 0.535]	[0.117, 1.147]
Test of Threshold	25.249	15.724	12.412	6.209	33.404	24.685	9.418	4.017
Bootstrap p-value	0.019**	0.064*	0.122	0.463	0.002***	0.009***	0.219	0.707
Number of countries	75	75	75	75	75	75	75	75
Number of observations	1650	1650	1650	1650	1650	1650	1650	1650

Notes: t-statistic derived using robust standard errors are in parentheses. P-values are bootstrapped with 1000 replications and 10% trimming percentage; significance at 10%, 5% and 1% are denoted by *, **, and ***, respectively.

Table 5: Threshold regression using inflation

Variable	**Total stocks**		**Total liabilities**		**FDI + PF equity**		**Debt liabilities**	
	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
Initial Income	-0.057	-0.053	-0.056	-0.051	-0.058	-0.054	-0.050	-0.045
	(-5.878)	(-5.497)	(-5.928)	(-5.528)	(-6.082)	(-5.799)	(-5.592)	(-5.197)
Schooling	0.047	0.034	0.044	0.033	0.043	0.030	0.046	0.034
	(4.611)	(3.489)	(4.45)	(3.352)	(4.291)	(3.13)	(4.601)	(3.461)
Investment rate	0.219	0.207	0.216	0.206	0.220	0.204	0.216	0.205
	(5.119)	(4.74)	(4.894)	(4.599)	(5.121)	(4.647)	(4.825)	(4.534)
Population growth	-0.068	-0.072	-0.084	-0.086	-0.082	-0.083	-0.085	-0.086
	(-0.593)	(-0.628)	(-0.717)	(-0.737)	(-0.704)	(-0.712)	(-0.722)	(-0.739)
Inflation		-0.021		-0.021		-0.020		-0.021
		(-4.033)		(-4.090)		(-4.123)		(-4.158)
IFI slope parameters								
Low regime (INFL$\leq \gamma$)	0.005	0.004	0.010	0.008	0.022	0.020	0.012	0.009
	(4.166)	(3.863)	(5.001)	(4.441)	(4.994)	(4.738)	(4.089)	(3.304)
High regime (INFL$> \gamma$)	-0.004	-0.001	-0.003	0.0004	-0.092	-0.051	-0.002	0.0004
	(-1.854)	(-0.58)	(-1.957)	(0.335)	(-3.247)	(-1.648)	(-1.893)	(0.458)
Threshold estimate	0.093	0.093	0.129	0.129	0.202	0.202	0.129	0.129
95% confidence interval	[0.088, 0.129]	[0.087, 0.129]	[0.096, 0.225]	[0.090, 0.225]	[0.198, 0.225]	[0.008, 0.231]	[0.096, 0.225]	[0.034, 0.225]
Test of Threshold	39.435	15.363	44.038	15.918	23.505	8.754	34.200	11.331
Boostrap p-values	0.000***	0.041**	0.000***	0.033**	0.004***	0.198	0.001***	0.090*
Number of countries	80	80	80	80	80	80	80	80
Number of observations	1760	1760	1760	1760	1760	1760	1760	1760

Notes: t-statistic derived using robust standard errors are in parentheses. P-values are bootstrapped with 1000 replications and 10% trimming percentage; significance at 10%, 5% and 1% are denoted by *, **, and ***, respectively.

Table 6: Threshold regression using government spending

Variable	**Total stocks**		**Total liabilities**		**FDI + PF equity**		**Debt liabilities**	
	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
Initial Income	-0.051	-0.048	-0.051	-0.050	-0.060	-0.059	-0.047	-0.045
	(-5.438)	(-4.774)	(-5.506)	(-4.831)	(-6.257)	(-5.581)	(-5.317)	(-4.9)
Schooling	0.049	0.048	0.050	0.048	0.048	0.045	0.050	0.049
	(4.767)	(3.872)	(4.933)	(3.886)	(4.766)	(3.779)	(4.895)	(3.892)
Investment rate	0.237	0.244	0.231	0.231	0.239	0.238	0.229	0.233
	(5.256)	(5.189)	(5.288)	(5.082)	(5.684)	(5.337)	(5.183)	(4.971)
Population growth	-0.100	-0.092	-0.083	-0.089	-0.081	-0.089	-0.083	-0.092
	(-0.818)	(-0.723)	(-0.704)	(-0.71)	(-0.688)	(-0.71)	(-0.696)	(-0.723)
Government exp.		-0.066		-0.036		-0.050		-0.056
		(-0.661)		(-0.333)		(-0.502)		(-0.545)
IFI slope parameters								
Low regime (GOV$\leq \gamma$)	0.007	0.006	0.006	0.006	0.045	0.044	0.007	0.009
	(4.219)	(3.765)	(3.717)	(2.663)	(5.497)	(5.014)	(2.764)	(2.53)
High regime (GOV$> \gamma$)	0.001	0.001	-0.001	-0.001	0.019	0.018	-0.002	-0.002
	(1.033)	(1.149)	(-1.501)	(-1.047)	(4.859)	(4.153)	(-2.284)	(-1.804)
Threshold estimate	0.103	0.103	0.196	0.196	0.101	0.101	0.193	0.116
95% confidence interval	[0.098, 0.249]	[0.094, 0.287]	[0.096, 0.287]	[0.095, 0.287]	[0.094, 0.266]	[0.094, 0.269]	[0.096, 0.287]	[0.095, 0.287]
Test of Threshold	12.042	10.083	16.156	12.139	11.246	11.084	13.299	10.258
Boostrap p-values	0.114	0.142	0.046**	0.117	0.161	0.180	0.077*	0.135
Number of countries	80	80	80	80	80	80	80	80
Number of observations	1760	1760	1760	1760	1760	1760	1760	1760

Notes: t-statistic derived using robust standard errors are in parentheses. P-values are bootstrapped with 1000 replications and 10% trimming percentage; significance at 10%, 5% and 1% are denoted by *, **, and ***, respectively.

A Data appendix

Table A.1: Country sample

Industrial (23)		Emerging (20)		Other developing economies (37)	
Australia	AUS	Argentina	ARG	Bangladesh	BGD
Austria	AUT	Brazil	BRA	Bolivia	BOL
Canada	CAN	Chile	CHL	Botswana	BWA
Switzerland	CHE	China	CHN	Cameroon	CMR
Germany	DEU	Cte d'Ivoire	CIV	Congo	COG
Denmark	DNK	Colombia	COL	Costa Rica	CRI
Spain	ESP	Ecuador	ECU	Dominican Republic	DOM
Finland	FIN	Greece	GRC	Egypt	EGY
France	FRA	Korea	KOR	Ghana	GHA
United Kingdom	GBR	Morocco	MAR	Guatemala	GTM
Ireland	IRL	Mexico	MEX	Honduras	HND
Iceland	ISL	Malaysia	MYS	Haiti	HTI
Israel	ISR	Panama	PAN	Indonesia	IDN
Italy	ITA	Peru	PER	India	IND
Japan	JPN	Philippines	PHL	Jamaica	JAM
Malta	MLT	Poland	POL	Jordan	JOR
Netherlands	NLD	Thailand	THA	Kenya	KEN
Norway	NOR	Turkey	TUR	Kuwait	KWT
New Zealand	NZL	Venezuela	VEN	Sri Lanka	LKA
Portugal	PRT	South Africa	ZAF	Mali	MLI
Singapore	SGP			Mozambique	MOZ
Sweden	SWE			Niger	NER
United States	USA			Nicaragua	NIC
				Pakistan	PAK
				Papua New Guinea	PNG
				Paraguay	PRY
				Saudi Arabia	SAU
				Sudan	SDN
				Senegal	SEN
				El Salvador	SLV
				Syria	SYR
				Trinidad and Tobago	TTO
				Tunisia	TUN
				Togo	TGO
				Tanzania	TZA
				Uganda	UGA
				Uruguay	URY

Notes: The sample consists of 80 countries. We restricted the emerging group to economies included in JP Morgan EMBI Global Index. The motivation is that developing countries considered in the EMBI Global Portfolio are financially more developed and integrated with international markets than the other developing countries (see Cavanagh and Long, 1999).

Table A.2: Variables descriptions and sources

Variable	Definition	Source
Growth	Growth rate of PPP real GDP per capita (calculated in logarithmic terms)	Penn World Table Version 6.3
Initial Income	Logarithm of real per capita GDP lagged one period	PWT
Human capital	Logarithm of average years of secondary in the population over age 15, lagged one period	Barro and Lee (2010)
Investment rate	Investment to GDP ratio	PWT
Population growth	Annual growth rate of population calculated in logarithmic terms	World Development Indicators (WDI)
Government expenditure	Government spending as a share of GDP	PWT
Inflation	Logarithmic first difference of Consumer Price Index	International Financial Statistics (IFS)
Trade openness	Sum of exports and imports to GDP	PWT
Institutions	Composite index of the five political risk components: corruption, law & order, quality of the bureaucracy, democratic accountability, socioeconomic conditions.	International Country Risk Guide
Private credit	Domestic credit to private sector to GDP	WDI
Total stocks	Total stocks of external assets and liabilities, divided by GDP	Lane and Milesi-Ferretti (2007)
Total liabilities	Stock of external liabilities, divided by GDP	idem
FDI and portfolio liabilities	Stock of external FDI and portfolio equity liabilities, divided by GDP	idem
Debt liabilities	Stock of external debt liabilities, divided by GDP	idem

Table A.3: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	Number
Total stocks					
Whole sample	1.763	1.439	0.403	8.718	80
Industrial countries	2.869	1.984	1.076	8.718	23
Emerging countries	1.265	0.936	0.555	4.947	20
Other developing countries	1.345	0.757	0.403	4.11	37
Total liabilities					
Whole sample	1.085	0.752	0.265	4.507	80
Industrial countries	1.482	0.91	0.429	4.507	23
Emerging countries	0.855	0.566	0.265	2.923	20
Other developing countries	0.964	0.648	0.301	3.765	37
FDI+PF equity					
Whole sample	0.305	0.299	0.008	1.986	80
Industrial countries	0.506	0.446	0.106	1.986	23
Emerging countries	0.25	0.145	0.088	0.557	20
Other developing countries	0.209	0.164	0.008	0.803	37
Debt liabilities					
Whole sample	0.776	0.566	0.125	3.528	80
Industrial countries	0.962	0.523	0.322	2.51	23
Emerging countries	0.604	0.489	0.125	2.391	20
Other developing countries	0.754	0.608	0.142	3.528	37

Table A.4: Cross-correlation matrix[a]

Variables	Growth	Initial income	Human capital	Invest -ment	Pop. growth	Total stocks	Total liab.	FDI+PF equity	Debt liab.	Open -ness	Institu -tions	Private credit	Infla -tion	Gov. spending
Growth	1													
Initial Income	0.134*	1												
Schooling	0.121*	0.763*	1											
Investment	0.243*	0.655*	0.565*	1										
Pop. Growth	−0.223*	−0.294*	−0.244*	−0.311*	1									
Total Stocks	0.001	0.313*	0.204*	0.225*	−0.089*	1								
Total liab.	−0.050**	0.117*	0.0787*	0.121*	−0.012	0.917*	1							
FDI+PF liab	0.103*	0.336*	0.293*	0.276*	−0.089*	0.796*	0.669*	1						
Debt liab	−0.109*	−0.009	−0.037	0.025	0.027	0.780*	0.941*	0.381*	1					
Openness	0.108*	0.232*	0.199*	0.324*	−0.055**	0.442*	0.326*	0.518*	0.174*	1				
Institutions	0.179*	0.773*	0.618*	0.576*	−0.229*	0.298*	0.148*	0.357*	0.019	0.192*	1			
Private credit	0.060*	0.597*	0.479*	0.483*	−0.256*	0.332*	0.235*	0.274*	0.165*	0.059*	0.581*	1		
Inflation	−0.220*	−0.132	−0.093*	−0.109*	0.045*	0.031	0.161*	−0.142*	0.265*	−0.167*	−0.232*	−0.082*	1	
Government spending	−0.118*	−0.277*	−0.225*	−0.254*	0.049**	−0.052**	0.013	−0.194	0.104*	−0.075*	−0.221*	−0.152*	0.159*	1

[a] Significant coefficients, at 5% significant level, are denoted by a *.

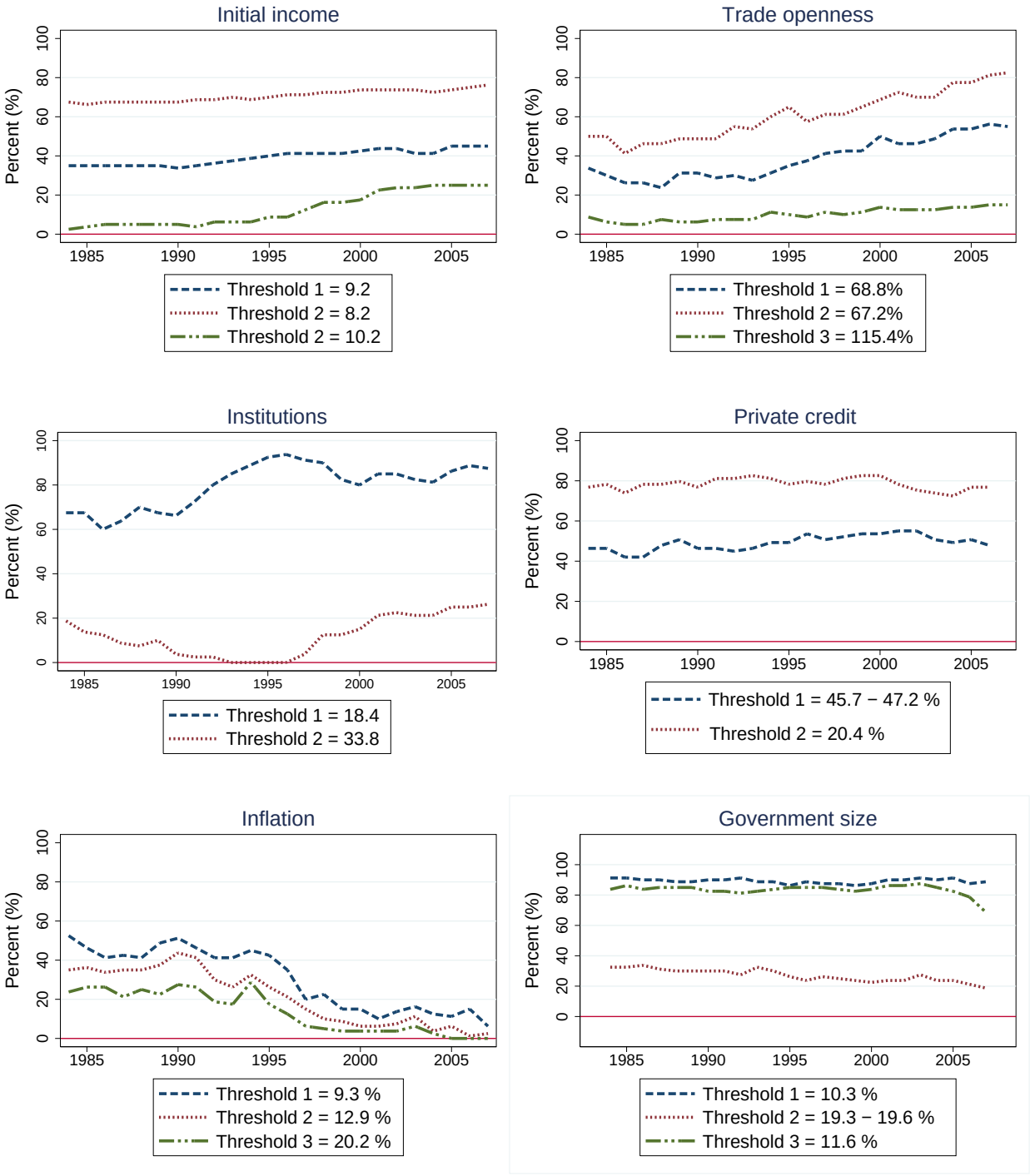


Figure A.1: Percentage of observations above threshold by year

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