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Financial globalization, convergence and growth*

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Abstract

Using a panel dataset covering the period 1970-2004 and 96 countries, we provide empirical evidence that the composition of foreign capital, measured by the ratio FDI over total liabilities, has a positive effect on growth, directly and through convergence. Developing countries benefit relatively more as their initial GDP is smaller. These results are consistent with a neoclassical growth model with credit constraints, in which the composition of foreign capital affects growth through diffusion of technology. Furthermore, we find that it is the composition of foreign capital, and not its volume, that matters for growth and convergence.

JEL Classification: F21, F36, F43, O47

Keywords: composition of foreign capital; diffusion of technology; convergence; growth

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1 Introduction

The ratio International Financial Integration (stock of foreign assets and liabilities) over GDP gives an idea of the dramatic increase of Financial Globalization in the last decades. Following Lane and Milesi-Ferretti (2007), this ratio increased by a factor of 7, from 45% in 1970 to over 300% in 2004. The theory suggests that Financial Globalization would lead to a better allocation of resources, implying an increase of growth, with capital going from industrial to developing countries. But there is no conclusive and robust empirical evidence of a positive effect of Financial Globalization on growth, as stated by Kose, Prasad, Rogoff and Wei (2006) after surveying this literature. In general, most studies were looking for a positive effect of a proxy of financial integration on growth. Henry (2007) provides a critical reading of the literature on Financial Globalization from the perspective of the textbook theory of liberalization. He claims that the neoclassical growth model only suggests a temporary effect on growth and that the macro growth regressions are not able to capture this effect following financial integration.

The results of Prasad, Rajan and Subramanian (2007) are even more puzzling. They find a positive correlation between current account balances and growth among developing countries, implying that a reduced reliance on foreign capital is associated with higher economic growth. Although this result is weaker in panel data estimations, the authors never find evidence of a positive effect of total foreign capital inflows on growth. Although these results contradict theoretical expectations, those obtained when analyzing the allocation of foreign capital are more encouraging. Prasad et al. (2007) find that the fastest-growing group of developing countries received the most foreign direct investment (FDI) over the period 1970-2004. Since these countries do not utilize more foreign capital overall, this finding is consistent with Rodrik and Subramanian (2008) who, after suveying the recent empirical evidence, conclude that "*It is time for a new paradigm on financial globalization, and one that recognizes that more is not necessarily better.*" (page 18) . This is also the main point of our paper. Concretely, our purpose is to show that the composition of foreign capital matters more than its volume for economic growth and convergence.

We present and test a neoclassical growth model for a small open economy where the composition of foreign capital affects growth through the diffusion of technology. Instead of relying on proxies based on all foreign capital or on its components over GDP, as in previous studies, we use the composition of foreign capital. We find that the composition of foreign capital, measured by the ratio foreign direct investment[1] over total liabilities, has a positive effect on growth through mechanisms in line with the model. That is, the effect on growth is related to an increase of convergence and to a direct effect on growth. The later effect could be associated with innovation. The former effect is associated with the possibility of an increase on technology catch-up.

Although the effect on growth associated with convergence in capital is one of the mechanisms of the dynamics of the small open economy neoclassical growth model, we are not aware of previous studies that analyze empirically, and in a systematic way, the convergence effect associated with the composition of foreign capital, nor the direct effect mentioned above.

Figure 1 provides an illustration of the effect of the composition of foreign capital on convergence. It shows the relationship between the growth rate of GDP and the initial level of GDP, using five-year period data for 96 countries over 1970-2004. In each graph we have the residuals of a growth regression[2] and the initial level of GDP, and the countries are ranked in function of their composition of foreign capital. The left-hand side graph shows the results for the lower quartile and the right-hand side shows those for the upper quartile. There is a stronger negative relationship between growth and initial GDP for the countries in the upper quartile, which implies that convergence is faster for countries that rely relatively more on foreign direct investment in their total foreign liabilities.

[INSERT FIGURE 1 ABOUT HERE]

In Section 2 we present a small open economy model, based on Barro, Mankiw and

[1] Foreign direct investment gives the foreign investors a lasting interest (10% or more of voting stock) in enterprises operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital.

[2] We run OLS regressions. The control variables are initial level of GDP, investment rate, average years of secondary schooling, population growth, trade openness, and the composition of foreign capital. The variables are defined in Section 3. Descriptive statistics are reported in Table 1.

Sala-i-Martin (1995), where only a part of the capital serves as collateral in international markets[3]. We introduce in this model a role for the composition of foreign capital on convergence and on growth, through diffusion of technology. The diffusion of technology depends on the lag of technology relatively to the world frontier, following the idea of Nelson and Phelps (1966)[4], and also on the composition of foreign capital. On the one hand, the more backward a country is, the higher its growth rate of technology will be. On the other hand, the higher the share of foreign direct investment in foreign capital, the higher the growth rate of technology for a given lag. A related paper to our specification is Findlay (1978), who uses the ratio foreign capital in the form of foreign direct investment over national capital, instead of the composition of foreign capital[5].

This specification introduces a role for foreign capital on growth, through diffusion of technology. Foreign capital is important, but its importance depends of its composition. Both external debt and foreign direct investment may help in the process of diffusion, but relatively more foreign direct investment will have a higher effect.

This mechanism, showing how financial globalization has an effect on growth, also points out that the volume of all foreign capital or of its components alone may not capture the process of technology diffusion. Moreover, the transmission mechanism of the composition of foreign capital appears theoretically (and empirically) in two ways: first, the interaction of the composition of foreign capital with initial productivity (proxied by initial GDP, in the empirical analysis), capturing the catch-up effect; and, second, the composition of foreign capital alone, capturing an innovation effect. We would like to point out that both effects are associated with the transition dynamics of technology.

The empirical implications of our open-economy growth model are tested using system-generalized method of moments (system-GMM) estimations on a dataset comprising seven consecutive and non-overlapping 5-year periods from 1970 to 2004, and 96 countries. After

[3]For an early model with borrowing constraints, see Cohen and Sachs (1986). These authors assume that a fraction of the capital, say k, serves as collateral. Barro et al. (1995) assume instead that there are two types of capital and that only one of the capitals serves as collateral.

[4]In their paper, Nelson and Phelps (1966) consider the lag between "best practices" and actual technology of a country. For a given lag, the technology of a country increases with human capital.

[5]Findlay (1978) does not consider the inflows of capital endogenously. Moreover, as we will see empirically, the composition of foreign capital captures the role of catch-up, while a variable like foreign direct investment over GDP does not.

controlling for initial GDP per capita, the investment share, initial education, population growth, and trade openness, we find that economies with relatively more foreign direct investment in the composition of foreign capital have higher convergence and a higher direct effect on growth. This important result is robust to (1) considering both foreign assets and liabilities in the definition of the composition of foreign capital; (2) restricting the sample to the period 1985-2004, over which financial globalization grew considerably; (3) restricting the sample to the developing countries; (4) controlling for macroeconomic stability and institutions; and, (5) considering alternative explanations for convergence and growth, such as human capital, openness to international trade, and financial development.

Our empirical analysis makes two important contributions to the literature. First, we show that the inclusion of an interaction term of the composition of foreign capital with initial GDP per capita is not only theoretically necessary, but it also clearly improves the empirical results. Studies that do not account for this effect of financial globalization on convergence suffer from omitted variable bias. Second, we also show that the composition of foreign capital is a crucial factor for the effects of financial globalization on economic growth. Concretely, a greater share of foreign direct investment (FDI) in international financial liabilities leads to higher convergence and to a higher direct effect on growth. Results in the baseline estimations for portfolio equity go in the same direction, but are weaker and do not survive the robustness tests. Finally, a greater share of external debt in financial liabilities has the opposite effects of FDI, as suggested by the model.

This paper is related to the literature on the growth effects of financial globalization, summarized in recent surveys by Kose et al. (2006) and by Henry (2007). Although the results of the studies they surveyed are not conclusive in general, there is a notable exception. Bekaert, Harvey and Lundblad (2005) find a positive and robust effect of equity market liberalization on growth of about 1% per year over a five-year period. Our results also point to a direct effect, but the overall impact depends on the convergence effect. Moreover, when using the ratio portfolio equity liabilities over total liabilities we do not reach robust results.

Some authors have emphasized pre-conditions for countries having benefits with financial globalization. This is the case with foreign direct investment and its interaction with some variables. Foreign direct investment will lead to higher growth, if the country has a relatively high level of financial development (Alfaro, Chanda, Kalemli-Ozcan and Sayek, 2004) or of human capital (Borensztein, De Gregório and Lee, 1998). In general, these high levels are more common in developed countries. We find that most developing countries benefit relatively more in terms of growth because of the convergence effect.

In a calibrated version of the neoclassical growth model, Gourinchas and Jeanne (2006) estimate the welfare gains of financial integration of a small open economy, when compared to an economy in autarky. They provide estimates of growth and welfare gains for countries beginning out of the steady state. The welfare gains are small, but would improve if catch-up of the productivity was associated with the entry of foreign capital in the form of foreign direct investment. Our results, based on a growth model with a process of diffusion of technology, in which the composition of foreign capital plays a role, show that the gains on growth vary between 0.65 percentage points for the average country and 1 percentage point for the average developing country.

Finally, there is a literature on the catch-up effect using cross-country regressions. Benhabib and Spiegel (1994), directly inspired in Nelson and Phelps (1966), find evidence for a role of human capital in catch-up. Based on a Schumpeterian model, Aghion, Howitt and Mayer-Foulkes (2005) show empirically that financial development has a positive effect on convergence.

The paper is organized as follows. Section 2 presents a small open economy growth model with diffusion of technology and its predictions. In Section 3 we describe the dataset and the empirical methodology. The empirical results are discussed in Section 4. Finally, concluding remarks are presented in Section 5.

2 A small open economy with diffusion of technology

This Section presents a neoclassical growth model with credit constraints, following Barro et al. (1995), where the composition of foreign capital affects growth through the diffusion of technology.

2.1 Diffusion of technology

Instead of a constant growth rate of technology, we assume a process of diffusion of technology. There will be a leader country with a constant growth rate of technology, but the growth rate of technology of any other country will depend on its initial level of technology.

The growth rate of technology in the leader country is given by

$$g^* = \frac{\dot{A^L}}{A^L},$$

where A^L represents the level of technology of the leader country.

We assume that the growth rate of technology in the small open economy is represented by

$$g = \frac{\dot{A}}{A} = \lambda * \left(\frac{A^L - A}{A} \right) + \tau. \tag{1}$$

There is catch-up to the technology of the leader. Following the idea of Nelson and Phelps (1966), this catch-up effect increases with the gap of technologies $A^L - A$ and with the technology absorption rate λ. We also represent a process of innovation by τ, with $\tau \leq g^*$.

During the transition $g > g^*$, as $A^L - A > 0$. In the steady state $g = g^*$.

Defining $a = \frac{A}{A^L}$:

$$\frac{\dot{a}}{a} = \lambda * \left(\frac{1}{a} - 1 \right) + \tau - g^* \tag{2}$$

and $g = \frac{\dot{a}}{a} + g^*$. It follows that with $\dot{a} = 0$, $g = g^*$ and

$$a^* = \frac{\lambda}{\lambda + g^* - \tau}.$$

Our key assumption is that λ will be a function of the composition of foreign capital:

$$\lambda = \lambda\left(\frac{FDI}{Foreign\_Cap}\right)$$

With relatively more foreign direct investment (FDI) than external debt ($DEBT$) on total foreign capital, the probability of diffusion of new technologies in the country increases. Taking this channel into account when we look for the effects of Financial Globalization on growth, there is a contrast between $DEBT$ and FDI, captured by the composition of foreign capital, but not with all foreign capital or its components individually.

2.2 The open economy with partial capital mobility

The production function is Cobb-Douglas:

$$Y = K_C^{\alpha} K_U^{\eta} \left(AL\right)^{1-\alpha-\eta}$$

with $\alpha + \eta < 1$. Y is output, L is labor , A is the level of technology. K_C is a capital that can be used as collateral in the foreign market, and K_U is another capital but that cannot be used as collateral. The production function in intensive form is given by:

$$y = k_C^{\alpha} k_U^{\eta}, \tag{3}$$

where y is output per unit of effective labor and k_i $(i = C, U)$ is capital per unit of effective labor.

The rental price of capitals, R_{kC} and R_{kU}, are given by

$$R_{kC} = \alpha k_C^{\alpha-1} k_U^{\eta} = \alpha \frac{y}{k_C} \tag{4}$$

$$R_{kU} = \eta k_C^{\alpha} k_U^{\eta-1} = \eta \frac{y}{k_U}. \tag{5}$$

The budget constraint is

$$\dot{k_C} + \dot{k_U} - \dot{d} = k_C^{\alpha} k_U^{\eta} - (\delta + n + g)(k_C + k_U) - (r^* - n - g)\, d - c, \tag{6}$$

where $k_{C0} > 0$, $k_{U0} > 0$ and d_0 are given. d is debt per units of effective labor, c is consumption per units of effective labor, and r^* is international real interest rate. The depreciation rate is δ, and population growth is n.

The economy can borrow abroad but, as stated above, only k_C serves as collateral ($d \leq k_C$).

If $k_{C0} + k_{U0} - d_0 \geq k_U^*$, the initial stocks of capitals are higher than the steady state level of the capital that can not be used as collateral and the economy goes directly to the steady state.

But with $k_{C0} + k_{U0} - d_0 < k_U^*$, the borrowing constraint is binding and $d = k_C$. For every period t, we have the rental rate of k_C equal to the international interest rate: $R_k - \delta = r^*$. Using equation (4):

$$\frac{k_C}{y} = \frac{\alpha}{r^* + \delta}. \tag{7}$$

Inserting equation (7) in equation (3), the production function is written as

$$y = B\,(k_U)^{\varepsilon}, \tag{8}$$

with $B = \left[\left(\frac{\alpha}{r^*+\delta}\right)^{\alpha}\right]^{\frac{1}{1-\alpha}}$ and $\varepsilon = \frac{\eta}{1-\alpha}$. As $0 < \alpha + \eta < 1$, it follows that $0 < \varepsilon < \alpha + \eta < 1$. Notice that $(1 - \varepsilon) = \frac{1-(\alpha+\eta)}{1-\alpha} > 1 - (\alpha + \eta)$.

Taking into account equations (7) and (8) and that $d = k$, the budget constraint, given by equation (6), takes now the following form:

$$\dot{k_U} = (1 - \alpha)\, B\,(k_U)^{\varepsilon} - (\delta + n + g)\, k_U - c.$$

Assuming that savings are a constant fraction of output[6], $s\left(1-\alpha\right)B\left(k_U\right)^{\varepsilon}$, we have

$$\dot{k_U} = \overline{s}\left(k_U\right)^{\varepsilon} - \left(\delta + n + g\right)k_U, \tag{9}$$

where $\overline{s} = s\left(1-\alpha\right)B$.

We characterize now the steady state of this open economy with credit constraints. With $\dot{k_U} = 0$, it follows from (9) that

$$k_U^* = \left[\frac{\overline{s}}{\delta + n + g^*}\right]^{\frac{1}{1-\varepsilon}}. \tag{10}$$

where g^* is the steady state growth rate of technology, which is equal for every country and also equal to the growth rate of technology of the leader country.

2.3 Transitional dynamics

Using the relation between output and the capital that can not be used as collateral, given by equation (8), we write equation (9) as a function of output:

$$\frac{\dot{y}}{y} = \varepsilon\left[\overline{s}y^{\frac{\varepsilon-1}{\varepsilon}} - \left(\delta + n + g\right)\right].$$

Defining Y_{pc} as GDP per capita, we have $\frac{\dot{y}}{y} = \frac{\dot{Y_{pc}}}{Y_{pc}} - \frac{\dot{A}}{A} = \frac{\dot{Y_{pc}}}{Y_{pc}} - g$. Taking also into account that $k_U = \left(\frac{y}{B}\right)^{1/\varepsilon}$ and $\ln k_U = \frac{1}{\varepsilon}\ln\left(\frac{y}{B}\right)$, which follow from equation (8), we linearize the equation above around the steady state to get:

$$\frac{\dot{Y_{pc}}}{Y_{pc}} = g^* - \beta\left(\ln y - \ln y^*\right) + \left(1-\varepsilon\right)\left(g - g^*\right) \tag{11}$$

$$g - g^* = \frac{\dot{a}}{a} = \lambda\left(\frac{1}{a} - 1\right) + \tau - g^* = -\lambda\ln a + \tau - g^* \tag{12}$$

where $\beta = \left(1-\varepsilon\right)\left(\delta + n + g^*\right)$ and $a = A/A^L$. Thus $\ln a < 0$ for countries below the technological frontier. Equation (12) is related to equations (1) and (2).

The transitional dynamics of GDP per capita depends on convergence of capital to its

[6] We coud also introduce consumer optimization in the model.

steady state level and also on the technological catch-up:

$$\frac{\dot{Y_{pc}}}{Y_{pc}} = g^* + \beta\left(\ln y^* - \ln y\right) + (1-\varepsilon)\left(-\lambda \ln a + \tau - g^*\right). \tag{13}$$

For a country below the steady state level of capital and also below the technological frontier, the growth rate of GDP per capita will be higher than g^*, because $\beta\left(\ln y^* - \ln y\right) > 0$ and $(1-\varepsilon)\left(g - g^*\right) > 0$.

We are principally interested in the second of these effects and how it depends on diffusion of technology through the composition of foreign capital.

2.4 Implications of the composition of foreign capital on growth though diffusion of technology

Defining the composition of foreign capital as $S = \frac{FDI}{Foreign\_Cap}$ and assuming that $\lambda(S) = \lambda * S$ and $\tau(S) = \tau * S$, we have:

$$g = -\lambda * S * \ln a + \tau * S.$$

It follows that there are two effects of the composition of foreign capital on the growth rate of the technology:

$$\frac{\partial g}{\partial S} = \underbrace{-\lambda \ln a}_{\text{Effect 1}} + \underbrace{\tau}_{\text{Effect 2}}$$

Effect 1 and Effect 2 are as presented below.

- Effect 1: $-\lambda \ln a > 0$. The first effect is an increase in the catch-up effect, when FDI increases in the composition of foreign capital. The transfer of technology may increase for a given gap of technologies with relatively more FDI.
- Effect 2: $\tau > 0$. The second effect is also positive and could be associated with a technological improvement following the increase in FDI, through innovation in the country.

Taking into account equation (11) and defining $\frac{\dot{Y_{pc}}}{Y_{pc}} = g_{Y_{pc}}$, the composition of foreign

capital affects growth though diffusion of technology:

$$\frac{\partial g_{Y_{pc}}}{\partial S} = (1 - \varepsilon) \frac{\partial g}{\partial S}.$$

We can present the effects of the composition of foreign capital on growth in the following proposition:

Proposition 1 *Economies with relatively more FDI in the composition of foreign capital have a higher convergence and a higher direct effect on growth.*

Empirically, the first effect can be captured by an interaction term between $\ln Y_0$ and S. The second effect appears as an explanation for a direct effect of S on growth, although we are using an exogenous growth model.

The next Sections will analyze empirically the main implications of the model.

2.5 Empirical implications

Taking into account the implications derived above, we have:

$$\begin{aligned} \ln Y_{i,t} - \ln Y_{i,t-1} &= \gamma_1 \ln Y_{i,t-1} + g_{i,t} + \psi' * Z_{i,t} + \kappa_i + \mu_t + \epsilon_{i,t} \\ g_{i,t} &= \gamma_2 * S_{i,t} * \ln Y_{i,t-1} + \gamma_3 * S_{i,t}. \end{aligned}$$

The empirical model can be summarized as follows:

$$\ln Y_{i,t} - \ln Y_{i,t-1} = \gamma_1 \ln Y_{i,t-1} + \gamma_2 * S_{i,t} * \ln Y_{i,t-1} + \gamma_3 * S_{i,t} + \psi' * Z_{i,t} + \kappa_i + \mu_t + \epsilon_{i,t} \quad (14)$$

where $i = 1, ..., N$ represents countries, $t = 1, ..., T_i$ is time, $\ln Y_{i,t}$ is the logarithm of real GDP per capita of country i at the end of period t, $S_{i,t}$ is the composition of foreign capital, $Z_{i,t}$ is a set of variables that may affect economic growth, κ_i are the fixed effects of country i, μ_t are period dummies, and $\epsilon_{i,t}$ is the error term.

Notice that $\ln A$ is proxied by $\ln Y$ (log GDP per capita).

The effects of $\lambda\left(\frac{FDI}{Foreign\_Cap}\right) = \lambda(S)$ on (transitional) growth are through diffusion of technology:

$$\frac{\partial(\ln Y_{i,t} - \ln Y_{i,t-1})}{\partial S_{i,t}} = \gamma_2 * \ln Y_{i,t-1} + \gamma_3. \tag{15}$$

Following the intuition of the model, we expect:

- $\gamma_2 < 0$. The greater the gap of technology between the country and the leader, that is the smaller the technology level of the country, the higher the catch-up effect as S increases.
- $\gamma_3 > 0$. This effect is positive and may be associated with innovation in the country.

The total effect of the composition of foreign capital on growth is as follows:

$$\frac{\partial(\ln Y_{i,t} - \ln Y_{i,t-1})}{\partial S_{i,t}} > 0 \qquad \text{with} \quad \ln Y_{i,t-1} < -\frac{\gamma_3}{\gamma_2}.$$

It follows that countries with lower initial level of GDP have a higher catch-up effect and then a higher total effect on growth.

The effect on convergence is given by:

$$\begin{aligned} \frac{\partial(\ln Y_{i,t} - \ln Y_{i,t-1})}{\partial \ln Y_{i,t-1}} &= \gamma_1 + \gamma_2 S_{i,t} < 0 \\ \gamma_1 &< 0, \qquad \gamma_2 < 0. \end{aligned}$$

Following the model, we expect $\gamma_2 < 0$. Thus an increase on S , that is, an increase of foreign direct investment in total foreign capital, will have a positive effect on convergence.

3 Data and empirical analysis

Annual data from 1970 to 2004 was gathered for 209 countries, but missing values for several variables reduce the number of countries in the estimations to 96. The main data sources were the *Penn World Tables, Mark 6.2* (PWT) - for GDP, investment, population, trade openness, and size of government, Barro and Lee (2000) updated educational

attainment dataset, Lane and Milesi-Ferretti (2007)'s *External Wealth of Nations Mark II*, the updated version of the *Financial Structure Dataset* of Beck, Demirgüç-Kunt and Levine (2000), and the International Monetary Fund's *International Financial Statistics* (IFS-IMF).

The hypothesis that financial globalization affects economic growth and convergence is tested by estimating dynamic panel data models for average annual real GDP per capita growth on a sample composed of seven consecutive, non-overlapping, 5-year periods from 1970 to 2004 (1970-74, 1975-79, ..., 1995-99, and 2000-04). Our baseline model includes the following explanatory variables:

- *Initial GDP per capita (log)* (PWT). A negative coefficient is expected, indicating the existence of conditional convergence among countries;

- *Composition of Financial Liabilities* (several proxies from Lane and Milesi-Ferretti (2007) will be used). We hypothesize that a greater share of FDI contributes to higher steady state GDP, and thus to higher growth, which is consistent with a positive coefficient;

- *Composition of Financial Liabilities * Initial GDP per capita.* This interaction term is used to test the hypothesis that a greater share of FDI also increases income convergence. Since greater convergence means that poorer countries should grow faster, we expect a negative coefficient;

- *Investment (% GDP)* (PWT). A positive coefficient is expected, as greater investment shares have been shown to be positively related with economic growth (Mankiw, Romer and Weil, 1992). For a more recent discussion, see Hsieh and Klenow (2007);

- *Initial years of schooling:* secondary years of schooling of the population above 15 years old (Barro and Lee, 2000). This variable is used to control for the level of human capital, which should be positively related to economic growth. A positive coefficient is expected;

- *Population growth* (PWT). All else remaining the same, greater population growth leads to lower GDP per capita growth. Thus, a negative coefficient is expected;

- *Trade openness* (PWT). Assuming that openness to international trade is beneficial to economic growth, a positive coefficient is expected.

Descriptive statistics of these and other variables for the 96 countries considered in the baseline estimations are shown in Table 1.

[INSERT TABLE 1 ABOUT HERE]

Equation (14), which summarizes our empirical model, is equivalent to ($\alpha = 1 - \gamma_1$):

$$\ln Y_{i,t} = \alpha \ln Y_{i,t-1} + \gamma_2 S_{i,t} * \ln Y_{i,t-1} + \gamma_3 S_{i,t} + \psi' Z_{i,t} + \kappa_i + \mu_t + \epsilon_{i,t} \qquad (16)$$

$$i = 1, ..., N \qquad t = 1, ..., T_i$$

OLS estimates of this baseline model will be inconsistent, both in the fixed and random effects settings, because the lagged value of the dependent variable would be correlated with the error term, $\epsilon_{i,t}$, even if the latter is not serially correlated[7]. Arellano and Bond (1991) developed a Generalized Method of Moments (GMM) estimator that solves this problem. Taking first differences of Equation (16) removes the individual effects (κ_i) and produces an equation that is estimable by instrumental variables (where D is the first-difference operator):

$$D \ln Y_{i,t} = \alpha D \ln Y_{i,t-1} + \gamma_2 D \left(S_{i,t} * \ln Y_{i,t-1} \right) + \gamma_3 D S_{i,t} + \psi' D Z_{i,t} + D\mu_t + D\epsilon_{i,t} \qquad (17)$$

$$i = 1, ..., N \qquad t = 1, ..., T_i$$

The valid instruments are: levels of the dependent variable, lagged two or more periods; levels of the endogenous variables, lagged two or more periods; levels of the pre-determined

[7] See Arellano and Bond (1991) and Baltagi (2001).

variables, lagged one or more periods; and the levels of the exogenous variables, current or lagged or, simply, the first differences of the exogenous variables. More moment conditions are available if the explanatory variables are uncorrelated with the individual effects. Then, the first lags of these variables can be used as instruments in the levels equation. This estimation combines the set of moment conditions available for the first-differenced equations with the additional moment conditions implied for the levels equations. If the level of an explanatory variable is correlated with the individual effects but its first-differences are not, lagged values of the first-differences can be used as instruments in the equation in levels (Arellano and Bover, 1995). Lagged differences of the dependent variable may also be valid instruments for the levels equations. According to Blundell and Bond (1998) this system-GMM estimator is preferable to that of Arellano and Bond (1991) when the dependent variable and/or the independent variables are persistent, which corresponds to our case.

4 Empirical Results

The main objective of our empirical analysis is to test the hypothesis, stated in Proposition 1, that a greater share of FDI in foreign financial liabilities leads to faster convergence and economic growth. Then, we check if the share of FDI is still determinant when foreign assets are also considered. The following step of the empirical analysis is to evaluate the sensitivity of the results to alternative samples. Concretely, we estimate the models for a sample covering only the period 1985-2004, the part of the original sample for which financial globalization is greatest, and for a sample of developing countries, so that we can analyze the effects of the composition of foreign capital in those countries. Then, we consider alternative explanations for convergence and growth, such as human capital, openness to international trade, and financial development. Finally, we account for the effects of institutions on growth.

4.1 Composition of foreign capital, convergence and growth

The results of the estimation of the empirical model described above on a sample of seven consecutive and non-overlapping 5-year periods from 1970 to 2004, using the system-GMM methodology, are presented in Table 2[8]. The model of column 1 follows the traditional approach of including a proxy for the stock of foreign capital along with the usual control variables.[9] The ratio of financial liabilities of portfolio equity and foreign direct investment to GDP, $\frac{Equity\_l+FDI\_l}{GDP}$, is not statistically significant, which could indicate that this type of foreign capital does not affect growth[10]. According to our theoretical model, the previous specification may suffer from omitted variable bias, as it does not account for the effects of foreign capital on convergence. That is, the model of column 1, like many similar ones found in the literature[11], is not correctly specified because it omits the interaction term of foreign capital with initial GDP. This problem is accounted for in column 2, but $\frac{Equity\_l+FDI\_l}{GDP}$ and its interaction with initial GDP are not statistically significant, indicating that the stock of FDI and portfolio Equity liabilities does not affect growth and convergence.

[INSERT TABLE 2 ABOUT HERE]

The model of column 3 is similar to that of column 1, but the proxy for the stock of financial liabilities is replaced by a proxy of their composition, $\frac{Equity\_l+FDI\_l}{Fin.Liab.}$. Again, foreign capital does not seem to affect growth. As noted above, this specification may suffer from omitted variable bias. This is accounted for in column 4, where both the proxy for the composition of financial liabilities and its interaction with initial GDP are

[8] All explanatory variables except the period dummies are treated as endogenous. In order to avoid a number of instruments greater than the number of countries, only the second lags of the dependent and explanatory variables are used as instruments in the first-difference equations, and their once lagged first-differences are used in the levels equation. Two-step results using robust standard errors corrected for finite samples (using Windmeijer (2005)'s correction) are reported in all tables.

[9] See, among others, Edison, Levine, Ricci and Sløk (2002).

[10] The results are similar for $\frac{Equity\_l}{GDP}$ and for $\frac{FDI\_l}{GDP}$. When the ratio of the total stock of liabilities to GDP $\left(\frac{Fin.Liab.}{GDP}\right)$ is used instead, it is weakly statistically significant, with a negative coefficient, indicating that foreign capital may be detrimental to growth. These results and all other not reported in the paper are available from the authors upon request.

[11] See Edison, Klein, Ricci and Sløk (2004), Henry (2007), and Kose et al. (2006) for surveys. Henry (2007) argues that most studies do not really address the theory they set out to test, as the neoclassical growth model predicts just a temporary increase in the rate of economic growth (faster convergence to the steady state) as the result of current account liberalization.

highly statistically significant and have the expected signs. In columns 5 and 6, we check the robustness of this result to the simultaneous inclusion of $\frac{Equity\_l+FDI\_l}{GDP}$ and of its interaction with initial GDP in the model. The results clearly demonstrate that the composition of financial liabilities affects growth and convergence, while the stock of FDI and portfolio equity does not. This result is consistent with our hypothesis that the composition of foreign capital matters more than its volume for economic growth and convergence. It also provides empirical support for the conclusion of Rodrik and Subramanian (2008) that more financial globalization is not necessarily better.

The results concerning the control variables generally conform to our priors, with the exception that *Initial Years of Schooling* is never statistically significant. *Investment (%GDP)* and *Trade Openness* have positive coefficients, although the latter is only weakly statistically significant in column 1, and *Population Growth* has the expected negative coefficient.

In the estimations of Table 3 we take a deeper look at the composition of financial liabilities. Column 1 replicates column 4 of Table 2 for comparison purposes. The effects of the shares of portfolio equity and FDI on financial liabilities are analyzed in columns 2 and 3, respectively. Both support the main hypotheses of our model, but results are much stronger for the share of FDI than for the share of Equity, as both the estimated coefficients and the t-statistics are of greater magnitude for $\frac{FDI\_l}{Fin.Liab.}$[12]. Finally, the effects of the share of external debt are shown in column 4. These indicate that a greater weight of external debt on financial liabilities is detrimental to growth and convergence, as the signs of the estimated coefficients are exactly the opposite of those for the other proxies. This result is also in line with the predictions of the model.

[INSERT TABLE 3 ABOUT HERE]

Overall, these results clearly support Proposition 1, which states that economies with relatively more FDI in the composition of foreign capital have a higher convergence (the

[12]When $\frac{FDI\_l}{GDP}$ is used instead, the coefficients of interest are only weakly statistically significant. Thus, results improve when the interaction with initial GDP is included, but they are weaker for the proxy of the stock of FDI than for that of the share of FDI. Furthermore, $\frac{FDI\_l}{GDP}$ and its interaction with *InitialGDP* are generally not statistically significant when included in the robustness and sensitivity tests of tables 4-9.

interaction term with initial GDP is negative and statistically significant) and a higher direct effect on growth (the proxy for the composition of financial liabilities is positive and statistically significant). We can illustrate these effects on growth with column 3 of Table 3. Increasing the share of FDI in total liabilities, $\frac{FDI\_l}{Fin.Liab.}$, by one standard deviation would lead to an annual growth rate increase of 0.65 percentage points during a five-year period. Following equation (15), the total effect on growth is measured as $\left(\gamma_2 * \overline{\ln Y} + \gamma_3\right) * \sigma_{FDI}$, where $\overline{\ln Y}$ is the mean of the log of initial GDP and σ_{FDI} is the standard deviation of the share of FDI in total liabilities. Taking also into account Table 1, it follows $(-0.0312 * 8.496 + 0.304) * 0.167 = 0.0065$.

A common concern to all empirical studies of economic growth is the possibility that most, or all, explanatory variables are endogenous. The system-GMM estimator used here controls for the potential endogeneity of all explanatory variables by using their lagged instruments in the first-difference and level equations. Additionally, it accounts for the dynamic bias that results of the inclusion of initial GDP in the regressions.

Nevertheless, the problem may not completely go away, as this estimation method assumes weak exogeneity of the explanatory variables, meaning that they can be affected by past and current growth rates but must be uncorrelated with future realizations of the error term. That is, future unanticipated shocks to GDP growth should not affect the current value of the explanatory variables. The statistical validity of this assumption is supported by the results of the Hansen test, reported at the foot of the tables, which never rejects the validity of the overidentifying restrictions. Furthermore, Difference-in-Hansen tests were used to assess the validity of the instruments of each explanatory variable individually and of subsets of instruments. Their validity was never rejected. Finally, the tests for autocorrelation of the differenced residuals, also reported at the foot of the tables, clearly reject second order autocorrelation, further testing the validity of the instruments used.

4.2 Composition of total foreign assets and liabilities

In order to check if results change when foreign assets are also considered, we used the composition of International Financial Integration (IFI) - total stocks of foreign financial assets and liabilities - instead of just financial liabilities, in the estimations whose results are reported in Table 4. The results are very similar to those reported in Tables 2 and 3, providing further support for Proposition 1. In fact, the estimated coefficients and the t-statistics associated with the composition of IFI are larger in absolute value, indicating slightly greater effects on growth and convergence. Thus, the results are robust to the inclusion of information on stocks of international financial assets.

[INSERT TABLE 4 ABOUT HERE]

4.3 Restricted samples: period 1985-2004, and developing countries

The next steps of the empirical analysis were to check the sensitiveness of the results to sample changes. First, we reduced the time period under analysis to 1985-2004, so that only the last 20 years, over which financial globalization grew considerably (Lane and Milesi-Ferretti, 2007), would be considered. The results reported in Table 5 are similar to those of Table 3, except that the share of portfolio Equity in financial liabilities and its interaction with initial GDP are no longer statistically significant.

[INSERT TABLE 5 ABOUT HERE]

Second, we restricted the sample by considering only developing countries (from 1970 to 2004). Again, as shown in Table 6, the share of Equity does not seem to affect growth and convergence, while that of FDI remains highly statistically significant. These results further strengthen our hypothesis that a greater share of FDI fosters growth and convergence. Moreover, these results provide evidence of benefits of financial globalization for developing countries. For those countries, increasing the share of FDI in total liabilities, $\frac{FDI\_l}{Fin.Liab.}$, by one standard deviation would lead to an annual growth rate increase of 0.97

percentage points during a five-year period[13]. This effect is higher than the effect found above for all countries.

[INSERT TABLE 6 ABOUT HERE]

4.4 Alternative explanations of convergence and growth: human capital, trade and financial development

In this subsection, we look for alternative explanations of catch-up which could drive our results based on the composition of foreign capital.

Following the idea of Nelson and Phelps (1966), Benhabib and Spiegel (1994) found a role for human capital in catch-up. In columns 1 and 2 of Table 7, we add to our baseline regressions an interaction term of human capital with initial GDP. Our main results are robust to the introduction of this new term and the coefficients of human capital alone and interacted with initial GDP are not statistically significant.

It is possible that trade openness is the channel through which the diffusion of technology generates greater effects on growth and convergence[14], instead of the relative importance of foreign direct investment. The possible role of trade openness was accounted for in the estimations of Table 7, columns 3 and 4, which add an interaction term of trade openness with initial GDP to the models of Table 3. Since the interaction of openness with initial GDP is never statistically significant, trade does not seem to affect growth through convergence. Furthermore, the direct effect of trade openness is also not statistically significant. The results regarding the composition of financial liabilities are similar to those reported in the previous two tables, as only the share of Equity does not seem to affect growth and convergence.

Following Findlay (1978), FDI over GDP could have a role on diffusion of technology. We have also seen in Table 2 that FDI over GDP does not capture the effects on

[13] By equation (15), the total effect on growth is again measured as $\left(\gamma_2 * \overline{\ln Y} + \gamma_3\right) * \sigma_{FDI}$, where $\overline{\ln Y}$ is the mean of the log of initial GDP and σ_{FDI} is the standard deviation of the share of FDI in total liabilities. Taking into account that $\overline{\ln Y}$ and σ_{FDI} are now computed only for developing countries, it follows $(-0.0371 * 8.118 + 0.355) * 0.181 = 0.0097$.

[14] For a model deriving a positive effect of trade openness on the speed of convergence and on the steady state GDP, see Acemoglu and Ventura (2002).

convergence and growth, as does the composition of foreign capital.

[INSERT TABLE 7 ABOUT HERE]

Table 8 reports the results of robustness tests in which we control for macroeconomic stability, proxied by the size of government and inflation[15] as in Levine, Loayza and Beck (2000), and for financial development. Since presenting results for the four shares of financial liabilities used in the previous tables would lead to 4 additional tables, we only report the results for $\frac{FDI\_l}{Fin.Liab.}$. As shown in column 1, our results are not sensitive to the inclusion of controls for macroeconomic stability. Of these, a greater government is detrimental to growth, while inflation is not statistically significant.

[INSERT TABLE 8 ABOUT HERE]

Several studies following Levine et al. (2000) have concluded that financial intermediation/development is an important determinant of economic growth. In order to test the robustness of our results to the inclusion of proxies for financial development, we included them in the estimations of columns 2-7. In columns 2, 4 and 6, the ratios of Liquid Liabilities, Deposit Money Bank Assets, and Private Credit to GDP (all taken from Beck, et al., 2000) were added to the model of column 1.

Aghion et al. (2005) provide evidence that financial development increases convergence in cross-country growth regressions, using an interaction term composed of proxies of financial development and initial GDP. Then, in columns 3, 5, and 7, interaction terms of these proxies with initial GDP were also included. While these proxies and their interactions with initial GDP are never statistically significant, $\frac{FDI\_l}{Fin.Liab.}$ is always statistically significant, and its interaction term with initial GDP is significant in all estimations except that of column 5. Thus, we conclude that our results are also robust to the inclusion of the most widely used proxies of financial development.

[15] Inflation was defined as *log(1+Inf/100)*.

4.5 Effects of institutions

The final step of our empirical analysis was to control for the effects of institutions. According to several authors, institutional quality affects economic growth.[16] Furthermore, the quality of a country's institutions may also be an important determinant of its capacity to attract FDI. Thus, it is necessary to check if the empirical result that a greater share of FDI in financial liabilities leads to higher growth and convergence is robust to the inclusion of proxies for institutions. That is done in Table 9. An efficient legal structure and secure property rights have been emphasized in the literature as crucial factors for encouraging investment, both domestic and foreign, and, consequently, economic growth.[17] The result reported in column 1 points in the same direction, as our proxy for the *Legal Structure and Security of Property Rights*[18] is highly statistically significant, with the expected positive sign. That is, greater protection of people and their rightfully acquired property leads to higher economic growth.

[INSERT TABLE 9 ABOUT HERE]

Regulations that restrict entry into markets and the free engagement in voluntary exchange reduce economic freedom and may be detrimental to economic growth. These are taken into account in column 2, where we included a proxy for the *Regulation of Credit, Labor, and Business*.[19] The positive and highly statistically significant coefficient implies that less restrictive regulations lead to higher economic growth.

The degrees of political freedom and democracy may also affect economic growth (Barro, 1996). Although the results presented in columns 3 to 5 are somewhat consistent with the view that democracy and political freedom are positively related to growth, they are not conclusive. Although *Checks and Balances*[20] are positively associated with growth

[16] See, among others, Hall and Jones (1999), and Acemoglu, Johnson and Robinson (2001).

[17] See, among others, La-Porta, Lopez-De-Silanes, Shleifer and Vishny (1997), and Hall and Jones (1999).

[18] *Area 2* of the *Economic Freedom of the World Index* (Gwartney and Lawson, 2007). It considers the rule of law, the security of property rights, the independence of the judiciary and the impartiality of the court system.

[19] *Area 5* of the *Economic Freedom of the World Index* (Gwartney and Lawson, 2007). Higher values of this variable correspond to greater economic freedom, that is, to smaller restrictions in credit, labor, and product markets.

[20] We used the variable *checks* from the DPI2004 (Beck, Clarke, Groff, Keefer and Walsh, 2001).

(column 3), the *Polity Scale*[21] is not statistically significant (column 4), indicating that the degree of democracy does not affect growth.[22] Finally, there is weak evidence that lower *Political Rights*[23] lead to lower growth (column 5).

Since our proxy for the composition of financial liabilities, $\frac{FDI\_l}{Fin.Liab.}$, and its interaction with initial GDP are always statistically significant, with the expected signs, our conclusion that a greater share of FDI in foreign capital leads to higher economic growth and convergence is robust to the inclusion of institutional variables.

5 Conclusion

The lack of robust empirical evidence in the literature of the growth benefits of financial liberalization may result from the fact that most studies do not really address the theory they set out to test (Henry, 2007), and also from a near absence of emphasis on the composition of foreign capital, when compared to the large number of studies focusing on measures of the magnitude of foreign capital flows or stocks.

Using an open-economy growth model with diffusion of technology, we show that the composition of foreign capital should affect convergence, an effect that has not been accounted for in most of the empirical studies dealing with issues of financial globalization, and should also affect growth directly.

Our empirical analysis makes two important contributions to the literature. First, we show that the inclusion of an interaction term of the composition of foreign capital with initial GDP per capita clearly improves the results. This implies that the failure of previous studies to find robust evidence of the benefits of financial globalization on growth may in part be due to a problem of omitted variable bias, as they do not account for the effects on convergence.

Second, we also show that the composition of foreign capital is a crucial factor for

[21] This variable, taken from the *Polity IV* database, is an indicator of the degree of democracy. It varies from -10 (extreme dictatorship) to 10 (full democracy).

[22] The same result is obtained when we use the variable *EXCONST* (Executive constraints), also from the *Polity IV* database.

[23] This variable, taken from the *Freedom House* ratings, varies from 1 to 7, with smaller values associated with higher political rights. It is worth noting that when we use the rating for *Civil Liberties* instead, it is not statistically significant.

the effects of financial globalization on economic growth. Concretely, we present robust evidence that economies with a greater share of foreign direct investment in international financial liabilities have a higher convergence and a higher direct effect on growth. Results for portfolio equity go in the same direction, but are weaker and not robust to alternative samples and alternative explanations of convergence and growth. Finally, a greater share of debt in financial liabilities has the opposite effects, a result also in line with the predictions of the model. Since we found stronger effects of the composition than of the volume of foreign capital, it is possible that previous studies did not find robust effects of financial globalization on growth also because they did not pay enough attention to the composition of foreign capital. That is, if as argued by Rodrik and Subramanian (2008), more foreign capital is not necessarily better, it is necessary to analyze its composition in order to find how countries can benefit from financial globalization.

The main policy implication of our study is that governments of developing countries should pay greater attention to the composition of foreign capital, and make sure that most of it enters in the form of FDI. According to our model and empirical results, a greater share of FDI in foreign liabilities would positively affect innovation and technological catch-up, increasing growth and convergence.

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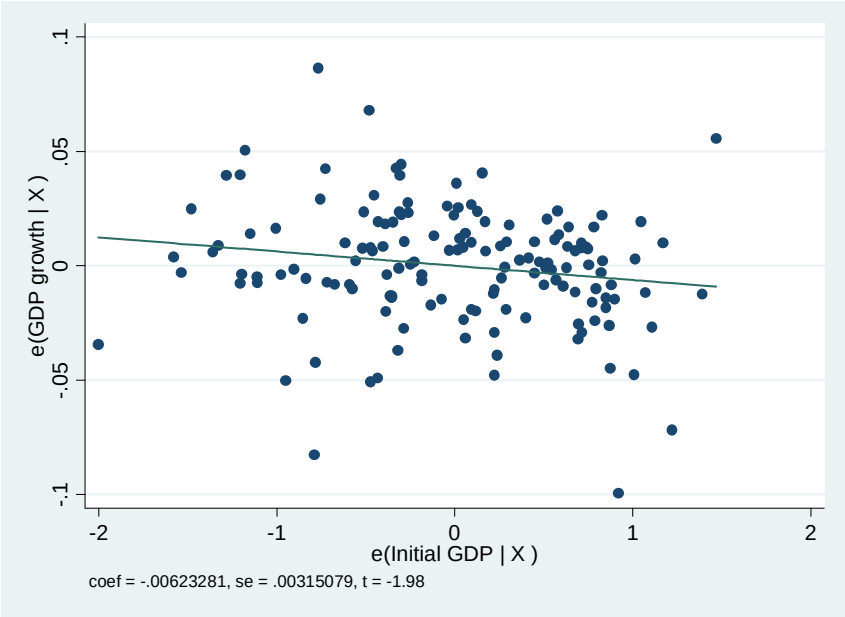
Figure 1:

Effect of the composition of foreign capital on convergence

(Added Variable Plots)

Lower Quartile of $\frac{FDI\_liab}{Fin.Liab.}$



Upper Quartile of $\frac{FDI\_liab}{Fin.Liab.}$

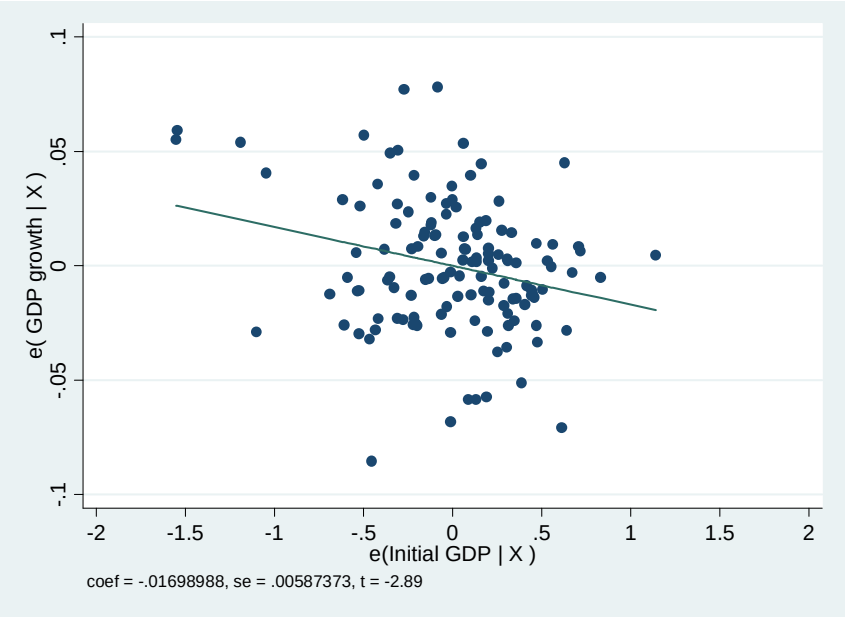


Table 1 – Descriptive Statistics

Variable	Obs.	Mean	St. Dev.	Min.	Max.	Source
GDP growth rate	619	0.017	0.033	-0.169	0.347	PWT
Initial GDP per capita (log)	662	8.496	1.094	6.014	10.736	PWT
Investment (%GDP)	679	16.329	8.948	1.024	91.964	PWT
Initial Years of Schooling	567	1.611	1.197	0.027	5.742	BL
Population Growth	686	0.094	0.070	-0.281	0.732	PWT
Trade Openness	679	70.084	48.337	7.558	387.423	PWT
Government (%GDP)	679	20.579	8.726	3.230	67.428	PWT
Inflation (log)	624	0.175	0.388	-0.056	4.178	IFS-IMF
(*Equity_l + FDI_l*) / *GDP*	656	0.220	0.331	0.000	4.251	LMF
(*Equity_l + FDI_l*) / *Fin.Liabilities*	656	0.244	0.181	0.000	0.897	LMF
Equity_l / Fin.Liabilities	657	0.033	0.063	0.000	0.405	LMF
FDI_l / Fin.Liabilities	657	0.209	0.167	0.000	0.897	LMF
Debt_l / Fin.Liabilities	668	0.756	0.181	0.102	1.000	LMF
(*Equity + FDI*) / *GDP*	638	0.332	0.572	0.000	6.221	LMF
(*Equity + FDI*) / *IFI*	637	0.205	0.149	0.000	0.833	LMF
Equity / IFI	646	0.033	0.061	0.000	0.491	LMF
FDI / IFI	656	0.169	0.126	0.000	0.833	LMF
Debt / IFI	667	0.699	0.176	0.136	1.000	LMF
Liquid Liabilities / GDP	502	0.424	0.297	0.000	2.434	BDKL
Dep. Money Bank Assets / GDP	575	0.440	0.343	0.000	1.766	BDKL
Private Credit / GDP	575	0.426	0.371	0.000	2.067	BDKL
Legal Structure and Security of Property Rights	540	5.518	1.891	1.271	9.363	GL
Regulation of Credit, Labor and Business	560	5.560	1.008	2.724	8.648	GL
Checks and Balances	570	2.815	1.657	1.000	12.000	DPI
Polity Scale	662	2.120	7.384	-10.000	10.000	Polity IV
Political Rights	674	3.497	2.107	1.000	7.000	FH

Sources: BDKL: Beck, Demirgüç-Kunt and Levine (2000); BL: Barro and Lee (2000); DPI: Database of Political Institutions (Beck, et al., 2001); FH: Freedom House; GL: Gwartney and Lawson (2006); IFS-IMF: International Financial Statistics - International Monetary Fund; LMF: Lane and Milesi-Ferretti (2007); PWT: Penn World Tables (Mark 6.2).

Notes: Sample of consecutive, non-overlapping, 5-year periods from 1970 to 2004, comprising the 96 countries considered in the baseline regressions (listed in the Appendix). The suffix '*_l*' means that only stocks of financial liabilities are considered. '*Fin.Liabilities*' stands for total stocks of financial liabilities. '*IFI*', international financial integration, stands for total stocks of international financial assets and liabilities.

Table 2 – Stock and Composition of Foreign Liabilities

COEFFICIENT	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Initial GDP per capita (log)	-0.00493	-0.000963	-0.00569	-0.00135	-0.00309	-0.00290
	(-0.66)	(-0.145)	(-0.77)	(-0.21)	(-0.444)	(-0.470)
Investment (%GDP)	0.00101**	0.000908**	0.000980**	0.00123***	0.00112***	0.00126***
	(2.17)	(2.244)	(2.40)	(3.03)	(2.607)	(2.857)
Initial Years of Schooling	0.00135	-0.000106	0.00130	0.000763	0.00257	0.00134
	(0.21)	(-0.0153)	(0.20)	(0.19)	(0.465)	(0.271)
Population Growth	-0.141**	-0.152**	-0.157***	-0.175**	-0.149**	-0.168***
	(-2.13)	(-2.165)	(-2.61)	(-2.57)	(-2.310)	(-2.621)
Trade Openness	0.000163*	0.000100	0.000131	0.000126	0.000109	0.000109
	(1.83)	(1.090)	(1.54)	(1.64)	(1.375)	(1.479)
$\frac{Equity\_l + FDI\_l}{GDP}$	-0.00831	0.197			-0.00358	-0.0694
	(-1.05)	(1.313)			(-0.400)	(-0.451)
$\frac{Equity\_l + FDI\_l}{GDP}$ * *Initial GDP*		-0.0199				0.00667
		(-1.371)				(0.439)
$\frac{Equity\_l + FDI\_l}{Fin.Liabilities}$			0.0274	0.370***	0.320***	0.343**
			(1.45)	(3.75)	(2.581)	(2.483)
$\frac{Equity\_l + FDI\_l}{Fin.Liabilities}$ * *Initial GDP*				-0.0386***	-0.0330**	-0.0351**
				(-3.34)	(-2.342)	(-2.329)
# Observations	585	585	584	584	584	584
# Countries	96	96	96	96	96	96
Hansen test (p-value)	0.284	0.543	0.238	0.534	0.797	0.867
AR1 test (p-value)	0.00166	0.00185	0.00223	0.00269	0.00229	0.00235
AR2 test (p-value)	0.450	0.531	0.624	0.763	0.600	0.714

Sources: See Table 1.

Notes:
- System-GMM estimations for dynamic panel-data models, including a constant and time dummies for 5-year periods.
- Sample composed of non-overlapping 5-year periods from 1970 to 2004 (1970-74, 1975-99, …, 1995-99, and 2000-04). The 96 countries considered are listed in the Appendix.
- The dependent variable is the average annual growth rate over a 5-year period.
- In each estimation, the second lag of the dependent and of the explanatory variables (all treated as endogenous) were used as instruments in the first-difference equations and their once lagged first-differences were used in the levels equation.
- Two-step results using robust standard errors corrected for finite samples (using Windmeijer's, 2005, correction).
- T-statistics are in parenthesis. Significance level at which the null hypothesis is rejected: ***, 1%; **, 5%, and *, 10%.

Table 3 – Composition of Financial Liabilities

COEFFICIENT	(1) *Equity _ l + FDI _ l* / *Fin.Liabilities*	(2) *Equity _ l* / *Fin.Liab.*	(3) *FDI _ l* / *Fin.Liab.*	(4) *Debt _ l* / *Fin.Liab.*
Initial GDP per capita (log)	-0.00135	-0.00115	-0.00404	-0.0334***
	(-0.21)	(-0.16)	(-0.65)	(-2.59)
Investment (%GDP)	0.00123***	0.000892***	0.00111***	0.00108***
	(3.03)	(2.72)	(3.06)	(2.73)
Initial Years of Schooling	0.000763	-0.000781	0.00237	0.00136
	(0.19)	(-0.12)	(0.51)	(0.30)
Population Growth	-0.175**	-0.147**	-0.187**	-0.159**
	(-2.57)	(-2.08)	(-2.31)	(-2.53)
Trade Openness	0.000126	0.000154*	0.000143	0.000119
	(1.64)	(1.75)	(1.53)	(1.60)
Composition of Liabilities	0.370***	1.020*	0.304**	-0.327***
	(3.75)	(1.79)	(2.27)	(-2.95)
*Comp. of Liabilities * Initial GDP*	-0.0386***	-0.105*	-0.0312**	0.0337***
	(-3.34)	(-1.78)	(-1.96)	(2.63)
# Observations	584	584	594	594
# Countries	96	96	96	96
Hansen test (p-value)	0.534	0.241	0.452	0.442
AR1 test (p-value)	0.00269	0.00214	0.00237	0.00217
AR2 test (p-value)	0.763	0.544	0.863	0.699

Sources: See Table 1.

Notes:
- System-GMM estimations for dynamic panel-data models, including a constant and time dummies for 5-year periods.
- Sample composed of non-overlapping 5-year periods from 1970 to 2004 (1970-74, 1975-99, …, 1995-99, and 2000-04). The 96 countries considered are listed in the Appendix.
- The dependent variable is the average annual growth rate over a 5-year period.
- The proxy for the Composition of Financial Liabilities used is indicated below the respective column number.
- In each estimation, the second lag of the dependent and of the explanatory variables (all treated as endogenous) were used as instruments in the first-difference equations and their once lagged first-differences were used in the levels equation.
- Two-step results using robust standard errors corrected for finite samples (using Windmeijer's, 2005, correction).
- T-statistics are in parenthesis. Significance level at which the null hypothesis is rejected: ***, 1%; **, 5%, and *, 10%.

Table 4 – Composition of International Financial Integration (IFI)

COEFFICIENT	(1) $\frac{Equity + FDI}{GDP}$	(2) $\frac{Equity + FDI}{IFI}$	(3) $\frac{Equity + FDI}{IFI}$	(4) $\frac{Equity}{IFI}$	(5) $\frac{FDI}{IFI}$	(6) $\frac{Debt}{IFI}$
Initial GDP per capita (log)	-0.00116	-0.00144	0.00336	-0.00172	0.000596	-0.0311**
	(-0.16)	(-0.19)	(0.54)	(-0.27)	(0.079)	(-2.34)
Investment (%GDP)	0.00118**	0.00119**	0.00134***	0.00110***	0.00102***	0.000831**
	(2.09)	(2.36)	(2.99)	(2.72)	(2.73)	(2.19)
Initial Years of Schooling	-0.000255	-0.00205	-0.00118	0.000541	0.00163	0.000763
	(-0.039)	(-0.32)	(-0.21)	(0.095)	(0.25)	(0.15)
Population Growth	-0.0725	-0.0945	-0.132**	-0.115*	-0.181**	-0.164**
	(-1.05)	(-1.43)	(-2.04)	(-1.73)	(-2.32)	(-2.54)
Trade Openness	0.000123	0.000109	0.000115	0.000104	0.000177*	0.000119*
	(1.47)	(1.23)	(1.55)	(1.39)	(1.93)	(1.65)
(Equity + FDI) / GDP	-0.00669					
	(-1.45)					
Composition of IFI		0.0154	0.486***	1.105**	0.552***	-0.353***
		(0.64)	(4.00)	(2.22)	(3.01)	(-2.90)
*Comp. of IFI * Initial GDP*			-0.0524***	-0.116**	-0.0608***	0.0353**
			(-3.72)	(-2.21)	(-2.85)	(2.51)
# Observations	568	567	567	575	584	594
# Countries	94	94	94	95	95	96
Hansen test (p-value)	0.277	0.211	0.379	0.411	0.269	0.371
AR1 test (p-value)	0.00182	0.00235	0.00360	0.00236	0.00326	0.00208
AR2 test (p-value)	0.133	0.180	0.259	0.255	0.667	0.776

Sources: See Table 1.

Notes:
- System-GMM estimations for dynamic panel-data models, including a constant and time dummies for 5-year periods.
- Sample composed of non-overlapping 5-year periods from 1970 to 2004 (1970-74, 1975-99, …, 1995-99, and 2000-04).
- The dependent variable is the average annual growth rate over a 5-year period.
- The proxy for the Composition of IFI used (columns 2-6) is indicated below the respective column number.
- In each estimation, the second lag of the dependent and of the explanatory variables (all treated as endogenous) were used as instruments in the first-difference equations and their once lagged first-differences were used in the levels equation.
- Two-step results using robust standard errors corrected for finite samples (using Windmeijer's, 2005, correction).
- T-statistics are in parenthesis. Significance level at which the null hypothesis is rejected: ***, 1%; **, 5%, and *, 10%.

Table 5 – Restricted Sample (1985-2004)

COEFFICIENT	(1) *Equity _ l + FDI _ l* / *Fin.Liabilities*	(2) *Equity _ l* / *Fin.Liab.*	(3) *FDI _ l* / *Fin.Liab.*	(4) *Debt _ l* / *Fin.Liab.*
Initial GDP per capita (log)	-0.0120**	-0.0117*	-0.0125**	-0.0503**
	(-1.98)	(-1.91)	(-2.16)	(-2.54)
Investment (%GDP)	0.00119**	0.000691	0.00141***	0.000993
	(2.04)	(1.26)	(2.95)	(1.63)
Initial Years of Schooling	0.00304	0.00203	0.00827*	0.00773
	(0.48)	(0.32)	(1.72)	(0.96)
Population Growth	-0.275***	-0.321***	-0.300***	-0.231***
	(-4.48)	(-5.28)	(-4.44)	(-3.69)
Trade Openness	0.000160*	0.000245**	0.0000724	0.000125
	(1.69)	(2.31)	(0.80)	(1.08)
Composition of Liabilities	0.297**	0.750	0.402**	-0.423**
	(2.01)	(1.63)	(2.03)	(-2.45)
*Comp. of Liabilities * Initial GDP*	-0.0279*	-0.0754	-0.0424*	0.0424**
	(-1.69)	(-1.58)	(-1.89)	(2.14)
# Observations	336	336	337	337
# Countries	95	95	95	95
Hansen test (p-value)	0.814	0.377	0.353	0.742
AR1 test (p-value)	0.0370	0.0389	0.0312	0.0324
AR2 test (p-value)	0.480	0.578	0.612	0.340

Sources: See Table 1.

Notes:
- System-GMM estimations for dynamic panel-data models, including a constant and time dummies for 5-year periods.
- Sample composed of non-overlapping 5-year periods from 1970 to 2004 (1970-74, 1975-99, …, 1995-99, and 2000-04).
- The dependent variable is the average annual growth rate over a 5-year period.
- The proxy for the Composition of Financial Liabilities used is indicated below the respective column number.
- In each estimation, the second lag of the dependent and of the explanatory variables (all treated as endogenous) were used as instruments in the first-difference equations and their once lagged first-differences were used in the levels equation.
- Two-step results using robust standard errors corrected for finite samples (using Windmeijer's, 2005, correction).
- T-statistics are in parenthesis. Significance level at which the null hypothesis is rejected: ***, 1%; **, 5%, and *, 10%.

Table 6 – Restricted Sample (Developing Countries)

COEFFICIENT	(1) *Equity _ l + FDI _ l* / *Fin.Liabilities*	(2) *Equity _ l* / *Fin.Liab.*	(3) *FDI _ l* / *Fin.Liab.*	(4) *Debt _ l* / *Fin.Liab.*
Initial GDP per capita (log)	-0.0110	-0.000975	-0.0133	-0.0521***
	(-1.37)	(-0.083)	(-1.64)	(-3.61)
Investment (%GDP)	0.00132**	0.00114**	0.00122**	0.00139**
	(2.35)	(2.49)	(2.30)	(2.21)
Initial Years of Schooling	0.00818	-0.000458	0.00988	0.00339
	(1.32)	(-0.052)	(1.47)	(0.42)
Population Growth	-0.167**	-0.145**	-0.159*	-0.168**
	(-1.99)	(-2.13)	(-1.93)	(-2.42)
Trade Openness	0.000123	0.000111	0.000160*	0.000123*
	(1.37)	(1.09)	(1.77)	(1.74)
Composition of Liabilities	0.348***	0.902	0.355***	-0.445***
	(3.55)	(1.42)	(3.08)	(-4.10)
*Comp. of Liabilities * Initial GDP*	-0.0357***	-0.0982	-0.0371***	0.0469***
	(-3.14)	(-1.44)	(-2.63)	(3.98)
# Observations	434	434	441	441
# Countries	74	74	74	74
Hansen test (p-value)	0.974	0.891	0.990	0.982
AR1 test (p-value)	0.00693	0.00505	0.00682	0.00592
AR2 test (p-value)	0.817	0.598	0.783	0.866

Sources: See Table 1.

Notes:
- System-GMM estimations for dynamic panel-data models, including a constant and time dummies for 5-year periods.
- Sample composed of non-overlapping 5-year periods from 1970 to 2004 (1970-74, 1975-99, …, 1995-99, and 2000-04).
- The dependent variable is the average annual growth rate over a 5-year period.
- The proxy for the Composition of Financial Liabilities used is indicated below the respective column number.
- In each estimation, the second lag of the dependent and of the explanatory variables (all treated as endogenous) were used as instruments in the first-difference equations and their once lagged first-differences were used in the levels equation.
- Two-step results using robust standard errors corrected for finite samples (using Windmeijer's, 2005, correction).
- T-statistics are in parenthesis. Significance level at which the null hypothesis is rejected: ***, 1%; **, 5%, and *, 10%.

Table 7 – Controlling for Human Capital and Trade Openness interacted with initial GDP

COEFFICIENT	(1) *Equity _ l + FDI _ l* / *Fin.Liabilities*	(2) *FDI _ l* / *Fin.Liab.*	(3) *Equity _ l + FDI _ l* / *Fin.Liabilities*	(4) *FDI _ l* / *Fin.Liab.*
Initial GDP per capita (log)	-0.00325	-0.00205	-0.00224	0.00326
	(-0.443)	(-0.275)	(-0.36)	(0.56)
Investment (%GDP)	0.00125***	0.00118***	0.00128***	0.000988***
	(2.898)	(3.391)	(2.80)	(2.80)
Initial Years of Schooling	-0.000750	0.00703	0.00132	0.000361
	(-0.0314)	(0.281)	(0.29)	(0.075)
*Initial Years of School. * Initial GDP*	0.000286	-0.000585		
	(0.114)	(-0.220)		
Population Growth	-0.164**	-0.152*	-0.177**	-0.160**
	(-2.217)	(-1.935)	(-2.57)	(-2.11)
Trade Openness	0.000120*	0.000153	0.000413	0.000713
	(1.835)	(1.358)	(0.72)	(1.09)
*Trade Openness * Initial GDP*			-0.0000348	-0.0000628
			(-0.60)	(-0.95)
Composition of Liabilities	0.341***	0.310***	0.283***	0.280*
	(3.161)	(2.688)	(2.70)	(1.96)
*Comp. of Liabilities * Initial GDP*	-0.0357***	-0.0331**	-0.0279**	-0.0285*
	(-2.872)	(-2.337)	(-2.31)	(-1.77)
# Observations	584	594	584	594
# Countries	96	96	96	96
Hansen test (p-value)	0.812	0.604	0.619	0.531
AR1 test (p-value)	0.00275	0.00231	0.00282	0.00230
AR2 test (p-value)	0.683	0.667	0.775	0.751

Sources: See Table 1.

Notes:
- System-GMM estimations for dynamic panel-data models, including a constant and time dummies for 5-year periods.
- Sample composed of non-overlapping 5-year periods from 1970 to 2004 (1970-74, 1975-99, …, 1995-99, and 2000-04).
- The dependent variable is the average annual growth rate over a 5-year period.
- The proxy for the Composition of Financial Liabilities used is indicated below the respective column number.
- In each estimation, the second lag of the dependent and of the explanatory variables (all treated as endogenous) were used as instruments in the first-difference equations and their once lagged first-differences were used in the levels equation.
- Two-step results using robust standard errors corrected for finite samples (using Windmeijer's, 2005, correction).
- T-statistics are in parenthesis. Significance level at which the null hypothesis is rejected: ***, 1%; **, 5%, and *, 10%.

Table 8 – Controlling for Macroeconomic Stability and Financial Development

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Liquid Liabilities / GDP		*D. Mon. Bank Assets / GDP*		*Private Credit / GDP*	
Initial GDP per capita (log)	-0.00534	0.000842	0.00736	0.00655	0.00683	0.00254	0.00327
	(-1.173)	(0.079)	(0.61)	(0.51)	(0.51)	(0.23)	(0.31)
Investment (% GDP)	0.0009***	0.000760	0.000587	0.00104*	0.000856	0.000950*	0.000995*
	(2.962)	(1.54)	(1.24)	(1.73)	(1.36)	(1.68)	(1.80)
Initial Years of Schooling	0.00231	-0.00171	-0.000556	-0.00249	0.00192	-0.00272	0.00107
	(0.515)	(-0.23)	(-0.077)	(-0.23)	(0.18)	(-0.28)	(0.11)
Population Growth	-0.221***	-0.300***	-0.257**	-0.253***	-0.199**	-0.277***	-0.241***
	(-3.654)	(-3.57)	(-2.56)	(-3.40)	(-2.05)	(-3.95)	(-2.71)
Trade Openness	0.000171*	0.000245*	0.000206*	0.000260**	0.000210*	0.000256**	0.000219**
	(1.957)	(1.96)	(1.78)	(2.18)	(1.75)	(2.34)	(2.00)
FDI_liab / Fin.Liabilities	0.332*	0.590*	0.570*	0.706**	0.606*	0.677**	0.616*
	(1.844)	(1.72)	(1.75)	(2.26)	(1.74)	(2.22)	(1.92)
*(FDI_liab / Fin.Liabilities) * Initial GDP*	-0.0369*	-0.0662*	-0.0637*	-0.0779**	-0.0661	-0.0764**	-0.0687*
	(-1.744)	(-1.65)	(-1.65)	(-2.10)	(-1.60)	(-2.13)	(-1.83)
Government (% GDP)	-0.000821*	-0.000983	-0.000989	-0.000572	-0.000681	-0.000721	-0.000695
	(-1.943)	(-1.49)	(-1.49)	(-0.75)	(-0.97)	(-0.96)	(-1.03)
Inflation (log)	-0.00436	-0.0107	-0.00714	-0.00584	-0.00242	-0.00621	-0.00465
	(-1.510)	(-1.37)	(-0.95)	(-0.70)	(-0.28)	(-0.73)	(-0.49)
Financial Development		-0.00163	0.166	-0.0199	0.146	-0.00553	0.0589
		(-0.15)	(0.97)	(-1.59)	(0.82)	(-0.50)	(0.40)
*Financial Development * Initial GDP*			-0.0176		-0.0165		-0.00703
			(-0.97)		(-0.92)		(-0.47)
# Observations	561	449	449	521	521	521	521
# Countries	94	81	81	92	92	92	92
Hansen test (p-value)	0.910	0.774	0.842	0.698	0.598	0.709	0.557
AR1 test (p-value)	0.00387	0.0132	0.0122	0.0123	0.0110	0.0105	0.0103
AR2 test (p-value)	0.813	0.639	0.809	0.908	0.838	0.867	0.982

Notes: System-GMM estimations for dynamic panel-data models, including a constant and time dummies. Sample composed of non-overlapping 5-year periods from 1970 to 2004. The dependent variable is the average annual growth rate over a 5-year period. The proxy for Financial Development used (columns 2-7) is indicated below the respective column number. In each estimation, the second lag of the dependent and of the explanatory variables (all treated as endogenous) were used as instruments in the first-difference equations and their once lagged first-differences were used in the levels equation. The option "collapse" of *xtabond2* was used to avoid a number of instruments much greater than the number of countries. Two-step results using robust standard errors corrected for finite samples (using Windmeijer's, 2005, correction). T-statistics are in parenthesis. Significance level at which the null hypothesis is rejected: ***, 1%; **, 5%, and *, 10%.

Table 9 – Controlling for Institutions

COEFFICIENT	(1)	(2)	(3)	(4)	(5)
Initial GDP per capita (log)	-0.0138**	-0.00803	-0.00549	-0.00221	-0.00497
	(-1.996)	(-1.210)	(-0.729)	(-0.389)	(-0.674)
Investment (% GDP)	0.00130***	0.00116***	0.00102*	0.00102***	0.00101***
	(2.676)	(2.821)	(1.778)	(2.759)	(2.758)
Initial Years of Schooling	0.00237	0.00321	0.00423	0.00212	0.00246
	(0.525)	(0.477)	(0.721)	(0.416)	(0.451)
Population Growth	-0.239***	-0.323***	-0.134*	-0.169**	-0.163**
	(-3.365)	(-4.445)	(-1.852)	(-2.434)	(-2.557)
Trade Openness	0.0000785	0.000132**	0.000189	0.000135	0.000165*
	(1.276)	(2.054)	(1.418)	(1.555)	(1.793)
FDI_liab / Fin.Liabilities	0.547***	0.600***	0.381**	0.305**	0.310***
	(2.866)	(3.181)	(2.040)	(2.449)	(2.745)
*(FDI_liab / Fin.Liabilities) * Initial GDP*	-0.0592***	-0.0665***	-0.0395*	-0.0312**	-0.0322**
	(-2.665)	(-3.038)	(-1.831)	(-2.122)	(-2.446)
Legal Structure and Security of Property Rights	0.00675***				
	(2.740)				
Regulation of Credit, Labor, and Business		0.00758***			
		(2.654)			
Checks and Balances			0.00516***		
			(2.808)		
Polity Scale				0.000244	
				(0.819)	
Political Rights					-0.00238*
					(-1.847)
# Observations	489	507	509	581	588
# Countries	91	91	95	94	95
Hansen test (p-value)	0.612	0.686	0.324	0.882	0.848
AR1 test (p-value)	0.000103	0.0239	0.00850	0.00235	0.00235
AR2 test (p-value)	0.664	0.508	0.383	0.745	0.686

Notes: System-GMM estimations for dynamic panel-data models, including a constant and time dummies. Sample composed of non-overlapping 5-year periods from 1970 to 2004. The dependent variable is the average annual growth rate over a 5-year period. In each estimation, the second lag of the dependent and of the explanatory variables (all treated as endogenous) were used as instruments in the first-difference equations and their once lagged first-differences were used in the levels equation. Two-step results using robust standard errors corrected for finite samples (using Windmeijer's, 2005, correction). T-statistics are in parenthesis. Significance level at which the null hypothesis is rejected: ***, 1%; **, 5%, and *, 10%.

Appendix

The 96 countries considered in the estimations of Tables 2 and 3

ALGERIA	HAITI	PARAGUAY
ARGENTINA	HONDURAS	PERU
AUSTRALIA	HONG KONG	PHILIPPINES
AUSTRIA	HUNGARY	POLAND
BAHRAIN	ICELAND	PORTUGAL
BANGLADESH	INDIA	RWANDA
BELGIUM	INDONESIA	SENEGAL
BENIN	IRAN	SINGAPORE
BOLIVIA	IRELAND	SOUTH AFRICA
BOTSWANA	ISRAEL	SPAIN
BRAZIL	ITALY	SRI LANKA
CAMEROON	JAMAICA	SUDAN
CANADA	JAPAN	SWAZILAND
CHILE	JORDAN	SWEDEN
CHINA	KENYA	SWITZERLAND
COLOMBIA	KOREA	SYRIAN ARAB REPUBLIC
CONGO, DEM.REP.	KUWAIT	TAIWAN
CONGO, REPUBLIC OF	MALAWI	TANZANIA
COSTA RICA	MALAYSIA	THAILAND
CYPRUS	MALI	TOGO
DENMARK	MAURITIUS	TRINIDAD AND TOBAGO
DOMINICAN REPUBLIC	MEXICO	TUNISIA
ECUADOR	MOZAMBIQUE	TURKEY
EGYPT	NEPAL	UGANDA
EL SALVADOR	NETHERLANDS	UNITED ARAB EMIRATES
FIJI	NEW ZEALAND	UNITED KINGDOM
FINLAND	NICARAGUA	UNITED STATES
FRANCE	NIGER	URUGUAY
GERMANY	NORWAY	VENEZUELA
GHANA	PAKISTAN	YEMEN
GREECE	PANAMA	ZAMBIA
GUATEMALA	PAPUA NEW GUINEA	ZIMBABWE