Financial Integration, Productivity and Capital Accumulation*

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Abstract

Understanding the mechanism through which financial globalization affects economic performance is crucial for evaluating the costs and benefits of opening financial markets. This paper is a first attempt at disentangling the effects of financial integration on the two main determinants of economic performance: productivity (TFP) and investment. I provide empirical evidence from a sample of 70 countries observed between 1975 and 1999. The results for both *de jure* and *de facto* indicators suggest that financial integration has a positive direct effect on productivity, while it does not directly affect capital accumulation. I also control for indirect effects of financial globalization through financial development and banking and currency crises. While financial integration does not systematically increase domestic financial depth, it may raise the likelyhood of banking crises, though only to a minor extent. Yet, the overall effect of financial liberalization remains positive for productivity and negligible for investment.

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1 Introduction

Academic economists and practitioners have long debated over the effects of financial globalization on growth.[1] The removal of restrictions on international capital transactions has on some occasions been welcome as a growth opportunity and in others blamed for triggering financial instability and crises. Yet, little has been done to address empirically the mechanism through which financial liberalization affects growth. How do the main sources of growth - total factor productivity (TFP) and capital accumulation - react to financial globalization? This issue is of particular relevance for at least two reasons. First, understanding how TFP and investments are affected by financial liberalization would allow us to identify which models are more appropriate to analyze and predict the economic effects of financial globalization. Second, answering the question above would greatly help understand the welfare effects of financial integration. Gourinchas and Jeanne (2006) show that, whether capital or TFP react to financial openness, matters significantly for the size of welfare gains (or losses).[2] Only recently, a few studies have started addressing this important issue. Among them, this paper is a first attempt at disentangling the effects of financial globalization on aggregate productivity and capital accumulation.

The theoretical literature proposes various mechanisms through which financial globalization may affect economic growth, with different implications for investments and productivity. In the neo-classical framework, all effects are generated through capital flows. In the standard model, opening international capital markets generates flows from capital-abundant towards capital-scarce countries, thereby accelerating convergence (hence short term growth) in the poor countries. In a more sophisticated context, also productivity may increase since capital inflows relieve the economy from credit constraints and thus allow agents to undertake more productive investments (as in Acemoglu and Zilibotti, 1997). An alternative view (see Saint-Paul, 1992 and Obstfeld, 1994) suggests that international capital mobility may affect productivity independently of investments, by promoting international risk diversification, wich induces more domestic risk taking in innovation activities, thereby fostering growth. To understand which theory is more appropriate to address the effects of financial globalization on growth, I separately regress investments and productivity on a series of indicators of international financial liberalization, and study whether TFP and capital react differently across developed and developing

[1] Here financial globalization is meant to be the absence of restrictions to international financial transactions. Henceforth, I will equivalently refer to it as (international) financial liberalization, financial integration, or financial openness.

[2] Their quantitative exercise points out that the benefits from an acceleration in capital accumulation along the convergence to the steady state, are way smaller (up to a fiftieth) than the gains from an improvement in productivity, hence in the steady state to which the economy converges.

countries.

I also investigate two indirect channels linking financial integration to capital accumulation and TFP. First, as pointed out by Rodrik (1998) and Stiglitz (2000) among others, financial liberalization may trigger financial instability, that is detrimental for both investments in physical capital and productivity.[3] I account for the effects of financial instability by controlling all regressions for indicators of banking and currency crises. In this way, any indirect effect of liberalization through crises is removed from the estimates for financial liberalization. I also estimate the joint effect of crises and liberalization and I explicitly address the link between financial liberalization and the likelihood of financial crises.

As another indirect effect, financial globalization may foster financial development (see Klein and Olivei, 1999), i.e. the availability of external finance to the private sector, which Beck et al. (2000) show to spur productivity more than investments. To disentangle this channel, I first control for a measure of financial depth in the regressions for TFP and capital. Next, I separately address the link between financial integration and financial depth.

The main results are robust to using two *de jure* and one *de facto* measures of financial integration and to adopting various econometric methodologies. They suggest the following: (1) International financial liberalization has a positive direct effect on TFP, especially in developed countries. (2) The direct effect on capital accumulation is insignificant. (3) Banking and currency crises generally harm both capital accumulation and productivity. However, (4) financial liberalization raises only the probability that developed countries experience minor banking crises and has virtually no effect on the likelihood of currency crises. (5) There is weak support for the hypothesis that financial integration affects productivity and investment by promoting financial depth.

The first two results appear difficult to reconcile within the neo-classical framework. Models predicting a rise in productivity due to efficient reallocation of capital within countries, with possibly no effect on overall capital accumulation, seem more suited to rationalize this evidence. After presenting the empirical analysis, I discuss more in depth the theories that may explain these results and provide supporting evidence for the proposed mechanisms.

This paper is mainly related to four strands of literature. The studies on growth and development accounting have shown that a large share of cross-country differences in economic performance and growth is driven by total factor productivity (TFP) rather than factor accumulation (physical and human capital).[4] Hence, financial globalization seems

[3] See Aizenman (2001) for a survey on the evidence on financial liberalization and crises.

[4] See Caselli (2005) for a survey on the develpment accounting literature, and Easterly and Levine (2001)

more likely to impact long-run growth if it affects TFP, rather than factor accumulation. This is indeed the main empirical result of the paper.

The theoretical literature on finance and growth argues that financial development spurs GDP growth not only by raising the funds available for accumulation, but also by fostering productivity growth.[5] King and Levine (1993), and more in detail Beck et al. (2000) show empirical evidence of a strong effect of financial development on TFP growth, and only a tenuous one on physical capital accumulation. In the same spirit, this paper analyzes separately the effects of financial integration on TFP and investments. Moreover, it partially encompasses the exercise in Beck et al. (2000) by assessesing whether financial depth works as an indirect channel through which globalization affects productivity and capital accumulation.

A wide empirical literature addresses the effects of financial globalization on economic growth and volatility with various datasets and methodologies.[6] Some studies (for instance, Grilli and Milesi-Ferretti, 1995, Kraay, 2000 and Rodrik, 1998) find that financial liberalization does not affect growth, others that the effect is positive (Quinn, 1997, Levine, 2001 and Bekaert et al., 2005 among others), yet others that it is negative (Eichengreen and Leblang, 2003).[7] Perhaps surprisingly, little evidence exists on the effects of financial globalization on the main sources of growth: productivity and capital accumulation.[8] Two recent works are particularly related to this paper. Levchenko et al. (2008) study the effect of *de jure* and *de facto* capital account liberalization on investments, productivity and growth focusing on industry-level data. Henry and Sasson (2008) address the reaction of sectoral real wages, investment and labor productivity to *de jure* equity market liberalization in developing countries. In the final section, I discuss the results of these works and relate them to the evidence in this paper.

The link between financial globalization, crises and growth has been widely debated during the last twenty years. A series of empirical contributions (see Kaminsky and Reinhart, 1999 and Glick and Hutchison, 2000) provide evidence that the occurrence of currency and banking crises is associated to the absence of capital account restrictions.

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for the stylized facts on development and growth accounting.

[5] Acemoglu, Aghion and Zilibotti (2005) and Acemoglu and Zilibotti (1997) among others show that financial development may relieve risky innovators from credit constraints, thereby fostering growth through technological change.

[6] See Kose et al. (2006) and Henry (2007) for extensive surveys of this literature.

[7] These effects are also shown to be heterogeneous across countries at different stages of institutional and economic development (see Bekaert et al., 2005 and Edwards, 2001), with different macroeconomic frameworks (Arteta Eichengreen and Wyplosz, 2001), and adopting a different sequence of other financial reforms (see Kaminsky and Schmukler, 2003 and Bekaert et al., 2005).

[8] As a first step in this direction, Chari and Henry (2002) find significant effects of equity market liberalization on investment and the Tobin's Q of listed firms, and conclude that these must be driven by changes in productivity, which they do not explore directly.

Works by Bordo et al. (2001), Leblang (2003) and Glick, Guo and Hutchison (2006) however find financial liberalization to be negatively correlated with the onset of currency crises. The present paper does not aim at studying in depth the determinants of financial crises. Rather, I perform probit estimations for the occurrence of banking and currency crises in order to evaluate the overall effect of financial integration on productivity and capital accumulation.

The remainder of the paper is organized as follows. Section 2 briefly introduces the empirical strategy, and describes the dataset and the variables used in the analysis. Section 3 presents the econometric methodologies and reports the estimation results for TFP and capital. Section 4 investigates further the indirect effects of financial integration through financial crises and financial development. Section 5 discusses the results of section 3, relates them to the evidence in other studies, and provides a theoretical explanation to reconcile them. Section 6 concludes.

2 Empirical strategy and the data

The previous studies on the impact of financial liberalization on growth have estimated various versions of the equation:

$$dy_{it} = b_0 + b_1 y_{it-1} + b_2' \mathbf{Z}_{it} + b_3 IFL_{it} + e_{it}, \tag{1}$$

where $dy_{it} \equiv d\log(Y_{it})$ is the growth rate of GDP in country i, y_{it-1} is the logarithm of lagged GDP, $\mathbf{Z}_{it}$ is a vector of control variables, IFL_{it} is an indicator of financial liberalization, and e_{it} is the error term.

The literature on growth and development accounting has shown total factor productivity (A) and capital (K) accumulation to be the main determinants of cross-country differentials in GDP growth rates. This paper, instead of considering Y, focuses on its main components and proposes estimates of the following equation:

$$P_{it} = \beta_0 + \boldsymbol{\beta}_1' \mathbf{X}_{it} + \gamma IFL_{it} + u_{it},$$

where P_{it} represents in turn A, K or their growth rates in country i at time t, $\mathbf{X}$ is a vector of control variables, IFL the indicator of financial integration, and u the error term.

I perform the analysis on an unbalanced panel dataset with annual observations for at most 70 countries, spanning from 1975 to 1999. Depending on the econometric methodology in use, I consider in turn a cross-section of 69 countries with data averaged over the sample period, and a panel comprising up to 70 countries with non-overlapping five-year observations over the same period. The following subsections describe the main variables

included in the regressions: TFP, the stock of physical capital, three measures of financial integration, indicators of financial crises and other control variables.

2.1 Capital accumulation

I retrieve the series of the physical capital stocks, K, applying the perpetual inventory method as in Hall and Jones (1999) on data from the Penn World Tables 6.1. I estimate the initial stock of capital, K_{t_0} as $\frac{I_{t_0}}{g+\delta}$, where I is investment, g is the average geometric growth rate of total investment between t_0 and $t_0+ 10$.[9] In the paper t_0 is 1960, since I have data on investment dating back to that year for most countries.[10] A depreciation rate δ of 6 per cent is assumed. The following values of the capital stock are computed as $K_t = (1- \delta)K_{t-1}+ I_t$.

2.2 Productivity

I construct the series of total factor productivity following Hall and Jones (1999). I assume the production function in country i to be

$$Y_i = K_i^{\alpha} \left(A_i H_i L_i\right)^{1-\alpha},$$

where Y_i is the output produced in country i, K_i is the stock of physical capital in use, A_i is labor-augmenting productivity, L_i is labor and H_i is a measure of the average human capital of workers ($H_i L_i$ is therefore human capital-augmented labor).[11] The factor share α is assumed constant across countries and equal to 1/3, which matches national account data for developed countries. I adopt the following specification for labor-augmenting human capital as a function of the years of schooling, s_i:

$$H_i = e^{\phi(s_i)}.$$

I rely on the results of Psacharopulos' (1994) survey and specify $\phi\left(s_i\right)$ as a piecewise linear function with coefficients 0.134 for the first four years of education, 0.101 for the next four years, and 0.068 for any value of $s_i > 8$.

Equipped with data on capital, output per worker, population and schooling (from

[9] Investment is defined as I = ki*rgdpch*pop from the PWT 6.1.

[10] In the countries which have no data for 1960 t_0 is the first year followed by at least 15 observations.

[11] Labor is computed as rgdpch* pop/ rgdpwok from the PWT 6.1. Note also that in Hall and Jones (1999) Y_i is rgdpch*pop from the PWT, net of the value-added of the mining industry. Following Caselli (2005), I simplify and take rgdpch*pop.

Barro and Lee, 2001), I can compute the series of total factor productivity as

$$A_i = \frac{Y_i}{H_i L_i} \left(\frac{K_i}{Y_i} \right)^{-\frac{\alpha}{1-\alpha}}.$$

2.3 Financial integration

I use three different measures of financial integration. First, I use a *de jure* dummy indicator of capital account liberalization, *IMF*, that takes value 0 if a country has held restrictions on capital account transactions by the residents during the year, and 1 otherwise. The existence of restrictions is classified on a 0-1 basis by the IMF in its Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER), which is available for a maximum of 212 countries over the period 1967- 1996.[12] The major limit of this indicator is that it does not capture the extent to which countries take advantage of liberalization by trading capital internationally. Despite this and the other limits summarized in Edison et al. (2002), *IMF* is the most commonly used indicator of international financial liberalization.

Second, I use the *de jure* index of capital account liberalization compiled by Quinn, that is available for a small number of developed countries (18 in my sample) on a yearly basis, while it covers 142 countries (60 in my sample) with observations for 1958, 1973, 1982, 1988, and 1997. This indicator (*Quinn*), taking values between 0 (total restriction) and 100 (perfect capital account liberalization), is based on the information provided in the AREAER about restrictions on residents and non-residents, and takes into account the severity of restrictions across all categories of financial transactions.

Third, to estimate the effects of the actual participation of a country in international capital markets (*de facto* financial integration), I take as an indicator its gross external position as a ratio of GDP. This variable, *IFIGDP*= (Total Foreign Assets + Foreign Total Liabilities)/GDP, was built by Lane and Milesi-Ferretti (2007) using assets and liabilities data on FDI, equity portfolios, debt, derivatives and official reserves adjusted for valuation, and is available for 145 countries over the period 1970-2004 (67 countries between 1975 and 1999 in my sample). Note however that the debt component of this indicator includes sovereign debt (assets and liabilities), and countries' debts with official creditors such as the IMF, which abstract from the conventional definition of financial integration. It follows that even countries where capital account transactions are forbidden to private agents (classified as closed by any *de jure* index) may have gross foreign debt positions

[12] Classification methods have changed in 1996, so that there are now 13 separate indexes that can hardly be compared to the previous single indicator. Miniane (2000) harmonized the classifications, though for a limited number of countries, and over a short time span.

and be therefore considered *de facto* integrated with the international financial markets. This implies that the estimates for *IFIGDP* may confound the effects of sovereign foreign debt with those of liberalizing private cross-border transactions. This problem could be solved by subtracting sovereign foreign debt positions from *IFIGDP*, but data are not available at this level of disaggregation.

I overcome the limits of the *de jure* dummy and the *de facto* measure by regressing TFP and capital accumulation on *IMF*, *IFIGDP* and their interaction. The estimates for *IMF*IFIGDP* capture the effect of *de facto* integration in countries that do not impose restrictions on capital account transactions.

2.4 Financial Crises

When accounting for financial crises, I distinguish between banking and currency crises. For banking crises (BC), I adopt the anecdotal indicator proposed by Caprio and Klingebiel (2003), that keeps record of 117 systemic and 51 non-systemic crises occurring in 93 and 45 countries respectively, from the late 1970's onwards. On a yearly basis, the variable BC takes value 2 or 1 if the country has experienced a systemic or a borderline banking crisis respectively, and 0 otherwise. Caprio and Klingebiel label a crisis as systemic if a substantial proportion of banks' capital has been exhausted and borderline if the losses were less severe. For example, the 1991 crisis in Sweden was systemic, since it involved insolvency or serious difficulties for 90 per cent of the banking system. The isolated failures of three UK banks between the Eighties and the Nineties, as well as the solvency problems of Credit Lyonnais in France in 1994-95, are instead labeled as borderline crises.

I rely on Glick and Hutchison (2000) for the chronology of currency crises (CC). They label as currency crises "large" variations (i.e. exceeding the sample mean plus twice the country-specific standard deviation) in an exchange rate pressure index, defined as a weighted average of monthly real exchange rate changes and monthly reserve losses. On a yearly base, the variable CC takes value 1 if the country has experienced such a "large" variation, 0 otherwise. This dummy is available for 90 countries between 1975 and 1997.

For robustness check, I also use the banking and currency crises dummy variables compiled by Bordo, Eichengreen, Klingebiel and Martinez-Peria (2001) for 56 countries between 1973 and 1997 (available for 21 of them since 1880).[13] An episode qualifies as a currency crisis ($CC\_BEKM\text{-}P = 1$) if either of the following occurs: (1) a forced change in parity, abandonment of a pegged exchange rate, or an international rescue; (2) the index of exchange market pressure exceeds a critical threshold.[14] The dummy for banking

[13] Eichengreen and Leblang (2003), among others, used these indicators.

[14] The exchange pressure index is calculated here as a weighted average of the percentage change in the

crises, *BC_ BEKM-P*, takes value 1 if a systemic banking crisis as defined in Caprio and Klingebiel (2003) occurs, 0 otherwise.

2.5 Other controls

Financial depth is proxied by the ratio of total credit to the private sector over GDP (*privo* from Beck and Demirguc-Kunt, 2001) and its growth rate. This variable gives a measure of the external finance available to firms. I control for *privo* in the equations for both investments and productivity to disentangle the direct effect of liberalization from the indirect one through financial depth.[15] I include the growth rate of *privo* in the linear probability models for financial crises, to account for the possibility that crises come along as by-products of sustained growth of the financial system (see Rancière et al., 2007).

I include *government expenditure* as a ratio of GDP (*kg* from the PWT 6.1) in the regressions for capital accumulation as several theories predict that government expenditure crowds out private investment. I also use it as a covariate for the likelihood of financial crises.

I control for *openness to trade*, proxied by import plus export as a ratio of GDP (*openk* from the PWT 6.1). Trade may affect the efficiency of an economy through several channels, such as specialization, access to larger markets with more product variety and increased competition. These effects may stimulate both capital accumulation and productivity growth. Openness to trade is also included among the determinants of financial crises.

Intellectual property right protection is expected to enhance productivity by giving incentives for innovation. This is controlled for by using the measure (*ipr*) by Ginarte and Park (1997), which is available for five-year periods from 1960 to 1990.

In the cross-sectional estimates for TFP growth, I explicitly control for *institutional quality* proxied by the Government Anti-Diversion Policy index ($GADP$, built as Hall and Jones, 1999 with annual data from the International Country Risk Guide).

As an indicator of *economic development*, I construct a dummy (*LDC's*)that takes value 1 if the country is defined as low or middle-low income in the World Development Indicators, and 0 otherwise. In the regressions for productivity and investment, I add this indicator interacted with the proxies of financial integration, to check for heterogeneity in

exchange rate, the change in the short-term interest rate, and the percentage change in reserves, all relative to the same variables in the center country. The threshold is 1.5 standard deviations above the mean.

[15] Klein and Olivei (1999) and Levine (2001) show that financial liberalization promotes financial development, which, according to Beck et al. (2000), may be expected to foster productivity more than capital accumulation.

the effects across developed and developing countries.[16]

I include a measure of *deposit insurance* (from Demirguc-Kunt and Sobaci, 2001) among the covariates for crises, since Demirguc-Kunt and Detragiache (2002) show that the existence of explicit deposit insurance increases the likelihood of bank runs and thus crises of the banking sector.

I also control for *inflation* (from the World Development Indicators) as a determinant of banking and currency crises crises. I take this variable as an indicator of bad macroeconomic policies, which are likely to make a country prone to crises.

2.6 A quick overview of the data

Table A lists the 70 countries in the sample and the dates in which they removed or imposed *de jure* restrictions on capital account transactions as defined by the IMF. Table B reports statistics for all indicators of financial integration, financial crises, TPF growth and capital accumulation across continents. Rows 2 and 3 contain respectively the numbers of reforms into and out of capital account liberalization, while row 1 indicates the number of country-years with open capital account ($IMF= 1$). Note that the twenty-two African countries in the sample never experienced financial openness, while countries in the rest of the world were open in about one third of the observations. The pattern of reforms varies across all continents, ranging from 3 liberalizations and one restriction in Asia, to 10 unreverted openings in Europe and North America, to 12 switches into openness and 11 out of it in Latin America. The other two measures of financial integration display less heterogeneity. Europe and North America are almost twice as open as Africa according to Quinn's *de jure* index, while they look similar with respect to average *de facto* integration.

The uneven pattern of financial openness in Africa, and the fact that African countries are generally much poorer than the rest of the sample, suggest that these observations may bias the estimates. In particular, the poor TFP performance of African countries (second last line of Table B) may bias the coefficient estimates upwards for the IMF *de jure* indicator, and downwards for the continuous *de facto* measure. I will account for this possibility by including interaction terms and splitting the sample. Another special case is Latin America, whose high degree of *de jure* financial openness (line 1) is characterized, differently from the other countries, by the occurrence of many policy reversals (lines 2 and 3). Moreover, its high scores in *de facto* integration hinge heavily on debt rather than equity, suggesting that sovereign positions and loans from official lenders may play a

[16] This gives equivalent results to interacting financial integration either with initial real per capita GDP, or with a dummy for countries with real per capita GDP below sample average. The results are available upon request.

prominent (and possibly different) role. As for Africa, I will address in the next sections the possibility that financial liberalization has a different impact on TFP and capital accumulation also in Latin American countries.

This section explains the methodologies I follow to assess the effects of financial integration on capital accumulation and productivity, and reports the results. I first present the difference in difference approach applied to yearly panel data, then I turn to the long-run cross-sectional analysis using twenty-five year averages, to conclude with the dynamic panel regressions performed on non-overlapping five-year observations.

2.7 Panel difference in difference

I fully exploit the cross-sectional and time-series information in the annual dataset and estimate

$$P_{it} = \beta_0 + \boldsymbol{\beta}_1' \mathbf{X}_{it-1} + \gamma IFL_{it-1} + \eta_i + \nu_t + \varepsilon_{it}, \tag{2}$$

where P_{it} is a proxy for the outcome variable (either $\log(K)$ or $\log(A)$ in the various specifications) observed in country i at year t, $\mathbf{X}$ are control variables including the indicators of financial crises BC and CC and IFL is an indicator of financial liberalization. To alleviate the simultaneity bias, all regressors enter as lagged values. I start by considering the *de jure* dummy for capital account liberalization (IMF). η_i is a country-specific fixed effect capturing heterogeneity in the determinants of P that are specific to i, and its inclusion in (2) implies that γ is only estimated from the within-country variation around the liberalization date. Including the year fixed effects (ν_t) allows me to compare the change in P between the pre and post-reform periods in countries that have liberalized with the change in the countries that maintained the restrictions. This means that equation (2) is a "difference in difference" specification, since it implies differencing out the time-mean for each i, and the common trend for all i's at any t. Two main problems may undermine the ability of γ to identify a causal link from financial liberalization to the sources of growth.

First, there may be concerns about the selection of the countries that liberalized. Suppose that fewer episodes of liberalization were observed among countries that share a certain characteristic, and the countries with that characteristic experienced particularly low productivity. Then this trend in productivity, specific to countries with that characteristic, may bias the estimated effect of financial integration upwards. To tackle this issue, I first identify the most important factors that influence the decision to liberalize capital account transactions, by estimating the following probit on the annual panel dataset:

$$\Pr\left(IMF\_r_{it} = 1\right) = \Phi\left(\beta_o + \boldsymbol{\beta}_1 \mathbf{X}_{it}\right).$$

IMF_r_{it}, with $r \in \{open, close\}$ is an indicator of the reforms observed in country i at time t, and $\mathbf{X}_{it}$ is a set of covariates.[17] IMF_open equals 1 if a switch into capital account liberalization occurs, zero otherwise. IMF_close equals 1 if restrictions are put in place, zero otherwise. I also estimate a probit for the unconditional probability that restrictions are not in place, i.e. $\Pr(IMF = 1)$. The coefficient estimates in Table C represent the percentage changes in probability associated to an increase in the covariates. The z-statistics reported below each coefficient are derived from robust standard errors, clustered by country. Consistently with the evidence in Glick et al. (2006), countries with higher financial development are more likely to be financially open, while they are not more likely to adopt, nor to abandon, capital account liberalization. The probability of switching into liberalization is expectedly higher where institutions are better. Current account over GDP has no significant effect across the specifications in Table C, meaning that large current deficits do not call for capital restrictions. However, if taken in absolute value current account desplays positive and significant coefficients, suggesting that countries with a large current account exposure, irrespectively of its sign, are more incline to liberalize capital transactions. Moreover, as argued in section 2.6, there seem to be also systematic differences in the pattern of capital account liberalization (IMF) and in productivity and investment across areas. This suggests that the difference in difference estimates for γ might be affected by selection bias. To amend this bias, I control the regressions for continental trends in both productivity and capital.

A problem of endogeneity of policy changes may also arise. Suppose a country opens up when experiencing an economic crisis to help the recovery or alternatively when it is already on a sustained growth path. This may attribute a negative or positive effect to financial liberalization which is actually due to a trend, thereby producing biased estimates. As a solution to this problem, I control for a dummy taking value 1 during the three or five years prior to the liberalization and zero otherwise. Comparing the coefficient for this dummy with γ allows me to verify whether the change in P was part of a previous trend or followed liberalization. As a robustness check, I replace the dummy variable with a trend variable, taking values 1, 2 and 3, respectively three, two and one years before the reform. Moreover, I assess whether both reforms into and out of capital account liberalization (opening when a country is closed and closing when a country is open) promote economic performance, to test if countries systematically adopt the reform that fosters growth.

A concern about the consistency of difference in difference estimators may arise if the

[17] Following Glick et al. (2006), I include among the covariates the current account as a ratio of GDP, the US real interest rate, government expenditure, openness to trade, and a measure of institutional quality (gadp). I also control for the occurrence of banking and currency crises in the previous year.

dependent variable is autocorrelated, as pointed out by Bertrand et al. (2004). In this case, the standard errors of the coefficient γ would be underestimated, thereby biasing the t-statistics towards over-rejection of the null $\gamma = 0$. Bertrand et al. (2004) propose several methods to get around this problem. I will follow their suggestion and estimate equation (2) without IMF, save the residuals only for the countries that experienced a reform, and regress them on IMF.[18] This is equivalent to identifying γ off the difference in the residuals before and after the reform.

The evidence produced with difference in difference estimations is suggestive, since it gives a measure of the differential in economic performance explained by a clear-cut reform. As it is frequently pointed out in the literature though, the extent of financial integration cannot be fully captured by a zero-one indicator. There are many different restrictions that can be removed at different times, so that countries that are equally labeled as open by the AREAR dummy may actually enjoy different degrees of financial integration. Also, the extent to which an open country is active in the global capital market may vary over time. Using the *de facto* measures of financial integration described above allows me to take into account these concerns. Hence, I replicate most of the analysis considering the *de facto* measure $IFIGDP$ instead of *IMF*, and then both indicators jointly with their interaction.

2.7.1 Productivity

Tables 1a, 2a and 3a report the results from the difference in difference regressions for *TFP* levels on yearly data. The specification in columns 1 and 2 only includes the *de jure* indicator of capital account liberalization (IMF), whose effects on productivity are positive. These coefficients are robust to controlling for trends in TFP up to three years prior to liberalization (IMF_switch3) and for time-continent effects, as reported in column 2.[19] The coefficients for *de jure* liberalization (IMF) are positive and significant also across all specifications in columns 3-8. Banking crises have a negative and significant effect on TFP under all specifications, while the negative coefficient for currency crises is significant (at ten per cent confidence level) only in columns 3 and 5. The interactions between *de jure* liberalization and financial crises of column 4 show that the effects of banking and currency crises do not differ across open and closed countries. The interactions with the Latin American dummy in column 5 suggest that the impact of capital account liberalization is positive all over. The statistically zero coefficients for *IMF*LDC's* and *IMF post '85* in columns 6 and 7 exclude different effects of financial integration on productivity

[18] This procedure is referred to as "ignoring time series information" in Bertrand et al. (2004).

[19] The results do not change if I use IMF_switch5, which equals 1 for the five years prior to the reform.

between developed and developing countries, as well as across the first and the second half of the sample period. Column 8 shows that intellectual property right protection, as expected, raises TFP, and that richer countries tend to have higher productivity. Despite the inclusion of real per capita GDP, the coefficient for IMF remains positive and significant, which does not lend support to the argument that open countries perform better in terms of TFP simply because they are also richer. Notice that the estimate for financial depth is not significantly different from zero, suggesting that financial depth may not be an effective indirect channel linking liberalization and productivity.

To check the robustness of these results to changes in the indicators of financial integration and crises, I replicate some of the estimations of Table 1a replacing the *de jure* index IMF with the *de facto* measure $IFGDP$, and substituting the financial crises indicators by Caprio and Klingebiel (2003) and Glick and Hutchison (2000) (CK-GH henceforth) with the dummies proposed by Bordo et al. (2001) (BEKM-P henceforth). The results are reported in Table 2a. In column 1, I regress TFP on *de facto* financial integration (IFIGDP) and the CK-GH crises indicators. While banking crises lose significance, the gross external position has a negative impact on TFP. As mentioned above, the estimates for *IFIGDP* may deliver a distorted picture of the link between financial globalization and economic outcomes, especially if countries that are *de jure* closed have large sovereign debt positions (such as most of the African countries in Table B). To account for this potential bias, in column 2 I control also for *de jure* liberalization (*IMF*) and its interaction with the *de facto* measure. The coefficients for *IFIGDP* and *IFIGDP*IMF* suggest that *de facto* integration does spur TFP when accompanied by *de jure* liberalization. Large gross external positions in presence of *de jure* restrictions may be arguably composed by sovereign foreign debt and loans from official creditors (e.g. the IMF). In line with this argument, column 3 shows that an increase in gross external positions reduced productivity in African and Latin American countries (hinging greatly on foreign sovereign debt and official loans), while it spurred TFP in the rest of the world. The interaction with the dummy for LDC's in column 4 suggests that financial integration was productivity enhancing in the developed countries, not in the developing ones. The robustness analysis with financial crises indicators by Bordo et al. (2001), in columns 5-7 confirms the previous results. Notice that 13 countries, mainly African and Latin American, are dropped from the sample when changing crises indicators. Their exclusion explains the loss of significance for the *de facto* measure alone in column 6.

Table 3a reports robustness checks on the difference in differences estimates with the maximum number of controls, reported in column 8 of Table 1a. The first two columns refer to the correction proposed by Bertrand et al. (2004). In column 1, I report the

results from regressing the physical capital stock on all control variables but IMF, and controlling for country and time fixed effects. Column 2 shows the coefficient estimated regressing on *IMF* the residuals from the specification in column 1 only for the countries that experienced a reform to capital account restrictions. Banking crises and per capita GDP maintain the coefficients of column 8 in Table 1a, and financial integration is shown to raise significantly productivity by almost 8 per cent. In columns 3 and 4 I try to identify the effect of a policy switch out of financial openness. In column 3, I restrict the attention to those countries that were not closed all the time, and regress capital stock on the usual controls plus an indicator that takes value one if there is not financial openness and zero otherwise. In this way, the coefficient compares the change in TFP before and after the adoption of restrictions in the countries that closed their financial markets with the change in TFP in the countries that remained open. The coefficient for *IMF_close* suggests that TFP grew less in the countries that closed their financial markets relative to the countries that remained open. In column 4, I take the full sample and regress productivity on an indicator that equals 0 if a country is open in a given year or if it is closed throughout the entire sample, and 1 otherwise. The negative and significant coefficient for IMF_close suggests that productivity growth was lower after countries closed their financial markets. These results prove that regime switches out of financial liberalization have not the same, positive effect of switches into it. In columns 5-7, I control in alternative ways for the pre-reform trends in TFP. In column 5, I decompose the pre-reform trend dummy *IMF_switch* into two dummies for switches into and out of liberalization. In column 6, these dummies are no longer step dummies, but take the form of a three-period linear trend in the three years prior to reforms. In both cases their introduction does not affect the significance of the coefficient for financial openness. Column 7 reports the result from adding a pre-reform trend for each country that has liberalized. Again, no significant changes occur with respect to the other regressions.

Overall, in countries that removed restrictions on residents' capital account transactions TFP grew by 5 to 8 per cent more than in those that did not. Countries that doubled their gross external position over GDP (*IFIGDP*) had a 1 per cent increase in productivity if *de jure* closed, while they enjoyed a 10 per cent rise if open. The occurrence of a banking and crisis worsens TFP performance by 3 to 5 per cent, while currency crises by 2-3 per cent. The coefficients are not significant for the BEKM-P indicators.

2.7.2 Capital

Table 1b reports the results from the difference in difference regressions for the logarithm of physical capital stock, $\log(K)$, on yearly data. The specification in columns 1 and 2 only

includes the *de jure* indicator of capital account liberalization (IMF), whose effects on investments are negative. These coefficients are robust to controlling for trends in capital up to three years prior to liberalization (IMF_switch3) and for time-continent effects, as reported in column 2.[20] Columns 3 and 4 show that banking crises (BC) and financial integration have a negative effect on capital accumulation, while currency crises seem to be irrelevant. Moreover, the estimates for the interactive terms *IMF*BC* and *IMF*CC* in column 4 suggest that financial crises do not have different effects across closed and open countries. The interaction analysis in columns 5 and 6 shows that capital account liberalization restrained capital accumulation less in developing countries, as well as in Latin America. Column 7 does not support the hypothesis that financial integration has different effects across the first and the second half of the sample period (pre and post 1985). When I control for real per capita GDP, government expenditure and credit to the private sector as a ratio of GDP (column 8), the results for IMF, and CC remain unchanged, while BC becomes positive and significant. The coefficients in column 8 also show that countries with higher per capita GDP and government expenditure accumulate more capital, while financial depth (as proxied by *privo*) is uninfluential. The results are robust to the inclusion of openness to trade, whose coefficient always turns out to be insignificant and is thus omitted.

In Table 2b, I replicate for capital the exercise reported for TFP in Table 2a. In column 1, I regress capital on *de facto* financial integration and crises from CK-GH. While banking crises lose significance, the gross external position has a negative impact on capital. As mentioned above, the estimates for *IFIGDP* may deliver a distorted picture of the link between financial globalization and economic outcomes, especially if countries that are *de jure* closed have large sovereign debt positions (such as most of the African countries in Table B). To account for this potential distortion, in column 2 I control also for *de jure* liberalization *IMF* and its interaction with the *de facto* measure. The coefficients for *IFIGDP* and *IFIGDP*IMF* suggest that countries with large gross external positions suffered a drop in physical capital if *de jure* closed, while they were not affected if *de jure* open. This result is consistent with the coefficients reported in column 3 for the interactions of *IFIGDP* with continental dummies. The only countries that suffered from external financial exposition were the African ones, that were mostly *de jure* closed as shown in Table B. The interaction with the LDC's in column 4 does not display a significant heterogeneity in the effect of financial liberalization. In columns 5-7, I consider the alternative set of financial crises indicators proposed by Bordo et al. (2001). In so doing, I lose observations for 13 countries, but add two years to the time series. The

[20] The results do not change if I use IMF_switch5, which equals 1 for the five years prior to the reform.

picture does not change significantly: both *de jure* and *de facto* indicators have a negative coefficient if considered separately (columns 5 and 6), while the effect of gross external positions on capital is nil in *de jure* open and negative in *de jure* closed countries (as from column 7). Neither banking nor currency crises have a significant link with capital stock.

Table 3b reports robustness checks on the difference in differences estimates with the maximum number of controls, reported in column 8 of Table 1b. The first two columns refer to the correction proposed by Bertrand et al. (2004). In column 1, I report the results from regressing the physical capital stock on all control variables but IMF, and controlling for country and time fixed effects. As in column 8 of Table 1b, the coefficients for banking crises, real per capita GDP and government expenditure are positive and significant, while those for currency crises and financial depth are nil. I saved the residuals from the estimation in column 1 only for the countries that experienced a regime shift in capital account restrictions, and regressed them on IMF. The coefficient and its standard error in column 2 confirm that financial integration reduces significantly capital by more than 8 per cent. In columns 3 and 4 I try to identify the effect of a policy switch out of financial openness. In column 3, I restrict the attention to those countries that were not closed all the time, and regress capital stock on the usual controls plus an indicator that takes value one if there is not financial openness and zero otherwise. In this way, the coefficient compares the change in capital stock before and after the adoption of restrictions in the countries that closed their financial markets with the change in K in the countries that remained open. The effect is positive and significant. In column 4, I take the full sample and regress K on an indicator that equals 0 if a country is open in a given year or if it is closed throughout the entire sample, and 1 otherwise. The positive and significant coefficient for IMF_close suggests that capital rose in countries that closed their financial markets compared to the countries that were open or remained closed ever. These results prove that regime switches out of financial liberalization have the opposite effect of switches into it. In columns 5-7, I control in alternative ways for the pre-reform trends in physical capital. In column 5, I decompose the dummy IMF_switch in two dummies for switches into and out of liberalization. In column 6, these dummies are no longer step dummies, but take the form of a three-period linear trend in the three years prior to reforms. In both cases their introduction does not affect the significance of the coefficient for financial openness. In column 7 I add a pre-reform trend for each country that has liberalized. This helps me account for other reforms that countries may have adopted just before capital account liberalization. Also in this case, no significant change occurs with respect to the other regressions.

Overall, countries that removed the restrictions on capital account transactions expe-

rienced up 14 per cent lower growth in physical capital compared to those that did not. Countries that doubled their gross external position over GDP (IFIGDP) did 6 to 16 per cent worse if they kept capital restrictions, while they were not affected if they removed them. The occurrence of a banking and currency crisis may hinder capital accumulation, raise it or even leave it unaltered: the results are not robust across different samples.

2.8 Cross-sectional analysis

To study the effects of financial openness on TFP and capital in the long run, I estimate the following growth regressions:

$$dp_{i(t-25,t)} = \beta_0 + \lambda p_{it-25} + \boldsymbol{\beta}_1' \mathbf{X}_{i(t-25,t)} + \gamma IFL_{i(t-25,t)} + u_{it}, \tag{3}$$

where $dp_{i(t-25,t)} = 100\frac{\log(P_{it})-\log(P_{it-25})}{25}$ with $p = \log(P)$, $P \in \{A, K\}$, and the regressors indexed by $(t-25,\ t)$ are 25-year period averages. A coefficient estimate $\hat{\lambda} < 0$ indicates that there is conditional convergence. The speed of convergence b can be obtained from $\lambda = -100\frac{1-e^{b25}}{25}$. As a proxy of international financial liberalization (IFL), I start by considering the IMF *de jure* indicator (IMF), then replicate the analysis for the *de facto* measure ($IFIGDP$) and Quinn's de jure index (*Quinn)*.

Tables 4a and 5a report the results for TFP growth rate. The coefficients for the initial level of TFP do not support robustly the hypothesis of conditional convergence in productivity. The coefficients of banking and currency crises on TFP growth are negative but only occasionally significant.

As for the effect of financial integration, in Table 4a, the IMF *de jure* proxy for capital account liberalization has a positive and significant coefficient under the basic specification in column 1. When I control for crises and their interaction with financial openness, in columns 2 and 3, no coefficient turns out significant. Yet, a positive and significant coefficient for financial liberalization is restored in columns 4-6, where I account for heterogeneity. In columns 4 and 5, I interact IMF with dummies for Latin America and the LDC's. The coefficients for the interaction terms suggest that *de jure* liberalization does not spur productivity in developing countries, mainly in Latin America, while it is beneficial in the others. In columns 6, I re-estimate the equation of column 4 leaving Africa out of the sample, to make sure these financially closed and poorly performing countries do not bias upwards the coefficient for the capital account liberalization index. The results, perfectly replicating column 4, suggest that Africa does not significantly bias the estimates. Once the interactive terms are removed from the specification and other controls are added, in columns 7 and 8, capital account liberalization loses significance,

while financial depth displays positive and significant coefficients.

In Table 5a, I first replace the *de jure* IMF dummy with the de facto measure of financial integration, *IFIGDP*. None of the coefficients in column 1 is significantly different from zero. As mentioned in section 2.3, the estimates for *IFIGDP* may deliver a distorted picture of the link between financial globalization and economic outcomes, especially if countries that are *de jure* closed have large sovereign debt positions (such as the African countries in Table B). To account for this potential bias, in column 2 I also control for *de jure* liberalization (*IMF)* and its interaction with the *de facto* measure. The coefficients for *IMF*, *IFIGDP* and *IMF*IFIGDP* suggest that only countries that are both *de jure* and *de facto* open benefit from financial integration in terms of TFP growth. Productivity growth is instead lower in countries holding large gross external positions despite being *de jure* closed. This result is consistent with the coefficients reported in columns 3 and 4 for the interactions of *IFGDP* with continental and LDC's dummies: financial integration is beneficial in countries outside Africa and Latin America, and mainly in the developed ones. This evidence lends support to the hypothesis that an increase in gross external wealth raises TFP growth if it is not due to changes in sovereign foreign debt or loans from international organizations. Finally, in columns 5-7 I regress productivity growth on Quinn's *de jure* index of capital account liberalization and its interactions with continental and LDC's dummies. As in the previous columns, financial liberalization is associated with higher TFP growth mainly in developed countries.

Tables 4b and 5b report the results for capital accumulation. The coefficients for capital stock at the beginning of the period (K_25) are always negative and significant, suggesting that, other things equal, countries starting with a lower endowment experience a faster growth of physical capital. The estimates for financial depth are positive and significant. All other control variables in Table 4b, including the indicators of banking and currency crises, are insignificant. The only exception is the coefficient for capital account liberalization in Latin American, which is negative and significant. This suggests that financial liberalization may have led to capital outflows.

In Table 5b, I replicate the exercise done in Table 5a. Higher gross external positions spur capital accumulation in *de jure* open countries, hinder it where residents cannot access international financial markets. Consistently with this result, investments grow with the exposition to foreign capital markets in all countries but the African and Latin American ones. The effect of *de jure* liberalization is insignificant if proxied by Quinn's index.

In sum, the long-run analysis provides some evidence that financial integration spurs productivity growth, mainly in the developed countries, while it has no significant impact

on capital accumulation. As emphasized by the empirical growth literature, cross-sectional estimates have several limits. They do not allow to exploit the time-series variation in the data on financial integration, which is particularly important when assessing the effects of reforms; nor control for omitted variables, country-specific effects and endogeneity of the regressors. Therefore, I move on to the panel analysis.

2.9 Dynamic panel analysis

To exploit the time variation in the proxies of *IFL*, I could estimate equation (3) on a panel dataset, assuming $u_{it} = \eta_i + \nu_t + \varepsilon_{it}$. This would generate consistency problems, however. As the right-hand side of equation (3) includes the lagged dependent variable ($p_{t-\tau}$), even if ε_{it} is not correlated with $p_{t-\tau}$, the estimates are not consistent, given the finite time span. Moreover, consistency may be undermined by the endogeneity of other explanatory variables. To correct for the bias created by lagged endogenous variables and the simultaneity of some regressors, I follow the approach proposed by Arellano and Bover (1995) and Blundell and Bond (1998). I estimate the following system with GMM

$$dp_{it} = \beta_0 + \theta dp_{it-5} + \boldsymbol{\beta}_1' d\mathbf{X}_{it} + \gamma dIFL_{it} + d\nu_t + d\varepsilon_{it} \quad (4)$$

$$p_{it} = \beta_0 + \theta p_{it-5} + \boldsymbol{\beta}_1' \mathbf{X}_{i(t-5,t)} + \gamma IFL_{i(t-5,t)} + \eta_i + \nu_t + \varepsilon_{it}, \quad (5)$$

where dp_{it} equals $\log(\frac{P_{it}}{P_{it-5}})$ with $P \in \{K, A\}$, and the other regressors are the same as in the previous equations. Variables indexed by $(t-5, t)$ are averages over the period between *t-5* and *t*. η_i, ν_t and ε_{it} are the unobservable country- and time-specific effects, and the error term, respectively. The presence of country effect in equation (5) corrects the omitted variable bias. The differences in equation (4) and the instrumental variables estimation of the system are aimed at amending inconsistency problems. I instrument differences of the endogenous and predetermined variables with lagged levels in equation (4) and levels with differenced variables in equation (5). For instance, I take p_{it-15} as an instrument for dp_{it-5} and IFL_{it-10} for $dIFL_{it}$ in (4) and dp_{it-10} as an instrument for p_{it-5} and $dIFL_{it-5}$ for IFL_{it} in (5). I estimate the system by two-step Generalized Method of Moments with moment conditions $E[dp_{it-5s}\ (\varepsilon_{it} - \varepsilon_{it-5})] = 0$ for $s \geq 2$, and $E[dz_{it-5s}\ (\varepsilon_{it} - \varepsilon_{it-5})] = 0$ for $s \geq 2$ on the predetermined variables z, for equation (4); $E[dp_{i,t-5s}\ (\eta_i + \varepsilon_{i,t})] = 0$ and $E[dz_{i,t-5s}\ (\eta_i + \varepsilon_{i,t})] = 0$ for $s = 1$ for equation (5). I treat all regressors as predetermined. The validity of the instruments is granted under the hypothesis that the residuals from (4) are not second order serially correlated. Coefficient estimates are consistent and efficient if both the moment conditions and the no-serial correlation are satisfied. To validate the estimated model, I apply a Sargan test of overidentifying restrictions, and a test of

second-order serial correlation of the residuals.[21] As pointed out by Arellano and Bond (1991), the estimates from the first step are more efficient, while the test statistics from the second step are more robust. Therefore, I will report coefficients and statistics from the first and second step respectively. Note that in this case the speed of convergence b obtains from $\theta = e^{5b}$.

Tables 6a and 7a report the results for TFP. The coefficients in the first line of both tables support robustly the existence of conditional convergence in productivity, with an implied speed of about 2-3 per cent per year. Under all specifications in Table 6a, *de jure* capital account liberalization (*IMF*) is shown to spur productivity growth, and banking crises are proven harmful, while currency crises are insignificant. Trade does not seem to have a significant effect on TFP growth, nor does financial depth, as reported in column 3. The interactions *IMF*BC* and *IMF*CC* in column 4 suggest that the negative effects of financial crises are not more severe in open countries. Also the interactive terms to capture heterogeneous effects of liberalization across continents (column 5) and stages of development (column 6) are virtually zero. In column 7, I interact the IMF indicator with a time dummy for the first half of the sample (taking value 1 through 1975-1989 and 0 elsewhere) in order to capture heterogeneity in the impact of liberalization over time. Financial integration may be expected to become more effective as more countries open up their markets, hence towards the end of the sample. If this were the case, the interaction in column 7 would be negative. In fact, it is insignificant.

The regressions in Table 6a show the positive impact of financial liberalization on TFP to be robust to the adoption of any of the three *de jure* and *de facto* measures of integration. Differently from the previous cross-sectional analysis, the gross external position stands alone (in column 1) as a TFP-enhancing factor. As in Table 5a, the positive effect of financial globalization is stronger where gross external positions are accompanied by *de jure* liberalization, and weaker in countries that rely more heavily on foreign sovereign debt and loans from international organizations, such as the African ones (columns 3 and 4). The results for Quinn's *de jure* measure in columns 7-10 tend to confirm the previous evidence. Columns 6 and 10 do not lend much support to the hypothesis of heterogeneous effects over time.

The estimates for capital are reported in Tables 6b and 7b. The coefficients for initial capital stock (*K_ 5)* in both tables confirm the prediction of the neoclassical growth model, that capital accumulation slows down as capital grows up towards its steady state value,

[21] Including too many lags among the instruments can cause the power of the Sargan test to collapse, potentially hiding the invalidity of instruments (see for example Bowsher, 2002). To avoid this problem, I restrict the number of lags to t-10 and t-15.

and also that there is conditional convergence across countries. In Table 6b, the coefficients for *de jure* capital account liberalization (*IMF*) are not significantly different from zero, in line with the ones reported in Table 4b. Banking crises depress investment, while the results for currency crises are not robust. Financial depth, as in Table 4b, is shown to spur capital accumulation. Table 7b rejects the hypothesis that financial integration, proxied by any of the three indicators in use, has an impact on capital accumulation, with the exception of Latin America, where it may have led to capital outflows.

In Tables 8a and 8b I address heterogeneity in the effects of financial integration by re-estimating the equations for TFP and capital on sub-samples. Compared with the interaction analysis in the previous tables, this approach has the advantage of letting the coefficients for all regressors vary across continents, stage of development and time. The disadvantage of this procedure though is that it may significantly restrict the sample, thereby reducing the power of the estimates if not making the implementation of the dynamic panel methodology impossible. This problem arises only to a minor extent when splitting the sample along the geographical dimension, since the estimations can be performed on a reasonable number of countries over the entire time-span. Splitting the sample along the time dimension is more problematic, since the econometric technique requires a minimum of three 5-year observations for each country (four, in order to test for second order autocorrelation of the residuals). This means that the only viable partition is 1975-94 vs 1980-99.[22]

The coefficients in columns 1-4 of Table 8a suggest that *de jure* capital account liberalization has no impact on productivity in Africa and Latin America, and generally in the LDC's, while it is beneficial in Europe, North America and Asia. De facto integration instead spurs TFP in all countries, though to a slightly lesser extent in Africa and Latin America. Interestingly, banking crises are detrimental for TFP only in Africa and Latin America, and the LDC's in general. Columns 5 and 6 suggest the positive effect of financial globalization on productivity to be stronger towards the end of the sample period. In columns 7 and 8, I estimate the equation on the subsamples of Africa plus Latin America vis-à-vis the rest of the world after 1980. The results are very similar to columns 1 and 3, where observations started in 1975. Table 8b displays no heterogeneity as regards financial integration (no effect on capital accumulation), while it suggests that banking crises may be less harmful in the developed countries.

Quantitatively, a country that liberalizes and stays open over a five-year period according to the AREAER, outperforms a closed one in terms of TFP by 11 to 15 per cent (by

[22] Given the already limited size of the sample for which Quinn's indicator is available, I do not perform sub-sample analysis using this proxy of financial integration.

21 per cent if African and Latin American countries are excluded from the sample). Similarly, doubling Quinn's index of capital account liberalization increases TFP by nearly 15 per cent. Moreover, doubling *de facto* integration (IFIGDP) implies raising productivity by more than 2 per cent in five years (more than 5 per cent if the country is also *de jure* open).

The results above suggest that international financial liberalization has a robust positive direct effect on TFP, while it hardly affects capital accumulation. This asymmetric effect on the two main components of output growth may help explain why the literature has struggled to establish a significant and robust empirical relationship between financial integration and GDP growth. To corroborate this claim, I report in Table 9 the results from estimating the system (4)-(5) for real GDP per worker, using the three measures of financial liberalization. On the full sample, *de jure* capital account liberalization has statistically zero effect (columns 1 and 8). Its coefficient becomes positive and significant when African and Latin American countries are taken away from the sample (column 2). The estimates for the *de facto* measure are positive and significant on the entire sample (column 4-5), and more so when excluding Africa and Latin America (column 6). None of the indicators is significantly related to GDP per worker and its growth rate in the developing countries (columns 3 and 7). These results suggest that the response of output per worker to financial integration follows, though attenuated, the same pattern as productivity.

3 The indirect channels

In this section I explore more in depth two indirect channels through which financial globalization may affect productivity and investment: banking and currency crises, and financial development.

3.1 Financial integration and financial crises

The analysis in the last section shows that banking and currency crises may be detrimental for both capital accumulation and TFP. It is often argued that financial instability may be triggered by the exposure to international financial markets. In this subsection, I investigate if, and to what extent, the negative effects of financial crises should ultimately be imputed to financial liberalization. To do so, I estimate on the annual panel dataset the following probit for the probability of banking and currency crises:

$$\Pr\left(Crisis\_type_{it}=1\right)=\Phi\left(\beta_o+\boldsymbol{\beta}_1\mathbf{X}_{it}+\gamma IFL_{it}\right).$$

The variable $Crisis\_type_{it}$ takes value one if a crisis of a given *type* (systemic, borderline or any banking crisis, currency crisis) has occurred in country i at time t, zero otherwise. The vector $\mathbf{X}_{it}$ includes a series of covariates, and IFL_{it} is a proxy of international financial liberalization. The reported coefficients represent the percentage changes in the probability of a crisis associated to an increase in the covariates. The z-statistics reported below each coefficient are derived from robust standard errors, clustered by country.

Table 10a reports the results for the probability of financial crises as a function of the *de jure* dummy for capital account liberalization (IMF) and a series of covariates. The coefficient estimates for IMF on the full sample (Panel A) are not significantly different from zero, with the exception of minor (borderline) banking crises, that are 1.7 per cent more likely in liberalized countries. This evidence is in line with the recent findings in Glick et al. (2006) and Ranciere et al. (2006). High inflation is generally responsible for a higher likelihood of banking crises. High real GDP per capita and growth rate of financial depth significantly reduce the probability of crises. The first result is in line with the predictions in Martin and Rey (2006), while the second seems to contradict the "bumpy path" hypothesis proposed by Rancière et al. (2007) and Tornell et al. (2003). Splitting the sample between developed and developing countries (panels B and C), I find that IMF increases the likelihood of (borderline) banking and currency crises in developed countries, while it has no effect in the developing ones. Higher per capita income is associated to a lower likelihood of banking and currency crises, while inflation raises the probability of banking crises, regardless of the degree of development of a country. Faster growth of financial depth reduces the likelihood of crises only in the LDC's.

I replicate the estimations of Table 10a using the other indicators of financial integration, whose coefficients I report in Table 10b.[23] Capital account liberalization, as indexed by Quinn, raises the probability of minor banking crises in all countries. The coefficients in the first row of Table 10b suggest that a country switching from half to totally open ($Quinn$=50 to 100) has a 22 per cent higher probability of suffering a minor banking crisis. Its likelihood of experiencing a severe banking or a currency crisis remains unchanged. The second row of Table 10b tells that the probability of a (systemic) banking crisis rises by 11 per cent in a developed country experiencing an increase in total foreign assets + liabilities equal to its GDP (equivalent to a more than 80 per cent rise of *IFIGDP* in the average European or North American country). The same change in foreign wealth would imply a 7 per cent drop in the likelihood that a developing country suffers a currency crisis

[23] For parsimony, only the coefficents for the proxies of IFL are reported. The estimates for the other covariates (deposit insurance, real per capita GDP, inflation, trade/gdp and the growth rate of privo) are available from the author.

(this would require the average African country to roughly double *IFIGDP*).

As argued in Eichengreen and Leblang (2003), the onset of a financial crises may follow capital account liberalization with some lag. If this were the case, the evidence in Tables 10a and 10b would not be capturing it, since it relies on one-year lags. To account for delayed effects of financial liberalization, I replicate the probit estimations on the 5-year averages of the IFL indicators and report the results in Table 10c. IMF only raises the probability of minor banking crises in developed countries, *Quinn* does the same, but also in the developing countries, *IFIGDP* keeps increasing the likelihood of systemic crises in developed countries, while reducing the risk of currency crises in the LDC's.

3.2 Financial integration and financial development

Beck et al. (2000) provide evidence that financial depth increases productivity and, to a lesser extent, investment. In this section, I assess if these results are robust to the inclusion of measures of financial openness, and whether financial globalization increases domestic financial depth.[24] Table 11a reports the results of the DPD regressions of TFP (columns 1-3) and physical capital (columns 4-6) on financial crises, financial depth and alternative indicators of financial integration. Financial depth affects positively capital accumulation throughout most specifications, while its positive impact on productivity is significant only when controlling for Quinn's index of capital account liberalization. In any case, controlling for financial development does not alter the coefficients for liberalization in a relevant way, compared to the results in Tables 7a and 7b.

To investigate if financial globalization raises financial depth, I regress private credit over GDP on the IFL indicators and other control variables. The results in Table 11b do not provide robust support to the existence of a link between financial liberalization and financial depth. Together with the previous evidence, this implies that financial depth does not seem to be a channel through which financial globalization affects the sources of growth.

4 Discussion

This section relates the results of section 3 with the industry-level evidence in two recent studies on the real effects of international financial liberalization and discusses the theoretical mechanisms that may explain the reaction of TFP.

[24] In section 3, I control for financial depth only when using the IMF de jure indicator. Financial depth seems to foster TFP growth in the cross-sectional estimates, while it has insignificant coefficients once the time-series dimension is considered and endogeneity is tackled with dynamic panel regressions. I now extend the analysis to the other measures.

Section 3 provides evidence that financial integration is accompanied by an increase in total factor productivity. A similar conclusion is indirectly drawn by Henry and Sasson (2008), after performing difference in difference analysis on annual industry-level data for 19 developing countries. They argue that *de jure* equity market liberalization must spur TFP since it raises real wages much more than investment. Differently from the present paper, this work also finds a positive effect on capital at sectoral level. As a possible explanation to their results, the authors put forward Delong's (2004) conjecture that capital flows to the developing countries raise productivity because they entail imports of capital goods from the rich countries, embodying technological progress. The results in section 3 are consistent with this argument only to the extent that the imports of capital goods do not translate into higher aggregate capital stock. However, the finding that aggregate productivity grows more in the developed countries than in the LDC's suggests that the main mechanism may not rely only on the technological content of capital flows.

A positive link between industry-level investment and capital account liberalization (both *de jure* and *de facto*) is documented also by Levchenko et al. (2008). This study provides additional evidence that sectoral markups drop and entry-exit dynamics increase in response to financial integration, while TFP rises just in the short run. At the aggregate level, these results may be reconciled with the evidence on TFP reported in section 3. First, an increase in competition (falling markups, more entry/exit) generally gives rise to improvements in aggregate productivity. Second, the aggregate increase in TFP may derive from sectoral reallocations, a compositional effect which cannot be captured with the specifications the authors estimate. Acharya et al. (2007) report evidence that domestic financial liberalization in the US (bank branching deregulation) induced a reallocation of capital towards the sectors with more efficient risk-return profile. It may be the case that also international financial liberalization brings similar improvements in the efficiency of capital allocation across sectors, thereby increasing aggregate productivity.

The evidence in this paper raises three questions. First, how to explain the zero effect of financial intagration on aggregate capital in section 3? A possible answer may be that estimates only capture an average effect across countries and over time. This implies that, if capital increases in certain countries receiving inflows and drops in others experiencing outflows, the net effect may well be zero.

Second, even assuming that capital flows cancel out so that the net effect is nil, why does the increase in productivity not foster investment? The results in Table 5a suggest that financial integration raises TFP towards the end of the sample period. If capital follows TFP with some lag, it is possible that the reaction is not captured in the data yet. An alternative explanation may rely on a risk-diversification argument. As shown in

Townsend and Ueda (2008) with respect to domestic financial liberalization in Thailand, better risk allocation may cause a drop in precautionary savings, which reduces capital supply. On aggregate data, this may offset the demand side effects given by an increase in TFP.

Third, what mechanism can explain the positive effects of financial integration on productivity, independently of capital accumulation? A plausible way to rationalize this result is to draw a parallel between financial integration and trade openness. In particular, one can interpret financial openness as integration in the market for financial services. In a world with market imperfections, financial services (such as screening, monitoring, debt structuring, etc.) can be seen as an important factor of production for firms that need to raise external capital. Since the quality and varieties of financial services are likely to differ across countries and sectors, financial liberalization may generate the typical gains from trade. Specialization allows firms in all countries to buy any given financial service at the best price. Moreover, the access to new varieties of services may provide firms with the most appropriate financial instruments. The rise in TFP would be due to an increase in allocative efficiency, as empirically documented by Galindo et al. (2007). If there is specialization in financial services, one should observe financial intermediaries enter foreign markets following comparative advantage patterns, as recent evidence from microdata shows. For instance, the results in Focarelli and Pozzolo (2005) suggest that foreign banks enter more often in countries where banks are less efficient, and Clarke et al. (1999) show that they tend to serve the sectors in which they have more expertise. Moreover, following the entry of foreign actors, the financial intermediation sector experiences an overall increase in efficiency, as documented by Claessens et al. (2001) and Giannetti and Ongena (2008).

An alternative explanation for the rise in TFP is offered by the models that interpret financial integration as a means of international risk diversification (see Obstfeld, 1994). The improvement in risk sharing provided by portfolio diversification promotes risk taking at the country level, so that riskier and more productive projects get financed, thereby raising aggegate TFP. Capital reallocation across countries and firms has instead ambiguous effects on aggregate investment.

To conclude this section, I propose a preliminary assessment of the empirical plausibility of the improved-efficiency hypothesis versus the risk-diversification argument focusing on their implications for economic volatility. According to the first hypothesis, financial integration may reduce the volatility of aggregate output, since it induces an efficiency improvement in financial services, that translates into a possibly safer allocation of funds (as domestic liberalization does in Acharya el al., 2007). In the alternative view instead,

financial integration tends to promote risk taking at the country level, which eventually raises output volatility. I thus regress the standard deviation of the annual growth rate of real GDP and TFP on the indicators of financial integration and financial crises. Table 12 reports negative and significant coefficients for the IFL indicators, which do not lend much support to the hypothesis that financial integration raises TFP by promoting domestic risk taking. This is in line with the evidence in Kose et al. (2007) that output growth volatility tends to drop with financial integration, while international risk sharing is not much affected. Although this preliminary evidence does not aim at providing conclusive support to the mechanism based on the efficiency gains from trade in financial services it opens an interesting avenue for future research. In particular, investigating the impact of international financial liberalization on capital reallocation across industries seems a necessary step to further understand the theoretical mechanism behind the results in this paper and in the recent industry-level studies.

5 Conclusions

A wide literature has focused on the effect of financial liberalization on GDP growth, often finding mixed results. To better understand the effect of financial liberalization, however, it is important to know the channels through which it operates. This paper is an attempt to probe deeper into the relationship by separately studying the impact of financial openness on the two main sources of income growth: capital accumulation and productivity. Contrary to the existing literature, I find fairly robust results, using both *de facto* and *de jure* indicators of financial integration. In particular, financial liberalization has a positive direct effect on productivity, mainly in the developed countries, while it has virtually none on capital accumulation.

In my analysis I take into account two possible indirect channels through which financial globalization may affect economic performance: financial development and financial crises. The most interesting result applies to the latter. As expected, banking and (to a minor extent) currency crises have a strong negative impact on economic performance, though the likelihood that they occur does not rise much under financial integration. In fact, globalization raises only the probability of minor banking crises in developed countries. Nevertheless, the positive direct effect of financial liberalization on TFP survives.

Finally, the paper briefly discusses a possible explanation for the positive direct effect of financial integration on productivity. The idea is that removing restrictions to international financial transaction opens the door to trade in financial services, which can be considered as a production factor. As in trade models, openness generates gains from specialization and increasing varieties, which raise efficiency in the allocation of capital,

thereby fostering TFP growth. This mechanism is supported by some existing evidence on the pattern of internationalization of financial intermediaries, and on the allocative efficiency of investments. Also the negative correlation between aggregate volatility and financial integration lends some support to this hypothesis.

As a next step to better understand the mechanism linking financial integration to aggregate productivity, more work has to be done on firm or industry-level data. In particular, future research should investigate the pattern of resource reallocation across firms and sectors and relate it to financial integration. Another interesting result in this paper suggests that the effects of financial globalization may vary depending on the instruments that are interantionally traded. To investigate this idea, it would be interesting to separately address the effects of equity, private debt and sovereign debt. This may bridge the literature on financial liberalization and growth to the most recent studies on the composition of countries' portfolios, and give new interesting insights.

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Table A
Sample: Countries, and de jure capital account liberalization (IMF) dates

Country	Open	Close	Country	Open	Close
Argentina	1967-1993	1970	Madagascar	1967	1968
Austria	1991		Malaysia	1973	
Bangladesh			Mali		
Bolivia	1986	1981	Mauritius		
Botswana			Mexico		1982
Brasil			Morocco		
Burundi			Mozambique		
Cameroon	1967	1968	Nepal		
Canada			Netherlands		
Chile			New Zealand	1984	
Colombia			Nicaragua		1978
Costa Rica	1980-1995	1974-1982	Nigeria		
Denmark	1988		Norway	1995	
Ecuador	1971-1988-1995	1970-1986-1993	Panama		
Egypt			Paraguay	1982	1984
El Salvador			Peru	1978-1993	1970-1984
Equatorial Guinea			Philippines		1969
Ethiopia			Portugal	1993	
Finland	1991		Sierra Leone		
France	1990	1968	Singapore	1978	
Germany			South Africa		
Ghana			Spain	1994	
Greece			Sri Lanka		
Guatemala	1973-1989	1980	Sweden	1993	
Guinea Bissau			Switzerland		
Hong Kong			Thailand		
Iceland			Trinidad and Tobago	1994	
India			Tunisia		
Indonesia	1969		Turkey		
Italy	1990		Uganda		
Jamaica			United Kingdom	1979	
Japan	1979	1995	Uruguay	1978	1968-1993
Jordan			Venezuela		1984
Kenia			Zambia		
Korea			Zimbabwe		

Note. Open and Close report the dates of removal and adoption, respectively, of restrictions on capital account transactions (source: IMF). All countries enter panel estimations, Mauritius is not included in the cross-section.

Table B

International Financial Liberalization, crises and economic performance across continents

	Asia	Africa	Latin America	Europe & N. America
IMF (de jure)	109	0	119	119
IMF (de jure): open (0 to 1)	3	0	12	10
IMF (de jure): close (1 to 0)	1	0	11	0
Quinn (de jure)	56	40	60	73
IFIGDP (de facto) (%)	145	105	150	115
Foreign Assets/GDP (%)	63	20	44	50
Foreign Liabilities/GDP (%)	82	85	105	65
Gross External (FDI+Equity)/GDP (%)	26	15	19	24
Gross External Debt/GDP (%)	99	76	121	81
Banking Crises (borderline)	18	27	24	45
Banking Crises (systemic)	34	76	84	28
Currency Crises	28	56	44	37
TFP growth (%)	1.122	-1.213	-1.515	0.050
K growth (%)	7.306	3.811	3.075	3.043
Observations	286	464	396	354
Countries	13	22	18	17

Note. Lines 2 and 3 report the number of switches into and out of capital account liberalization. Lines 1 and 10-12 report the number of country-years with IMF=1, BC=1, BC=2, CC=1, respectively. Quinn's index of financial liberalization is averaged over 48, 52, 72 and 68 observations only. Continent sample averages are reported for the de-facto indicators (IFIGDP and its components) and the growth rates of TFP and Capital, all expressed as a percentage.

Table C
De jure International Financial Liberalization (IMF) - yearly panel - dprobit

	Pr[IMF=1]	**Pr[IMF from 0 to 1]**	**Pr[IMF from 1 to 0]**	**Pr[IMF=1]**	**Pr[IMF from 0 to 1]**	**Pr[IMF from 1 to 0]**
Current Account	-0.017	0.001	-0.001	-0.019	0.001	-0.001 **
	-1.590	0.720	-0.610	-1.560	1.130	-2.140
US real interest	-0.006	0.000	0.001	-0.033 ***	-0.003	0.001
	-1.160	-0.180	0.500	-2.590	-1.590	1.230
Government Size	0.024	0.000	-0.001	0.120	0.004	-0.002
	0.310	0.030	-0.200	1.510	0.660	-0.710
Trade	-0.043	0.015 ***	0.006	-0.086	0.010	0.004
	-0.550	2.650	1.380	-0.910	1.580	0.910
Financial Depth	0.216 ***	0.006	-0.001	0.217 ***	-0.004	0.003
	3.960	1.480	-0.650	3.210	-1.010	1.000
Institutional Quality				0.039	0.008 *	-0.003 *
				0.760	1.880	-1.870
Banking Crisis	-0.003	-0.012 *	0.004	-0.031	-0.014 **	0.002
	-0.080	-1.860	1.140	-0.870	-2.100	0.620
Currency Crisis	-0.044	-0.009	-0.002	-0.004	-0.006	0.002
	-1.110	-0.870	-0.310	-0.070	-0.530	0.300
Pseudo R2	0.171	0.058	0.044	0.242	0.105	0.115
Observations	965	962	962	612	611	611

Note. The dependent variable is the probability that capital account restrictions are: absent (IMF=1), removed (IMF from 0 to 1) or adopted (IMF from 1 to 0). The coefficients in theese columns are estimated with probit and represent the increase in the probability of capital account liberalization (and its swicthes) associated with a per cent change in the covariates. Institutional quality is proxied by the Government Anti-Diversion Policy index. All covariates enter as lagged values. A constant is included in all regressions. The robust standard errors are clustered by country. *, ** and *** indicate that a coefficiant is significant at 10, 5 and 1 per cent level, respectively.

Table 1a

Capital account liberalization and TFP- yearly panel - difference in difference

	1	2	3	4	5	6	7	8
IMF	0.124 ***	0.060 ***	0.056 ***	0.056 ***	0.064 **	0.062 **	0.062 ***	0.075 ***
	0.018	0.019	0.019	0.021	0.028	0.027	0.023	0.017
IMF*BC				0.000				
				0.015				
IMF*CC				0.001				
				0.032				
IMF*Latin America					0.000			
					0.036			
IMF*LDC's						-0.009		
						0.033		
IMF post '85							-0.009	
							0.022	
Banking Crises (BC)			-0.041 ***	-0.041 ***	-0.042 ***	-0.041 ***	-0.041 ***	-0.030 ***
			0.006	0.007	0.006	0.006	0.006	0.006
Currency Crises (CC)			-0.020 *	-0.020	-0.025 **	-0.020	-0.020	-0.008
			0.012	0.014	0.012	0.013	0.013	0.011
Real p.c. GDP								0.778 ***
								0.030
Trade								-0.008
								0.016
Financial Depth								-0.010
								0.011
IPR's								0.010 *
								0.007
IMF_switch3		-0.350	0.001	0.001	0.005	0.001	0.001	0.022
		0.709	0.018	0.018	0.017	0.018	0.018	0.014
Time-continent	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	1461	1461	1398	1398	1398	1398	1398	913
Countries	70	70	70	70	70	70	70	59

Table 1b

Capital account liberalization and capital stock - yearly panel - difference in difference

	1	2	3	4	5	6	7	8
IMF	-0.039 *	-0.093 ***	-0.084 ***	-0.091 ***	-0.151 ***	-0.139 ***	-0.077 ***	-0.091 ***
	0.023	0.025	0.024	0.026	0.036	0.034	0.028	0.022
IMF*BC				0.014				
				0.019				
IMF*CC				0.009				
				0.041				
IMF*Latin America					0.112 **			
					0.045			
IMF*LDC's						0.101 **		
						0.043		
IMF post '85							-0.013	
							0.027	
Banking Crises (BC)			-0.014 *	-0.017 **	-0.011	-0.013 *	-0.014 *	0.021 ***
			0.008	0.009	0.008	0.008	0.008	0.007
Currency Crises (CC)			0.003	0.001	0.004	0.004	0.003	0.015
			0.015	0.017	0.016	0.016	0.016	0.015
Real p.c. GDP								0.833 ***
								0.041
Government Size								0.051 **
								0.021
Financial Depth								-0.007
								0.015
IMF_switch3		-0.036	-0.035	-0.036	-0.033	-0.032	-0.036	-0.019
		0.023	0.022	0.059	0.022	0.022	0.022	0.021
Time-continent	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	1497	1497	1432	1432	1432	1432	1432	1117
Countries	70	70	70	70	70	70	70	61

Note. The dependent variables are the logarithms of TFP in Table 1a, and physical capital in Table 1b. All regressors are in lagged values. IMF is a de jure dummy indicator of capital account liberalization. The variable IMF_switch3 equals 1 in the 3 years prior to capital account reforms, zero elsewhere. LDC's indicates developing countries. The sample spans between 1975 and 1999. Robust standard errors are reported below each coefficient. *, ** and *** indicate significance at 10, 5 and 1 per cent confidence level respectively.

Table 2a
International Financial Liberalization and TFP - yearly panel - difference in difference

	1	2	3	4	5	6	7
IFL = IMF (de jure)		-0.047 **			0.037 ***		-0.056 ***
		0.021			0.014		0.019
IFL = IFIGDP (de facto)	-0.015 ***	-0.089 ***	0.018 **	0.023 ***		0.005	-0.095 ***
	0.005	0.009	0.008	0.008		0.006	0.015
IMF*IFIGDP		0.100 ***					0.103 ***
		0.010					0.015
IFL*Africa			-0.135 ***				
			0.021				
IFL*Latin America			-0.046 ***				
			0.01				
IFL*LDC's				-0.059 ***			
				0.010			
Banking Crises (BC)	-0.033 ***	-0.027 ***	-0.029 ***	-0.030 ***	-0.046 ***	-0.051 ***	-0.038 ***
	0.006	0.006	0.006	0.006	0.009	0.009	0.009
Currency Crises (CC)	-0.019	-0.016	-0.011	-0.018	-0.026 ***	-0.020 *	-0.028 ***
	0.013	0.013	0.013	0.013	0.011	0.011	0.011
Time-continent	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Crises Source	CK-GH	CK-GH	CK-GH	CK-GH	BEKM-P	BEKM-P	BEKM-P
Obs	1492	1333	1492	1492	1390	1438	1303
Countries	67	67	67	67	54	54	54

Table 2b
International Financial Liberalization and capital stock - yearly panel - difference in difference

	1	2	3	4	5	6	7
IFL = IMF (de jure)		-0.139 ***			-0.139 ***		-0.272 ***
		0.028			0.022		0.030
IFL = IFIGDP (de facto)	-0.019 ***	-0.056 ***	-0.014	-0.018 *		-0.019 **	-0.160 ***
	0.006	0.012	0.01	0.010		0.009	0.024
IMF*IFIGDP		0.056 ***					0.155 ***
		0.014					0.023
IFL*Africa			-0.176 ***				
			0.028				
IFL*Latin America			0.006				
			0.014				
IFL*LDC's				-0.001			
				0.013			
Banking Crises (BC)	-0.010	-0.013	-0.006	-0.010	-0.017	-0.011	-0.007
	0.008	0.008	0.008	0.008	0.014	0.013	0.014
Currency Crises (CC)	0.011	0.008	0.023	0.011	0.003	0.020	0.002
	0.017	0.016	0.016	0.017	0.017	0.018	0.017
Time-continent	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Crises Source	CK-GH	CK-GH	CK-GH	CK-GH	BEKM-P	BEKM-P	BEKM-P
Obs	1521	1360	1521	1521	1431	1462	1325
Countries	67	67	67	67	54	54	54

Note. The dependent variables are the logarithm of TFP in Table 2a, and physical capital in Table 2b. All regressors are in lagged values. IMF is a de jure dummy indicator of capital account liberalization. IFIGDP is (Total Foreign Assets+Liabilities)/GDP. The variable IMF_switch3 is included in the regressions of columns 2, 5 and 7. Crises source CK-GH refers to the banking and currency crises indicators of Caprio and Klingebiel (2003) and Glick and Hutchison (2000) respectively. Crises source BEKM-P refers to the banking and currency crises indicators of Bordo et al. (2001). The sample spans between 1975 and 1999, 1973-1999 when BEKM-P is used. Robust standard errors are reported below each coefficient. *, ** and *** indicate significance at 10, 5 and 1 per cent confidence level respectively.

Table 3a
Capital account liberalization and TFP - yearly panel - difference in difference

	1	2	3	4	5	6	7
		Bertrand et al. (2004) correction	No closed countries	Full Sample	Full Sample	Full Sample	Full Sample
IMF		0.077 ***			0.069 ***	0.072 ***	0.062 ***
		0.013			0.019	0.019	0.020
IMF_close			-0.039 **	-0.062 ***			
			0.02	0.015			
Banking Crises (BC)	-0.030 ***		-0.041 ***	-0.030 ***	-0.029 ***	-0.028 ***	-0.028 ***
	0.006		0.009	0.006	0.006	0.006	0.006
Currency Crises (CC)	-0.006		-0.005	-0.007	-0.009	-0.010	-0.008
	0.011		0.019	0.011	0.011	0.011	0.011
Real p.c. GDP	0.778 ***		0.800 ***	0.777 ***	0.755 ***	0.755 ***	0.746 ***
	0.031		0.056	0.030	0.035	0.035	0.036
Financial Depth	-0.007		0.019	-0.010	-0.003	-0.004	-0.003
	0.011		0.017	0.011	0.012	0.012	0.012
Trade	-0.008		0.011	-0.007	0.003	0.003	0.000
	0.016		0.029	0.016	0.018	0.018	0.018
IPR's	0.011		0.004	0.010	0.012 *	0.012 *	0.012 *
	0.007		0.012	0.007	0.007	0.007	0.007
IMF_switch_in3					0.020		
					0.016		
IMF_switch_out3					0.005		
					0.024		
IMF_switch_in_trend						0.008	
						0.008	
IMF_switch_out_trend						0.009	
						0.011	
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time-continent	Yes	No	Yes	Yes	Yes	Yes	Yes
Country pre-IMF trend	No	No	No	No	No	No	Yes
Obs	934	291	375	931	814	814	814
Countries	59	17	29	59	57	57	57

Table 3b
Capital account liberalization and the capital stock - yearly panel - difference in difference

	1	2	3	4	5	6	7
		Bertrand et al. (2004) correction	No closed countries	Full Sample	Full Sample	Full Sample	Full Sample
IFL= IMF		-0.083 ***			-0.090 ***	-0.093 ***	-0.081 ***
		0.014			0.026	0.026	0.027
IMF_close			0.036 *	0.082 ***			
			0.02	0.019			
Banking Crises (BC)	0.020 ***		0.041 ***	0.021 ***	0.013	0.013	0.014 *
	0.008		0.009	0.007	0.008	0.008	0.008
Currency Crises (CC)	0.017		0.009	0.015	0.012	0.012	0.012
	0.015		0.021	0.015	0.015	0.015	0.015
Real p.c. GDP	0.836 ***		0.719 ***	0.834 ***	0.888 ***	0.888 ***	0.909 ***
	0.043		0.057	0.041	0.049	0.049	0.051
Financial Depth	-0.010		0.029	-0.007	-0.024	-0.024	-0.026
	0.015		0.019	0.015	0.016	0.016	0.017
Government Size	0.051 **		0.026	0.051 **	0.023	0.021	0.024
	0.022		0.037	0.021	0.026	0.026	0.026
IMF_switch_in3					-0.037		
					0.023		
IMF_switch_out3					0.025		
					0.033		
IMF_switch_in_trend						-0.017	
						0.011	
IMF_switch_out_trend						0.005	
						0.015	
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time-continent	Yes	No	Yes	Yes	Yes	Yes	Yes
Country pre-IMF trend	No	No	No	No	No	No	Yes
Obs	1060	317	465	1117	875	875	814
Countries	61	17	31	61	59	59	57

Note. The dependent variables are the logarithms of TFP in Table 3a, and physical capital in Table 3b. All regressors are in lagged values. The indicator IMF_close takes value 1 if the country is financially closed as a result of a closing reform. The variables IMF_switch_in3 and IMF_switch_out3 equal 1 in the 3 years prior to capital account opening and closing, respectively. The same variables with _trend termination take value 1, 2 and 3 respectively 3, 2 and 1 year prior to reform. The sample spans between 1975 and 1999. All regressions include a constant. Standard errors are clustered by country. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent, respectively.

Table 4a
International Financial Liberalization (IFL) and TFP Growth - cross-section

	1	2	3	4	5	6	7	8
TFP_25	-0.275	-0.354	-0.329	-0.368	-0.401	-1.377 ***	-0.907 *	-1.031 **
	0.357	0.554	0.399	0.378	0.394	0.519	0.479	0.495
IFL = IMF (de jure)	0.680 *	0.554	0.118	1.345 **	1.130 **	1.016 *	-0.266	-0.177
	0.420	0.434	0.834	0.561	0.566	0.592	0.365	0.387
Banking Crisis (BC)		-1.492	-1.852	-1.132	-1.448	-1.321	-1.386	-1.292
		0.954	1.078	0.959	0.949	1.104	0.943	0.979
Currency Crisis (CC)		-2.107	-1.896	-2.241	-2.092	-2.010	-1.938	-1.660
		3.765	4.566	3.643	3.703	4.177	3.555	3.794
IMF*Latin America				-2.466 ***		-2.570 ***		
				0.675		0.689		
IMF*LDC's					-1.125 *			
					0.600			
IMF*BC			2.189					
			1.586					
IMF*CC			-3.786					
			6.402					
Institutional quality								0.272
								0.236
Financial Depth							0.903 ***	0.657 *
							0.262	0.352
Trade							0.229	0.166
							0.319	0.386
IPR's							0.203	0.151
							0.397	0.434
R2	0.032	0.109	0.126	0.186	0.133	0.361	0.313	0.334
Obs	65	65	65	65	65	46	58	57
Countries	All	All	All	All	All	No Africa	All	All

Table 4b
Capital account liberalization and Capital accumulation - cross-section

	1	2	3	4	5	6	7	8
K_25	-0.300 ***	-0.293 ***	-0.293 **	-0.409 ***	-0.279 **	-0.635 ***	-0.531 ***	-0.432 **
	0.115	0.113	0.115	0.136	0.125	0.220	0.185	0.216
IFL = IMF (de jure)	0.736	0.707	0.759	2.020	0.508	1.782	-0.006	-0.119
	0.789	0.832	1.196	1.283	0.895	1.298	0.847	0.826
Banking Crisis (BC)		-0.692	-0.666	-0.033	-0.730	0.575	0.190	0.199
		1.079	1.212	1.116	1.096	1.219	1.274	1.216
Currency Crisis (CC)		1.758	1.846	1.935	1.678	3.268	5.136	3.124
		4.841	4.964	4.876	4.746	5.468	5.617	5.028
IMF*Latin America				-3.674 ***		-4.802 ***		
				1.325		1.620		
IMF*LDC's					0.395			
					1.567			
IMF*BC			-0.121					
			3.410					
IMF*CC			-0.098					
			1.288					
Institutional quality								-0.606
								0.421
Financial Depth							1.194 **	1.702 **
							0.553	0.681
Trade							-1.005	-0.836
							0.639	0.623
Government Size							0.132	-0.258
							0.576	0.597
R2	0.066	0.071	0.071	0.139	0.073	0.218	0.191	0.229
Obs	69	69	69	69	69	48	63	63
Countries	All	All	All	All	All	No Africa	All	All

Note. The dependent variables are the 25-year average annual growth rates of TFP (100*dlog(TFP)/25) in Table 4a and of physical capital (100*dlog(K)/25) in Table 4b. All regressors are expressed as period average, except for the logaritm of the initial capital stock and TFP level. IMF is the de jure dummy indicator of capital account liberalization averaged over the sample period. The sample spans between 1975 and 1999. All (OLS) regressions include a constant. Robust standard errors are reported below the coefficients. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent, respectively.

Table 5a
International Financial Liberalization (IFL) and TFP Growth - cross-section

	1	2	3	4	5	6	7	8	9	10
TFP_25	-0.338	-0.167	-0.491	-0.567	-0.988 **	-0.659	-1.137 **	-0.669 **	-0.708 *	-0.889 **
	0.475	0.379	0.411	0.437	0.500	0.451	0.480	0.333	0.365	0.427
IFL = IMF (de jure)		-1.382 **						0.273	0.156	
		0.603						0.383	0.749	
IFL = IFIGDP (de facto)	0.031	-1.565 ***	0.269 ***	0.266 ***					0.252	
	0.198	0.450	0.096	0.100					0.667	
IMF*IFIGDP		1.675 ***							-0.075	
		0.467							0.666	
IFL = Quinn (de jure)					1.261 *	1.197 *	0.762			0.879
					0.741	0.689	0.745			0.578
IFL*Africa			-0.987 **			-0.118				
			0.455			0.167				
IFL*Latin America			-0.704 **			-0.402 ***				
			0.280			0.086				
IFL*LDC's				-0.748 **			-0.312 ***			
				0.289			0.098			
Banking Crisis	-1.550	-1.338 *	-1.378 *	-1.162	-1.803 *	-0.788	-1.291	-2.646 *	-2.468 *	-3.148 **
	0.996	0.712	0.819	0.815	1.034	0.990	0.991	1.420	1.416	1.353
Currency Crisis	-1.499	-3.561	-1.839	-2.921	-0.586	-2.293	-1.279	-5.453 ***	-4.806 ***	-4.558 **
	3.799	3.519	3.397	3.101	3.980	3.609	3.677	1.525	1.699	1.745
Crises Source	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	BEKM-P	BEKM-P	BEKM-P
R2	0.088	0.278	0.291	0.269	0.198	0.357	0.287	0.319	0.281	0.287
Obs	63	63	63	63	56	56	56	52	52	50

Table 5b
International Financial Liberalization (IFL) and Capital accumulation - cross-section

	1	2	3	4	5	6	7	8	9	10
K_25	-0.287 **	-0.421 ***	-0.585 ***	-0.371 **	-0.346 **	-0.679 ***	-0.194	-0.376 **	-0.411 **	-0.280
	0.127	0.133	0.159	0.145	0.148	0.185	0.195	0.191	0.206	0.191
IFL = IMF (de jure)		-1.063						0.636	-0.479	
		1.333						0.907	1.579	
IFL = IFIGDP (de facto)	0.048	-1.549 **	0.283 **	0.154					-1.045	
	0.217	0.656	0.117	0.201					1.025	
IMF*IFIGDP		1.638 **							1.079	
		0.683							1.033	
IFL = Quinn (de jure)					-0.361	0.042	-0.061			-0.686
					0.937	0.919	0.965			0.997
IFL*Africa			-1.542 **			-0.537 *				
			0.771			0.295				
IFL*Latin America			-0.793 **			-0.631 ***				
			0.336			0.196				
IFL*LDC's				-0.365			0.346			
				0.274			0.251			
Banking Crisis	-0.714	-0.418	-0.117	-0.421	-1.703	0.177	-2.448 *	-0.555	-1.171	-1.619
	1.113	1.083	1.095	1.166	1.178	1.279	1.319	2.488	2.607	2.513
Currency Crisis	1.088	-1.086	-0.169	0.435	2.354	0.355	2.757	-5.501	-5.994	-5.555
	4.887	5.000	4.737	5.031	4.965	4.929	4.894	3.529	3.646	3.896
Crises Source	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	BEKM-P	BEKM-P	BEKM-P
R2	0.062	0.144	0.163	0.077	0.120	0.249	0.155	0.111	0.138	0.097
Obs	66	66	66	66	59	59	59	54	54	52

Note. The dependent variables are the 25-year average annual growth rates of TFP (100*dlog(TFP)/25) in Table 5a, and of physical capital (100*dlog(K)/25) in Table 5b. All regressors are expressed as period average, except for the logaritm of initial TFP and capital stock. IMF is a de jure dummy indicator of capital account liberalization, Quinn is a de jure indicator of capital account liberalization valued in [0,100], IFIGDP is the gross external position as a ratio of GDP and measures de facto financial integration. The sample spans between 1975 and 1999. All regressions include a constant. Crises Source CK-GH refers to Caprio and Klingebiel (2003), BEKM-P to Bordo et al. (2001). Robust standard errors are reported below the coefficients. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent, respectively.

Table 6a
International Financial Liberalization (IFL) and TFP - Dynamic Panel Data - System GMM

	1	2	3	4	5	6	7
TFP_5	0.950 ***	0.877 ***	0.863 ***	0.857 ***	0.886 ***	0.850 ***	0.858 ***
	0.118	0.089	0.086	0.101	0.085	0.085	0.093
IFL= IMF (de jure)	0.120 *	0.128 **	0.109 *	0.245 ***	0.108 *	0.156 ***	0.144 **
	0.073	0.065	0.066	0.096	0.057	0.053	0.063
Banking Cisis		-0.149 **	-0.111 **	-0.119	-0.141 *	-0.139 *	-0.160 **
		0.076	0.046	0.076	0.075	0.074	0.075
Currency Crisis		0.238	0.082	0.501	-0.001	-0.139	0.293
		0.401	0.286	0.462	0.289	0.336	0.372
IMF*BC				-0.201			
				0.127			
IMF*CC				-1.286			
				0.952			
IMF*Latin America					-0.075		
					0.088		
IMF*LDC's						-0.144	
						0.098	
IMF*Pre_1985							-0.019
							0.076
Trade			-0.049				
			0.063				
Financial Depth			0.037				
			0.046				
Sargan (p-val)	0.686	0.286	0.576	0.733	0.551	0.374	0.524
m2 (p-val)	0.649	0.752	0.811	0.84	0.947	0.664	0.785
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	331	331	268	331	331	331	331
Countries	68	68	59	68	68	68	68

Table 6b
International Financial Liberalization (IFL) and Capital accumulation - Dynamic Panel Data - System GMM

	1	2	3	4	5	6	7
K_5	0.948 ***	0.962 ***	0.935 ***	0.977 ***	0.946 ***	0.969 ***	0.977 ***
	0.032	0.020	0.022	0.018	0.021	0.022	0.021
IFL= IMF (de jure)	0.064	0.009	-0.032	0.056	0.094	-0.018	-0.020
	0.065	0.059	0.076	0.073	0.070	0.074	0.055
Banking Crisis		-0.142 ***	-0.066 **	-0.115 ***	-0.121 ***	-0.129 ***	-0.147 ***
		0.049	0.032	0.037	0.048	..047	0.052
Currency Crisis		-0.166	-0.124	-0.114	-0.159	-0.028	-0.161
		0.245	0.227	0.282	0.210	0.205	0.244
IMF*BC				-0.054			
				0.152			
IMF*CC				-0.484			
				0.605			
IMF*Latin America					-0.139		
					0.100		
IMF*LDC's						0.114	
						0.113	
IMF*Pre_1985							0.105 *
							0.061
Trade			-0.046				
			0.095				
Financial Depth			0.145 ***				
			0.042				
Goverment Size			0.051				
			0.065				
Sargan (p-val)	0.198	0.387	0.823	0.519	0.204	0.262	0.774
m2 (p-val)	0.859	0.610	0.598	0.405	0.47	0.586	0.679
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	344	344	278	344	344	344	344
Countries	70	70	61	70	70	70	70

Note. The dependent variables are the 5-year log-difference and the log of the end-of-period level of TFP (Table 6a) and capital stock (Table 6b). All regressors are log differences and levels of 5-year period averages. The indicator IMF (dummy on yearly basis) refers to de jure capital account liberalization. Trade is import+export, Financial Depth is total credit to the private sector, Government Size is government expenditure; all are expressed as a ratio of GDP. The sample spans between 1975 and 1999. All regressions include a constant. The estimation is performed with the two-step system-GMM procedure. Coefficients and standard errors are reported from the first step. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent, respectively. The p-values for the Sargan overidentification test and the second order serial correlation (m2) test are reported from the second step.

Table 7a
International Financial Liberalization (IFL) and TFP - DPD - System GMM

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
TFP_5	0.909 ***	0.909 ***	0.915 ***	0.872 ***	0.876 ***	0.891 **	0.969 ***	0.819 **	0.947 ***	0.928 ***	0.609 ***	0.679 ***	0.659 ***	1.000 ***
	0.105	0.066	0.087	0.085	0.094	0.106	0.103	0.126	0.108	0.096	0.114	0.108	0.114	0.062
IFL= IFIGDP (de facto)	0.024 ***	-0.033	0.021 ***	0.019 ***	0.027 ***	0.009						0.142 **	0.127	
	0.007	0.025	0.006	0.007	0.009	0.012						0.061	0.091	
IFL= IMF (de jure)		0.037									0.024 **		-0.019	
		0.065									0.009		0.070	
IMF*IFIGDP		0.053 **											0.027	
		0.026											0.065	
IFL= Quinn (de jure)							0.147 **	0.001	0.062	0.172 **				-0.024
							0.074	0.096	0.086	0.071				0.073
IFL*Africa			-0.087 **	-0.098 **				-0.112						
			0.044	0.044				0.100						
IFL*Latin America				-0.009				-0.048 **						
				0.008				0.022						
IFL*LDC's					-0.011				-0.035					
					0.010				0.023					
IFL*Pre_1985						0.018 *				-0.121				
						0.010				0.094				
Banking Crisis	-0.135	-0.107 *	-0.089	-0.106 *	-0.148 *	-0.122	-0.034	-0.017	0.024	-0.060	-0.098	-0.155 **	-0.127 *	-0.124 *
	0.084	0.057	0.068	0.063	0.083	0.081	0.088	0.091	0.073	0.075	0.064	0.067	0.070	0.064
Currency Crisis	0.433	0.141	0.149	0.046	0.228	0.409	0.348	0.146	0.325	0.340	-0.291	-0.266 *	-0.366 **	-0.354 **
	0.364	0.287	0.321	29.000	0.315	0.341	0.417	0.283	0.394	0.389	0.215	0.149	0.187	0.172
Sargan (p-val)	0.224	0.571	0.150	0.148	0.249	0.609	0.473	0.854	0.909	0.864	0.846	0.941	0.999	0.998
m2 (p-val)	0.952	0.836	0.864	0.843	0.834	0.831	0.493	0.532	0.586	0.544	0.890	0.418	0.839	0.038
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Crises Source	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	BEKM-P	BEKM-P	BEKM-P	BEKM-P
Obs	321	317	321	321	321	321	209	209	209	209	313	328	308	261
Countries	65	65	65	65	65	65	59	59	59	59	53	53	53	51

Table 7b
International Financial Liberalization (IFL) and Capital accumulation - DPD - System GMM

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
K_5	0.972 ***	0.965 ***	0.953 ***	0.947 ***	0.971 ***	0.975 ***	0.966 ***	0.968 ***	0.994 ***	0.966 ***	0.971 ***	0.969 ***	0.979 ***	0.994 ***
	0.021	0.019	0.023	0.025	0.018	0.021	0.016	0.022	0.015	0.016	0.019	0.019	0.016	0.013
IFL= IFIGDP (de facto)	0.000	-0.056	-0.003	0.008	0.001	-0.009						0.017	-0.068	
	0.008	0.043	0.008	0.007	0.008	0.013						0.038	0.059	
IFL= IMF (de jure)		-0.077									-0.004		-0.067	
		0.065									0.010		0.051	
IMF*IFIGDP		0.062											0.069	
		0.046											0.050	
IFL= Quinn (de jure)							-0.008	0.063	0.038	0.068				-0.066
							0.061	0.055	0.058	0.059				0.044
IFL*Africa			-0.063	-0.076				0.065 *						
			0.061	0.062				0.036						
IFL*Latin America				-0.033 **				-0.018						
				0.015				0.025						
IFL*LDC's					-0.008				0.034 ***					
					0.011				0.010					
IFL*Pre_1985						0.013				-0.153 ***				
						0.012				0.049				
Banking Crisis	-0.130 ***	-0.081 **	-0.115 ***	-0.099 ***	-0.124 ***	-0.126 ***	-0.073	-0.055	-0.088 **	-0.056	-0.105 ***	-0.096 ***	-0.062 *	0.011
	0.042	0.034	0.039	0.038	0.041	0.041	0.046	0.044	0.045	0.044	0.041	0.039	0.037	0.043
Currency Crisis	-0.239	-0.357 *	-0.286	-0.318	-0.206	-0.231	0.235	0.030	0.142	0.265	-0.372 **	-0.343 ***	-0.319 **	-0.077
	0.269	0.199	0.305	0.251	0.219	0.263	0.196	0.169	0.171	0.189	0.151	0.119	0.125	0.102
Sargan (p-val)	0.265	0.204	0.279	0.202	0.285	0.401	0.199	0.339	0.333	0.597	0.748	0.907	0.999	0.968
m2 (p-val)	0.837	0.674	0.920	0.652	0.731	0.760	0.940	0.536	0.846	0.920	0.004	0.001	0.010	0.850
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Crises Source	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	BEKM-P	BEKM-P	BEKM-P	BEKM-P
Obs	332	328	332	332	332	332	216	216	216	216	321	336	336	268
Countries	67	67	67	67	67	67	60	60	60	60	54	54	54	52

Note. The dependent variables are the 5-year log-difference and the log of the end-of-period level of TFP in Table 7a and of the capital stock in Table 7b. All regressors are log differences and levels of 5-year period averages. The indicators IMF (dummy on yearly basis) and Quinn (between 0 and 100) refer to de jure capital account liberalization. IFIGDP is the gross external position as a ratio of GDP and proxies de facto financial integration. Crises Source CK-GH refers to the banking and currency crises indicators of Caprio and Klingebiel (2003) and Glick and Hutchison (2000) respectively. Crises Source BEKM-P refers to the banking and currency crises indicators of Bordo et al. (2001). The sample spans between 1975 and 1999. All regressions include a constant. The estimation is performed with the two-step system-GMM procedure. Coefficients and standard errors are reported from the first step. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent, respectively. The p-values for the Sargan overidentification test and the second order serial correlation (m2) test are reported from the second step.

Table 8a
International Financial Liberalization (IFL) and TFP - DPD - System GMM - Sub-samples

	1 Africa & Latin America	2 No Africa	3 No (Africa & Latin America)	4 LDC's	5 1975-1994	6 1980-1999	7 1980-1999 Africa & L. A.	8 1980-1999 No (Africa & L. A.)
IFL= IMF (de jure)	-0.280	0.119 *	0.210 **	0.076	0.081	0.144 **	-0.018	0.238 **
	0.098	0.060	0.102	0.119	0.083	0.071	0.101	0.097
Banking Crisis	-0.189 *	-0.114 *	-0.014	-0.201 *	-0.068	-0.145 **	-0.172 *	0.000
	0.109	0.063	0.076	0.107	0.066	0.065	0.101	0.069
Currency Crisis	0.058	0.163	-0.511 *	0.303	-0.111	0.122	-0.063	-0.399
	0.319	0.348	0.308	0.435	0.627	0.370	0.359	0.282
Sargan (p-val)	0.705	0.166	0.760	0.445	0.789	0.157	0.528	0.866
m2 (p-val)	0.957	0.715	0.211	0.980	0.760	0.894	0.983	0.293
Obs	190	231	141	240	264	268	155	113
Countries	39	47	29	49	67	68	39	29
IFL= IFIGDP (de facto)	0.022 ***	0.024 ***	0.023 **	0.027 ***	0.010	0.023 ***	0.019 **	0.026 **
	0.007	0.006	0.011	0.010	0.011	0.007	0.008	0.011
Banking Crisis	-0.206 *	-0.111	0.019	-0.204 **	0.013	-0.122	-0.179 *	0.018
	0.121	0.072	0.063	0.089	0.080	0.077	0.106	0.061
Currency Crisis	0.304	0.425	-0.275	0.407	-0.369	0.386	0.230	-0.244
	0.324	0.431	0.331	0.529	0.521	0.403	0.339	0.361
Sargan (p-val)	0.399	0.418	0.832	0.526	0.928	0.110	0.262	0.670
m2 (p-val)	0.970	0.731	0.409	0.913	0.897	0.769	0.647	0.720
Obs	177	234	144	227	257	259	144	115
Countries	36	47	29	46	65	65	36	29

Table 8b
International Financial Liberalization (IFL) and Capital - DPD - System GMM - Sub-samples

	1 Africa & Latin America	2 Africa	3 No (Africa & Latin America)	4 LDC's	5 1975-1994	6 1980-1999	7 1980-1999 Africa & L. A.	8 1980-1999 No (Africa & L. A.)
IFL= IMF (de jure)	0.036	0.088	-0.003	0.046	0.102	-0.05	-0.032	0.039
	0.066	0.164	0.079	0.095	0.101	0.055	0.075	0.069
Banking Crisis	-0.121 **	-0.143	-0.078	-0.146 ***	-0.153 ***	-0.144 ***	-0.116 *	-0.066
	0.061	0.153	0.061	0.056	0.058	0.049	0.060	0.052
Currency Crisis	-0.209	-0.361	0.587 **	-0.202	-0.408	0.016	-0.009	0.566 **
	0.262	0.408	0.290	0.223	0.302	0.259	0.320	0.272
Sargan (p-val)	0.627	0.900	0.858	0.519	0.263	0.267	0.617	0.637
m2 (p-val)	0.684	0.961	0.878	0.567	0.100	0.459	0.333	0.924
Obs	207	117	137	247	273	279	160	118
Countries	42	24	28	50	69	70	40	30
IFL= IFIGDP (de facto)	-0.001	0.070	-0.003	-0.006	0.003	0.002	-0.008	0.000
	0.010	0.135	0.011	0.009	0.008	0.008	0.008	0.009
Banking Crisis	-0.098 *	-0.034	-0.097	-0.128 **	-0.170 ***	-0.156 ***	-0.122 **	-0.089 *
	0.051	0.068	0.064	0.053	0.058	0.056	0.062	0.054
Currency Crisis	-0.306	-0.954 **	0.694	-0.410 *	-0.114	0.096	-0.021	0.711 **
	0.213	0.459	0.452	0.239	0.335	0.320	0.297	0.361
Sargan (p-val)	0.313	0.984	0.919	0.338	0.210	0.210	0.470	0.447
m2 (p-val)	0.855	0.831	0.905	0.765	0.060	0.504	0.338	0.966
Obs	192	102	140	232	265	267	147	120
Countries	39	21	28	47	67	67	37	30

Note. The dependent variables are 5-year log-difference and log of the end-of-period level of TFP (Table 8a) and capital stock (Table 8b). All regressors are log differences and levels of 5-year period averages. The indicators IMF (dummy on yearly basis) and Quinn (between 0 and 100) refer to de jure capital account liberalization. IFIGDP is the gross external position as a ratio of GDP and proxies de facto financial integration. The sample spans between 1975 and 1999. All regressions include a constant. The estimation is performed with the two-step system-GMM procedure. Coefficients and standard errors are reported from the first step. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent, respectively. The p-values for the Sargan overidentification test and the second order serial correlation (m2) test are reported from the second step.

Table 9
International Financial Liberalization (IFL) and GDP - DPD - System GMM

	1	2	3	4	5	6	7	8
	All Countries	No (Africa and Latin America)	LDC's	All Countries	All Countries	No (Africa and Latin America)	LDC's	All Countries
IFL = IMF (de jure)	0.068	0.096 ***	0.040		-0.009			
	0.045	0.032	0.059		0.051			
IFL = IFIGDP (de facto)				0.015 **	-0.036 *	0.018 ***	0.008	
				0.007	0.022	0.003	0.007	
IMF*IFIGDP					0.053 **			
					0.024			
IFL = Quinn (de jure)								0.064
								0.050
Banking Crisis	-0.066 **	0.006	-0.091 ***	-0.051	-0.047	0.047	-0.092 **	-0.036
	0.032	0.030	0.036	0.042	0.032	0.035	0.046	0.036
Currency Crisis	-0.185	-0.186	-0.029	-0.020	-0.041	-0.274 *	0.155	0.049 **
	0.288	0.120	0.206	0.234	0.161	0.169	0.207	0.122
Sargan (p-val)	0.459	0.975	0.589	0.303	0.468	0.898	0.230	0.426
m2 (p-val)	0.942	0.06	0.881	0.900	0.644	0.110	0.886	0.838
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	333	141	242	323	319	144	229	209
Countries	68	29	49	65	65	29	46	59

Note. The dependent variables are the 5-year log-difference and the log of the end-of-period real GDP per worker. All regressors are log-differences and levels of 5-year period averages. The indicators IMF (dummy on yearly basis) and Quinn (between 0 and 100) refer to de jure capital account liberalization. IFIGDP is the gross external position as a ratio of GDP and proxies de facto financial integration. The sample spans between 1975 and 1999. All regressions include a constant. The estimation is performed with the two-step system-GMM procedure. Coefficients and standard errors are reported from the first step. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent, respectively. The p-values for the Sargan overidentification test and the second order serial correlation (m2) test are reported from the second step.

Table 10a
Capital account liberalization and financial crises

Panel A: Full Sample				
	1	2	3	4
	Any BC	Borderline BC	Systemic BC	Currency
IMF	0.060	0.017 **	-0.031	-0.017
	1.120	2.080	-0.630	-0.800
Deposit Insurance	0.096 *	-0.003	0.099	0.000
	1.650	-0.510	1.500	-0.020
Real p.c. GDP	-0.084 ***	0.001	-0.085 ***	-0.019 *
	-2.790	0.250	-2.560	-1.730
inflation	0.011 ***	-0.038 **	0.010 ***	-0.002
	2.530	-2.200	2.790	-0.640
Trade	0.039	0.009 *	0.003	0.031 **
	1.100	1.770	0.080	2.200
Financial Depth (growth)	-0.325 ***	-0.015	-0.275 ***	-0.153 **
	-3.390	-1.070	-3.610	-2.300
Pseudo R2	0.051	0.072	0.087	0.024
Obs	1077	1077	1077	1039
Panel B: Developed Countries				
	Any BC	Borderline BC	Systemic BC	Currency
IMF	0.399 ***	0.003 ***	0.029	0.061 **
	4.850	2.890	0.250	2.270
Deposit Insurance	0.078	0.003 **	-0.113	-0.027
	0.660	2.290	-0.620	-1.510
Real p.c. GDP	-0.129 **	0.000	-0.131 ***	-0.029 ***
	-2.200	0.720	-2.550	-3.060
inflation	0.166 ***	-0.001	0.164 ***	-0.029
	3.400	-0.500	3.100	-0.690
Trade	0.209 ***	0.002 ***	0.006	0.045 **
	2.670	3.070	0.090	2.400
Financial Depth (growth)	0.209	0.002 *	0.085	0.015
	0.600	1.830	0.290	0.190
Pseudo R2	0.157	0.381	0.263	0.054
Obs	283	283	283	258
Panel C: Developing Countries				
	Any BC	Borderline BC	Systemic BC	Currency
IMF	-0.015	0.006	-0.035	-0.036
	-0.260	0.340	-0.630	-1.590
Deposit Insurance	0.131 *	-0.034 **	0.218 ***	0.010
	1.900	-2.460	3.120	0.460
Real p.c. GDP	-0.100 ***	0.002	-0.099 ***	-0.018
	-2.570	0.270	-2.560	-1.330
inflation	0.005 **	-0.048	0.006 **	0.000
	2.030	-1.580	2.300	0.020
Trade	0.001	0.009	-0.005	0.021
	0.030	0.950	-0.110	1.250
Financial Depth (growth)	-0.573 ***	-0.035	-0.476 ***	-0.258 ***
	-4.400	-1.330	-4.130	-3.550
Pseudo R2	0.067	0.064	0.094	0.036
Obs	794	794	794	781

Note. The dependent variables are the indicators of banking and currency crises, that equals 1 if a crisis of a certain type (any banking crisis, borderline BC, systemic BC or currency crisis) occurs, 0 otherwise. All regressors are in lagged values. The estimation is performed on yearly observations with probit, and the coefficients quantify marginal effects. Standard errors are clustered by country and z-statistics are reported below the coefficients. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent respectively.

Table 10b
International Financial Liberalization and financial crises - yearly panel - dprobit

Panel A

	Any Banking Crisis			Currency Crises		
	1	2	3	4	5	6
	Full Sample	Developed	Developing	Full Sample	Developed	Developing
Quinn	0.164 **	0.365	0.108	-0.012	0.068	-0.029
	2.050	1.310	1.100	-0.270	0.860	-0.420
Pseudo R2	0.046	0.149	0.035	0.009	0.062	0.009
Obs	455	164	291	381	129	252
IFIGDP	0.008	0.117 ***	-0.009	-0.040 **	-0.012	-0.067 ***
	0.380	2.770	-0.560	-2.040	-0.720	-3.700
Pseudo R2	0.040	0.120	0.048	0.036	0.043	0.052
Obs	1165	315	850	1074	270	804

Panel B

	Systemic Banking Crises			Borderline Banking Crises		
	1	2	3	4	5	6
	Full Sample	Developed	Developing	Full Sample	Developed	Developing
Quinn	-0.013	0.095	-0.001	0.222 ***	0.304 ***	0.079 ***
	-0.220	1.110	-0.020	4.720	2.640	3.960
Pseudo R2	0.101	0.666	0.056	0.107	0.223	0.183
Obs	455	164	291	455	164	291
IFIGDP	0.010	0.107 ***	-0.007	-0.002	-0.002	-0.002
	0.600	3.070	-0.540	-0.840	-0.330	-0.650
Pseudo R2	0.071	0.292	0.070	0.048	0.228	0.054
Obs	1165	315	850	1165	315	850

Note. The dependent variables are the indicators of banking and currency crises, that equal 1 if a crisis of a certain type (any banking crisis, borderline BC, systemic BC or currency crisis) occurs, 0 otherwise. All covariates of Table 10a, except IMF, are included but not reported. All regressors are in lagged values. The estimation is performed on yearly observations with probit, and the coefficients quantify marginal effects. Standard errors are clustered by country and z-statistics are reported below the coefficients. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent respectively.

Table 10c
International Financial Liberalization and financial crises - yearly panel - dprobit
Panel A

	Any Banking Crisis			Currency Crises		
	1	2	3	4	5	6
	Full Sample	Developed	Developing	Full Sample	Developed	Developing
IMF_5year	0.057	0.312 ***	0.004	-0.029	0.031	-0.045
	1.200	3.860	0.060	-1.200	1.160	-1.550
Pseudo R2	0.053	0.130	0.059	0.021	0.042	0.029
Obs	1229	315	914	1098	270	828
Quinn_5year	0.077	0.209	0.033	-0.024	0.005	-0.047
	1.530	1.210	0.480	-0.910	1.200	-1.330
Pseudo R2	0.350	0.123	0.021	0.021	0.066	0.035
Obs	823	252	571	741	210	531
IFIGDP_5year	0.009	0.095 ***	-0.008	-0.032 *	-0.006	-0.065 ***
	0.450	2.690	-0.530	-1.800	-0.490	-3.350
Pseudo R2	0.043	0.115	0.048	0.032	0.040	0.049
Obs	1165	315	850	1074	270	804

Panel B

	Systemic Banking Crises			Borderline Banking Crises		
	1	2	3	4	5	6
	Full Sample	Developed	Developing	Full Sample	Developed	Developing
IMF_5year	-0.009	-0.023	-0.007	0.182	0.055 **	0.002
	-0.200	-0.200	0.056	1.470	2.140	0.120
Pseudo R2	0.073	0.248	0.072	0.047	0.265	0.055
Obs	1229	315	914	1229	315	914
Quinn_5year	-0.042	0.037	-0.074	0.076 ***	0.114 ***	0.076 ***
	-0.960	0.550	-1.050	4.350	2.620	3.320
Pseudo R2	0.058	0.358	0.034	0.121	0.278	0.156
Obs	823	252	571	823	252	571
IFIGDP_5year	0.012	0.091 ***	-0.005	-0.002	-0.005	-0.001
	0.710	3.150	-0.540	-0.910	-0.660	-0.550
Pseudo R2	0.071	0.288	0.007	0.048	0.229	0.054
Obs	1165	315	850	1165	315	850

Note. The dependent variables are the indicators of banking and currency crises, that equal 1 if a crisis of a certain type (any banking crisis, borderline BC, systemic BC or currency crisis) occurs, 0 otherwise. All covariates of Table 10a, except IMF, are included in lagged values but not reported. The indicators of financial integration are the averages of the past 5 years. The estimation is performed on yearly observations with probit, and the coefficients quantify marginal effects. Standard errors are clustered by country and z-statistics are reported below the coefficients. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent respectively.

Table 11a
International Financial Liberalization (IFL), Financial Depth, TFP and Capital

	1 TFP	2 TFP	3 TFP	4 Capital	5 Capital	6 Capital
IFL = IMF (de jure)		-0.036			-0.134 *	
		0.060			0.070	
IFL = IFIGDP (de facto)	0.011	-0.040		-0.020 **	-0.067	
	0.009	0.026		0.009	0.043	
IMF*IFIGDP		0.059 **			0.061	
		0.027			0.046	
IFL= Quinn (de jure)			-0.041			-0.053
			0.929			0.058
Financial Depth	0.045	0.024	0.074 *	0.168 ***	0.153 ***	0.052
	0.039	0.035	0.042	0.046	0.041	0.033
Sargan	0.317	0.397	0.993	0.135	0.422	0.540
m2	0.700	0.936	0.720	0.519	0.450	0.788
Time	Yes	Yes	Yes	Yes	Yes	Yes
Obs	300	296	202	309	305	209
Countries	65	65	58	67	67	59

Note: the dependent variables are TFP and physical capital expressed in log and log difference. All equations are estimated with two-step system GMM dynamic panel (DPD) method. Banking and currency crises, lagged dependent variable and a constant are included in all specifications, the is included in the DPD. All regressors are log differences and levels of 5-year period averages. The sample spans between 1975 and 1999. DPD coefficients and standard errors are reported from the first step. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent, respectively. The p-values for the Sargan over-identification test and the second order serial correlation (m2) test are reported from the second step.

Table 11b
International Financial Liberalization (IFL) and Financial Depth

	1	2	3	4
IFL = IMF (de jure)	0.117		0.401 *	
	0.181		0.221	
IFL = IFIGDP (de facto)		-0.03	0.028	
		0.023	0.054	
IMF*IFIGDP			-0.056	
			0.064	
IFL= Quinn (de jure)				0.706 ***
				0.151
Sargan	0.786	0.555	0.841	0.767
m2	0.650	0.676	0.637	0.242
Time FE	Yes	Yes	Yes	Yes
Time-continent	No	No	No	No
Obs	289	290	287	193
Countries	65	64	64	56

Note: the dependent variable is private credit over GDP, expressed in log and log difference. All equations are estimated with two-step system GMM dynamic panel (DPD) method. Banking and currency crises, the lagged dependent variable and a constant are included in all specifications. All regressors are log and log differences of 5-year period averages. The sample spans between 1975 and 1999. Coefficients and standard errors are reported from the first step. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent, respectively. The p-values for the Sargan over-identification test and the second order serial correlation (m2) test are reported from the second step.

Table 12
International Financial Liberalization (IFL) and volatility - Cross-section (1975-1999)

	1	2	3	4	5	6	7	8
	sd(dlogGDP)	sd(dlogGDP)	sd(dlogGDP)	sd(dlogGDP)	sd(dlogTFP)	sd(dlogTFP)	sd(dlogTFP)	sd(dlogTFP)
IFL = IMF (de jure)	-0.027 *		0.025		-0.052 **		0.011	
	0.016		0.026		0.025		0.042	
IFL = IFIGDP (de facto)		-0.003	0.041 ***			0.004	0.075	
		0.003	0.011			0.004	0.065	
IMF*IFIGDP			-0.046 ***				-0.071	
			0.011				0.065	
IFL= Quinn (de jure)				-0.015				-0.028 ***
				0.015				0.010
Banking Crisis	0.069 ***	0.072 ***	0.066 ***	0.084 ***	-0.016	-0.006	-0.018	-0.005
	0.023	0.025	0.021	0.026	0.026	0.022	0.030	0.013
Currency Crisis	-0.017	-0.017	-0.007	-0.003	-0.016	-0.011	0.005	0.002
	0.022	0.021	0.022	0.021	0.015	0.012	0.011	0.011
R2	0.197	0.169	0.319	0.493	0.044	0.007	0.167	0.125
Obs	67	67	67	59	70	67	67	60

Note: OLS regressions. The dependent variables are the standard deviations over the period 1975-99 of the annual growth rates of real GDP and TFP. The regressors are the averages over the period 1975-1999 of the indicators of international financial liberalization and financial crises. Robust standard errors are reported in parenthesis. ***, ** and * indicate that coefficients are significant at 1, 5 and 10 per cent, respectively.