Borradores de ECONOMÍA

Financial Globalization, Economic Growth, and Macroeconomic Volatility

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No. 430

2007

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January, 2007

Abstract

This paper evaluates the effects of financial globalization on growth and macroeconomic volatility, from 1984 to 2003, for a sample of 43 countries. Particular attention is given to those effects on the member countries of the Latin American Reserve Fund (FLAR): Bolivia, Colombia, Costa Rica, Ecuador, Peru, and Venezuela. The findings show that financial globalization spurs growth, when the countries' income level is controlled; it does not increase macroeconomic volatility, as it is commonly stated, but does not reduce it either. Belonging to FLAR does not seem to make a difference in terms of growth and macroeconomic volatility; however, the findings of a strong negative effect on the volatility of consumption might be related to the fact that those countries have an insurer (FLAR) that has helped them to smooth consumption during periods of adverse external shocks.

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1. Introduction

The purpose of this paper is to evaluate the effects of financial globalization on economic growth and volatility of output, income, consumption, and investment, of a sample of 43 countries from 1984 to 2003.[1] Particular attention is given to the member countries of the Latin American Reserve Fund (FLAR): Bolivia, Colombia, Costa Rica, Ecuador, Peru, and Venezuela.

In theory, financial globalization, and particularly, capital flows, increases efficiency and productivity in the real (Grossman and Helpman, 1991; Stulz, 1999) and financial (Levine, 1996, 1997) sectors; permits smoothing consumption and investment through international risk sharing (Sach, 1981; Obstfeld and Rogoff, 1996); promotes macroeconomic discipline (Obsfeld, 1998); reduces macroeconomic volatility (Razin and Rose, 1994; Sutherland; 1996; Caballero and Krishnamurthy, 2000); and as consequence promotes growth (MacDougall, 1968; Kemp and Liviatan, 1973; McKinnon, 1973; Hanson, 1974; Frenkel, 1976; Grossman and Heplman, 1991; Levine, 1997; Klein, 2005).[2] Notwithstanding, financial globalization may have costs, as summarized by Agénor (2003, p. 1096-1101), such as concentration of capital flows in certain groups of countries, misallocation of resources, loss of macroeconomic stability (inflation pressures, real exchange rate appreciation, external imbalances, etc.), contagion, and risk of sharp reversal of capital flows.

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[1] Financial globalization is understood here as the situation where international capital markets are more integrated as a consequence of countries' dismantling capital restrictions and controls on capital flows, favorable interest differentials, liberalization of domestic financial markets, international diversification of risk, trade liberalizations, better economic environments and institutions, and cyclical push (or external) factors. Appendix A.1 lists the sample countries.

[2] Three recent broad theoretical and empirical discussions on financial globalization and its macroeconomic effects are found in Agénor (2003), Eichengreen (2003) and Prasad et. al. (2004).

In practice, countries have imposed, with varying degrees of intensity and span, restrictions and controls on capital flows. The expected benefits of these policies are related mainly to macroeconomic stability, in terms of lower volatility of output, consumption, and employment. The costs are associated with the administrative difficulties in managing the regime and the negative economic consequences derived from the protectionism provided to the domestic financial sector. The realization of those benefits and costs has been conditioned to the effectiveness of the isolation of the economy from capital flows, which is not always the case.

The findings of the voluminous empirical literature about financial globalization's potential benefits to economic growth are mixed.[3] Rodrik's (1998) paper may be the most well known and cited study on this issue. It shows there is not a relationship between capital flows and growth. On the contrary, Quinn's (1997) paper, another broadly quoted study, finds a positive relationship between the change in his measure of restrictions to the capital account and growth. From the twelve papers documented by Edison *et al*. (2004, Table 6), six of them found that capital account openness raises growth significantly. The others do not support this hypothesis.

Many findings differ depending on whether the data refers to high-income countries or to low-income nations. For example, Edwards (2001) found support for the hypothesis of a positive relationship for the former countries, while he rejects it in the case of the latter ones. On the other hand, Quinn (1997) and Bekaert *et al*. (2001) show evidence that financial globalization endorses growth in low-income countries. Edison (2004, p. 1-2) and Klein (2005) showed that when institutional variables are included in growth regression models, the effect of the financial globalization is washed out. However, they argued that, when regression models allow for institutional and nonlinearities on the explanatory variables, the responsiveness of growth rises. Their results are poor, though, since a statistically significant effect is shown only for one-quarter of the countries in the sample.

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[3] Excellent reviews are found in Edison *et al*. (2002), Edison *et al*. (2004), and Prasad *et al*. (2004).

In addition, where there is positive evidence, it is for middle-income countries, but not for poorer or richer ones. Mora and Rincón (2006), using data of FLAR member countries, middle-income countries according to the World Bank classification, found that, in general, capital controls neither reduce growth nor reduce macroeconomic volatility. On the contrary, and as expected, financial globalization promotes growth.

In summary, "while financial globalization can, in theory, help to promote economic growth through various channels, there is not as yet robust empirical evidence that this causal relationship is quantitatively very important" (Prasad *et al*., 2004, p. 5).

Regarding the evidence of the effects of financial globalization on macroeconomic volatility, the empirical literature is limited. Moreover, it focuses mostly on studying output volatility and scarcely on consumption and investment volatility. Recent evidence provided by Prasad *et al*. (2004, Table 4) shows that financial globalization seems to have reduced, on average, output and consumption volatility in industrial economies and "less financially integrated (LFI)" developing economies; however, they only reduced modestly in "more financially integrated (MFI)" developing economies. Even for MFI countries, volatility of private consumption raised in the 1990's relative to the 1980's.[4] Bekaert *et al*. (2004) found that equity market liberalization and capital account openness are associated with lower volatility of consumption, as opposed to what was found by Stiglitz (2000) and Agénor (2003).

The main findings of this paper indicate that financial globalization spurs growth, when the countries' income level is controlled, it does not increase macroeconomic volatility, but does not reduce it, either. Whether a country belongs to FLAR does not appear to make a difference in terms of growth and macroeconomic volatility. However, a strong negative effect on the volatility of consumption was found, which might be related to the fact those

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[4] The positive productivity and output shocks that developing countries faced during the late 1980s and 1990s, as well as the procyclical nature of capital flows, "appear to have had an adverse impact on consumption volatility" in these countries (*Ibid*., p. 23).

countries have an insurer (FLAR) that has helped them to smooth consumption during periods of adverse external shocks.

The remainder of the paper is organized as follows: section two depicts the evolution of different indicators of financial globalization for the 43 countries in the sample. Also, it shows those indicators against the volatility of the macro aggregates of interest: output, income, private consumption, and investment. Section three runs economic growth regressions to evaluate the consequences of financial globalization on economic growth. Section four estimates a regression model to evaluate the effects on macroeconomic volatility. Yearly data covering the period from 1983 to 2003, and alternative econometric techniques are used. Finally, section five offers some concluding remarks.

2. Facts on Financial Globalization, Economic Growth, and Macroeconomic Volatility

In order to measure the effects of financial globalization, our variable of interest, on economic growth and macroeconomic volatility, four different sets of indicators will be used. The first two consist of official or *de jure* measures of restrictions on capital account transactions. The second set corresponds to *de facto*, or empirically observed indicators of financial globalization. It is important to mention that differences in the enforcement of the law among countries may, for example, contribute to explaining differences in the level of *de facto* indicators, even for the same level of *de jure* indicators, since agents may evade the regulation if its enforcement is weak. However, *de jure* indicators are useful to explain the aims of polices adopted regarding the liberalization of the capital account. Moreover, even in the absence of formal restrictions on capital transactions, some developing countries may present low levels of *de facto* indicators as a result of the relatively low degree of financial globalization.

Concerning *de jure* indicators, they are constructed from the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). These measures take the value of 1 if at least one restriction for a category of "capital transactions" exists, and zero,

otherwise. The first indicator (referred to as Fg_1), which was taken from Miniane (2004), averages the dummies by country and year, for twelve different categories of "capital transactions", plus a dummy for the category "exchange rate structure."[5] Miniane's sample was extended to also cover the years 2001 through 2003, as well as ten additional countries.[6] The second indicator (referred to as Fg_2) considers only the twelve categories of capital transactions, that is, no categories related to exchange rate regimes are included. As discussed by the literature, the type of codification of indicators built from the IMF's reports would imply that different intensities of capital controls are not captured. However, the dummy nature of the restriction makes averaging them equivalent to dividing the number of transactions subject to controls by the total number of transactions considered in the analysis, which is a proxy for the degree of intensity of controls, as in von Hagen and Zhou (2005).

Thus, *de jure* indexes indicate the official decisions regarding openness or closeness of the capital account. However, even with a full *de jure* restriction, countries may be financially integrated with the rest of the world. Conversely, countries without official restrictions may have a low degree of effective financial integration if competition in the local market, by foreigners, is limited due to domestic market risk, lack of a proper financial development and regulation, or other economic and institutional reasons. Therefore, the previous indicators need to be complemented with measures of effective financial integration. With this purpose, we build two indicators: (1) net capital flows as a percentage of GDP (referred

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[5] These twelve categories refer to purchases and sales, made by residents and non-residents, of the following assets: 1) capital market securities which include shares and other participating securities, as well as bonds with maturity of more than one year; 2) money market instruments such as certificates of deposit, treasury bills with an original maturity of one year or less; 3) collective investment securities, like mutual funds; 4) derivatives and other instruments; 5) commercial credits from private and multilateral financial institutions and governments, linked to trade transactions; 6) financial credits; 7) guarantees, sureties, and financial backup facilities through authorized intermediaries; 8) direct investment; 9) liquidation of direct investment and repatriation of profits; 10) real estate transactions; 11) provisions specific to commercial banks and other credit institutions such as reserve requirements in local and foreign currency, lending from abroad to residents, lending locally in foreign currency to non-residents and residents, and investments abroad by banks and in banks by non-residents; 12) provisions specific to institutional investors, as the foreign asset share in a portfolio.

to as Fg_3), which is the summation of net foreign direct investment, net portfolio equity, and net debt accounts from the countries' balance of payments; and (2) net foreign assets (stock) as a percentage of GDP (referred to as Fg_4), following the methodology proposed by Lane and Milesi-Ferretti (2001),[7] which is a proxy of a country's net international wealth.

It is necessary to mention that for estimating purposes, we will use the complement of the first two indicators; accordingly, an increase in their level means a country's higher level of financial globalization.[8]

2.1 *De Jure and De Facto Indicators of Financial Globalization and Economic Growth*

Figures 1 through 4 show the evolution of alternative *de jure* and *de facto* indicators against the growth rate of the GDP per capita on constant *Purchasing Power Parities*, and its volatility, for a sample of countries.[9] Series are averaged per year and per group of countries. The first three groups of countries correspond to the standard World Bank classification, namely, high-income, middle-income, and low-income countries; and the last one, to the FLAR member countries, which are all classified by the World Bank as middle-income countries. [10]

Figure 1 presents the evolution of the second *de jure* indicator (Fg_2) against the output growth rate. It shows that none of the groups has had its capital account completely opened or completely closed. Second, all countries have experienced a capital account

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[6] Juan Pablo Fernández, and then Carlos Patiño, worked on extending the sample. The countries additional to Miniane's are Bolivia, Costa Rica, Dominican Republic, El Salvador, Nicaragua, Panama, Paraguay, Peru, Thailand, and Venezuela.

[7] This methodology consists on accumulating the different net components of the capital account of a country's balance of payments. We transform the calculations in such a way that an increase in the indicator means that the country's net foreign liabilities increase (net foreign assets decrease).

[8] Thus, for the first two indicators, zero means full controls on the capital account, and one means full liberalization.

[9] Henceforth, we will show facts for only some indicators and variables. The complete set of figures is available upon request.

liberalization process since the beginning of the eighties, which has accelerated from the end of that decade. Third, the richer the country, the more open its capital account is. Fourth, while high-income and FLAR member countries have continued opening their capital account along the period, low-income countries have stopped and middle-income nations, excluding FLAR members, have reversed that process. The fact that the latter countries reimposed restrictions on capital flows may be related to the international financial crises which occurred during the end of the nineties in some of the main emerging markets contained in the sample. It is necessary to mention that the FLAR members carried out a continuous financial liberalization process through the period, even more rapidly than high-income countries. Fifth, there is, at least graphically, a positive relationship between financial globalization and economic growth for middle-income and FLAR member countries. Unexpectedly, figure 1 shows that for high-income countries, the more financially globalized, the less they grow.

Figure 1. *De Jure* Indicator and Economic Growth

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[10] Appendix A.1 shows which country belongs to which group.

High Income

Middle Income, excluding FLAR

Low Income

FLAR
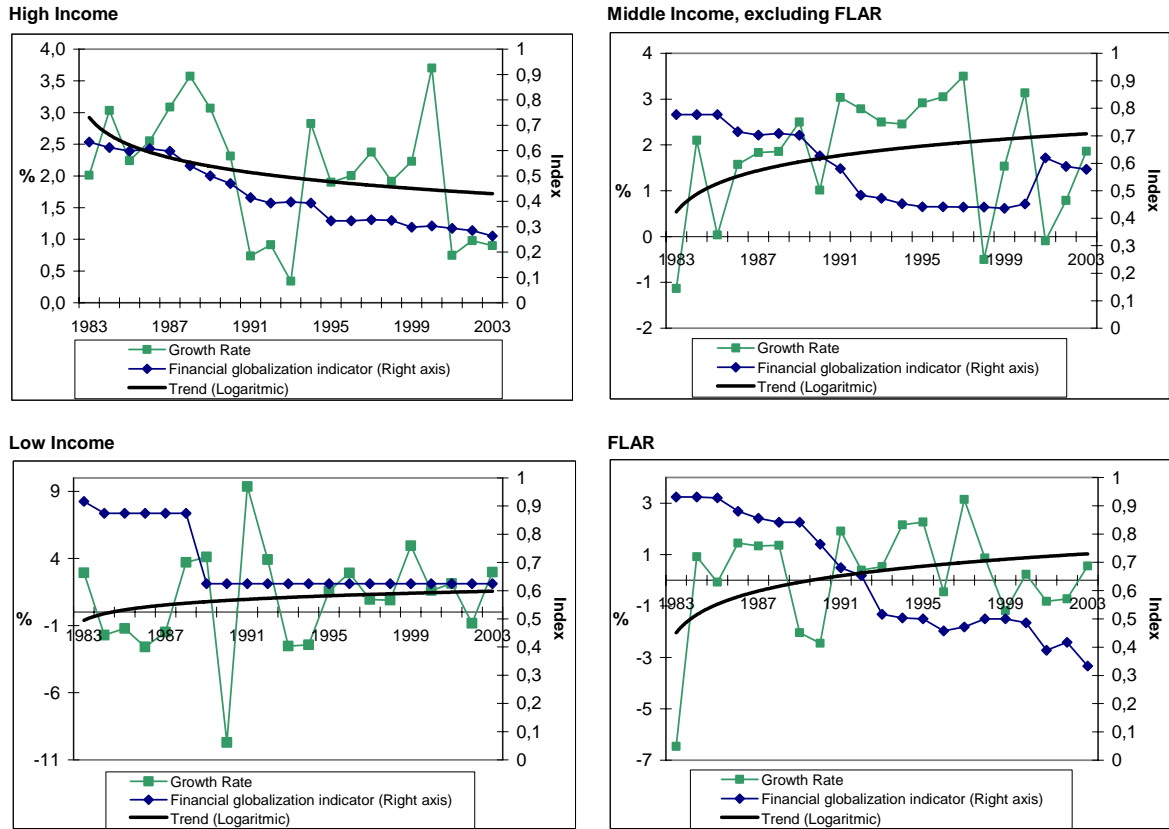
Source: Author's own calculations

Figure 2 depicts a scatter plot of the third indicator of financial globalization (Fg_3) against the output growth rate. It shows a positive association (correlation) between financial globalization and growth for high- and middle-income countries, but negative for low-income countries, and nil for the FLAR members. Notice that for middle-income and FLAR countries, there is great dispersion of the observations. For example, for the former countries, there could be a situation where they are growing at a rate close to 3.5% and also have net capital flows of -1% of GDP or 4% of GDP.

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Figure 2. *De Facto* Indicator and Economic Growth

High Income

Middle Income, excluding FLAR

Low Income

FLAR
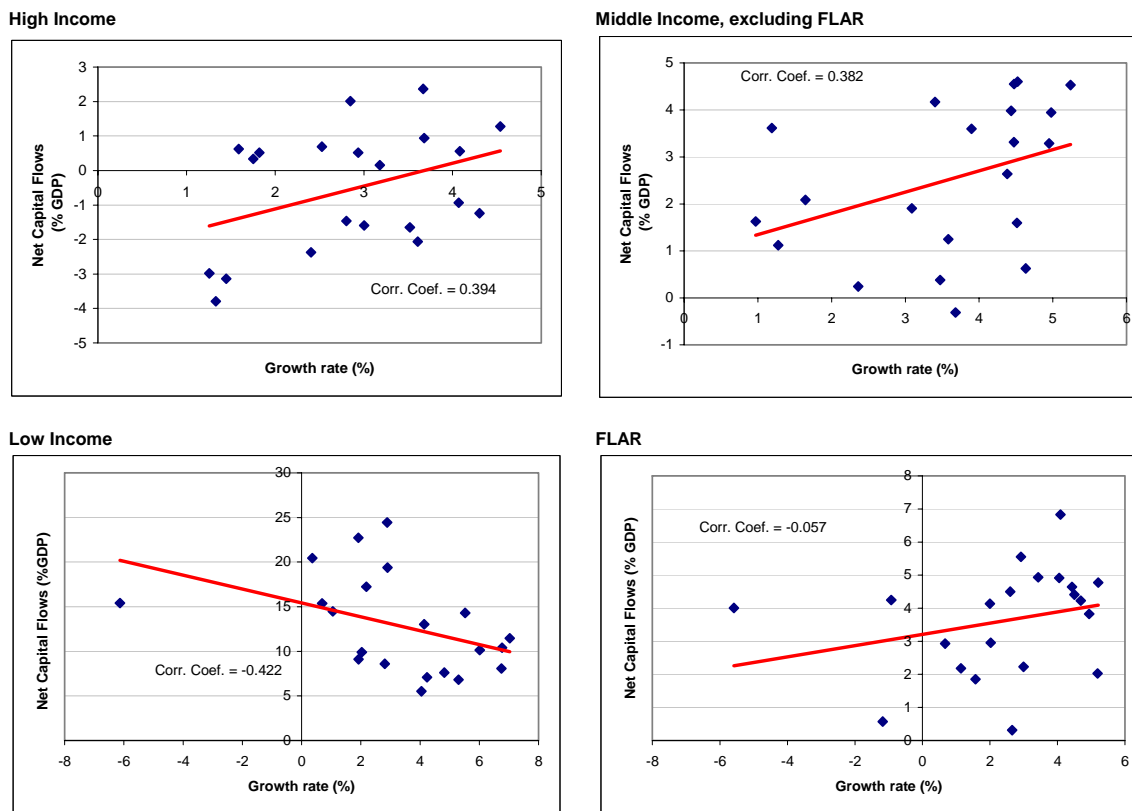
Source: Author's own calculations

2.2 *De Jure and De Facto Indicators of Financial Globalization and Macroeconomic Volatility*[11]

Figure 3 shows the degree of association between *de jure* indicator Fg_2 and the volatility of output. There is almost no association between these two variables neither for high-income nor low-income countries. On the other hand, there is a strong positive association for middle-income and FLAR member countries, especially for the latter ones. As a

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[11] Volatility is measured as the standard deviation of the growth rate of a variable, using a rolling window of order four.

comparison, figure 4 indicates that for high-income and FLAR member countries there is no association between net capital flows (Fg_3) and the volatility of output; while for middle-income and low-income countries there is a strong negative and positive relationship, respectively.

Figure 3. *De Jure* **Indicator and Output Volatility**
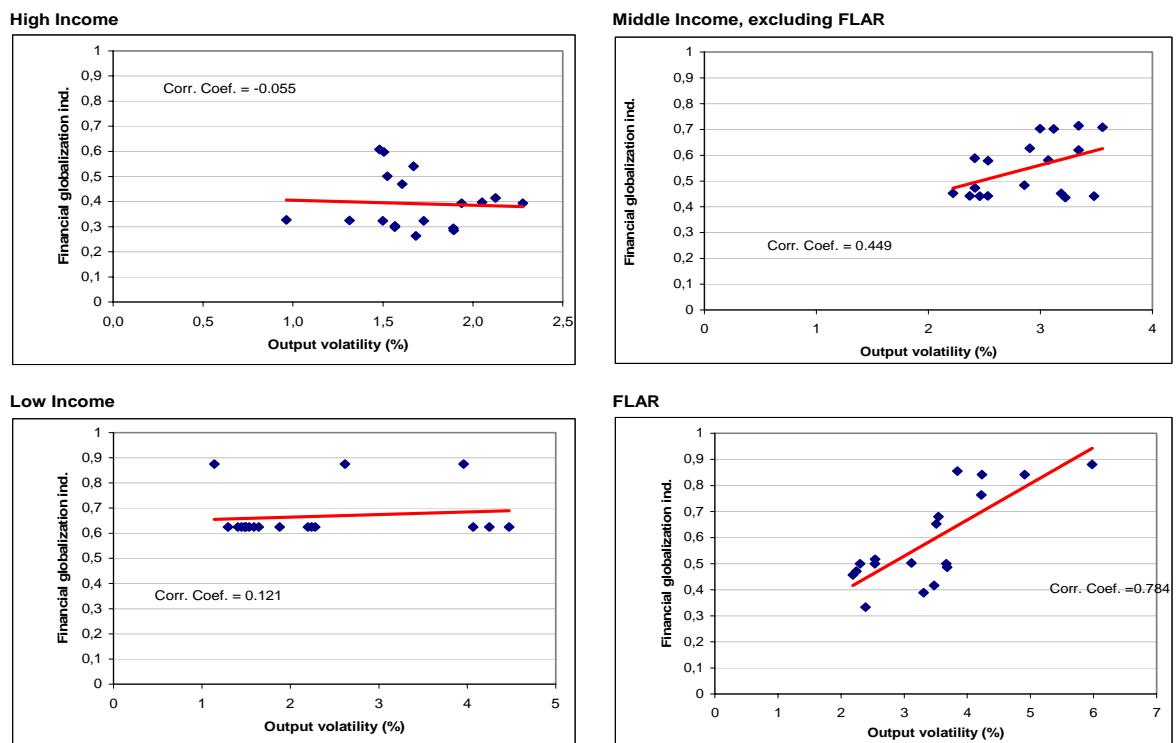
Source: Author's own calculations

Figure 4. *De Facto* **Indicator and Output Volatility**
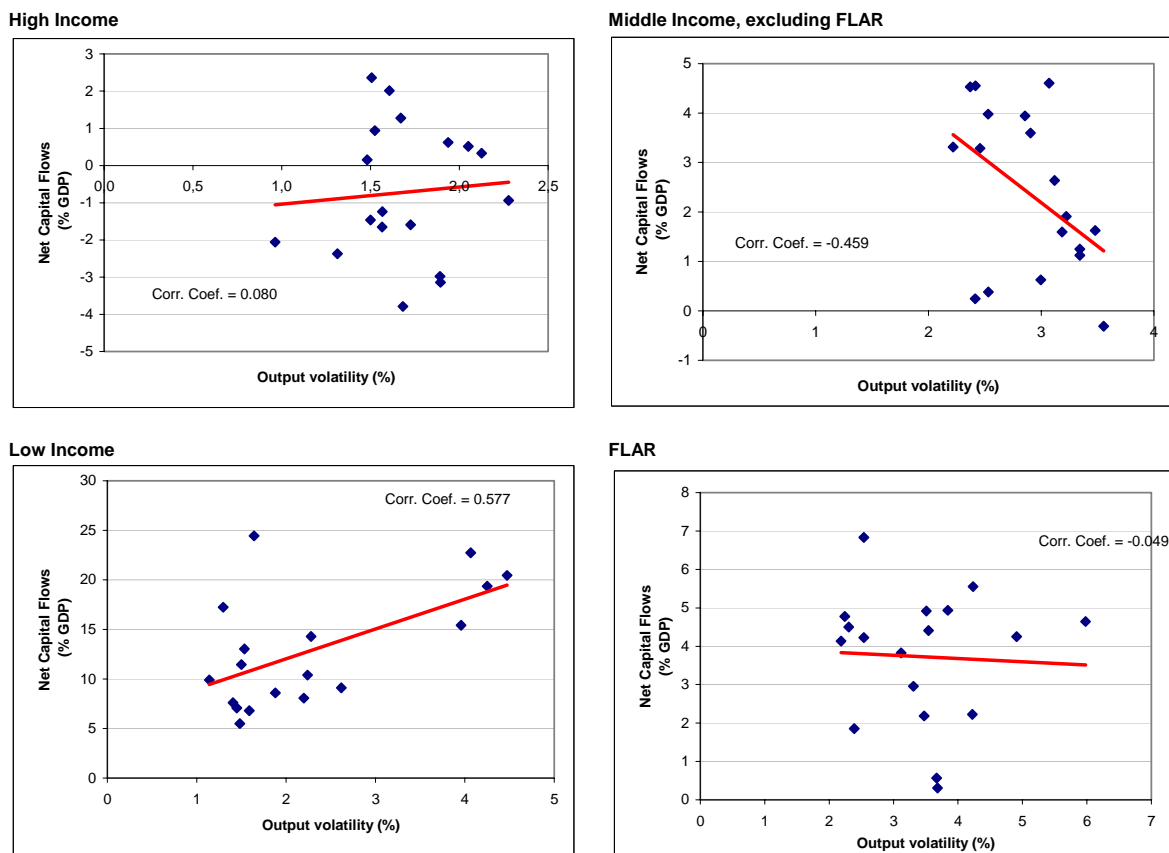
Source: Author's own calculations

In summary, figures 1 through 2 show a positive relationship between financial globalization and economic growth for middle-income countries, excluding FLAR's members, and negative for low-income countries. For high-income countries and FLAR's members the relationship is ambiguous. With respect to volatility, figures 3 through 4 indicate no association between financial globalization and output volatility for high-income countries. For the other countries, figures show contradictory evidence. Of course, these are simply graphical interpretations that will be formally evaluated later on.

3. Data and Econometrics

First, a standard growth regression model is estimated[12], based on theoretical grounds and empirical findings, to evaluate the effects of financial globalization on economic growth. Measurements of "state" variables, as proxies for parameters, and variables sought to capture macroeconomic reforms (trade and domestic financial liberalizations); economic environment; and institutional quality, as explanatory variables are used. Second, a model, in the spirit of Razin and Rose (1994), Easterly et al. (2001), and Kose et al. (2003) is estimated to quantify the effects of financial globalization on the volatility of output, income, consumption, and investment. In both cases, we ran cross-section and panel-data regressions using OLS and GLS with robust standard errors. It is worth noting that cross-section is also implemented for comparative purposes only, most of the literature has used that technique, since there are well known the advantages of the panel-data estimations. Finally, IV panel-data regressions were run when needed.

The data covers the period from 1984 to 2003 and a sample of 43 countries, among them the FLAR member countries.[13] Those four alternative indicators of financial globalization explained in Section 2, denoted as Fg_1, Fg_2, Fg_3, and Fg_4, are used as the interest explanatory variables in the estimations.

3.1 *Financial Globalization and Growth*

Cross-Section Estimations

The linear cross-section growth regression for the i-th country is the following:

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[12] The theoretical and empirical references on growth models that this paper is based on are in Romer (1986), Barro (1991), Levine and Renelt (1992), Barro and Sala-i-Martin (1995), Barro and Lee (1996), Sach and Warner (1995), Levine (1996, 1997), Rodrick (1998), Frankel and Romer (1999), Baldwin and Forslid (2000), Easterly and Levine (2003), and Klein (2005).

[13] Appendix A.2 describes the data, sources, and units of measurement.

$$Gy_i = \mathbf{Z}_i \boldsymbol{\delta} + \mu + \varepsilon_i,$$

(1)
$$i = 1,2,...,43$$

where Gy is the growth rate of the real per capita GDP over the sample period,[14] $\mathbf{Z}_i$ is a 1x13

vector of observations on the explanatory variables, which are either the Fg_1 (+), Fg_2 (+), Fg_3 (+), or Fg_4 (+) indicators of financial globalization with their respective expected sign in parenthesis; real per capita GDP in 1984, $y84$ (-); literacy rate in 1984, $hum84$ (+); population growth rate, Gp (-); literacy rate, Hum (+); investment as a percentage of GDP, Inv (+); and trade openness, $Open$ (+/-), defined as the ratio of exports plus imports to GDP;[15] domestic financial depth, Fd (+), measured by M3 as a percentage of GDP; government consumption as a percentage of GDP, Gc (-); institutional quality (+), $Icrg$ (+), measured by the Composite Risk Rating of the *World Development Indicators*; a dummy variable for the FLAR member countries, $Flar$ (?); and two interaction variables between the financial globalization indicator and the categories 'high-income country' and 'middle-income country', $I(Fg_i*h)$ and $I(Fg_i*m))$, respectively. $\boldsymbol{\delta}$ is a 13x1 vector of parameters of the explanatory variables; μ is a constant; and ε_i is the error term, which is assumed to have zero mean, $E(\varepsilon_i/X_i)=0$, and to be uncorrelated with itself, $E(\varepsilon_i\varepsilon_j)$, i≠j, uncorrelated with X_i, $E(\varepsilon_iX_i)=0$, and homoskedastic, $V(\varepsilon_i/X_i)=\sigma^2_\varepsilon$.

Before showing the estimations, some recalls are needed. First, all explanatory variables different from the "state" variables were averaged throughout the sample period. Second, we included, as a first step, interaction variables that link the financial globalization indicators to the different levels of the countries' (1) per capita income, (2) institutional quality, (3) trade openness, (4) financial depth, and (5) size of the government. The only interaction variable that resulted statistically significant was income so that the

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[14] We alternately used the change in the natural logarithm of real per capita GDP between 1983 and 2003 as the dependent variable, and the results did not vary significantly.

[15] The more open the economy, the more vulnerable it is to trade shocks (-). However, the more open the economy is to trade, the less volatile consumption should be (+).

simultaneous presence of financial globalization and high-and-middle income countries reinforce the positive effects on growth. Thus, as stated by the literature, the benefits from financial globalization seem to be available after the countries' income attains certain threshold. Third, we carried out endogeneity tests on the critical variables Fg_3, Fg_4, *Inv*, and *Open* using the Durbin-Wu-Hausman's augmented regression test (Davidson and Mackinnon, 1993). The results showed that, at a 5% level of significance, OLS were consistent. Moreover, we ran Hausman tests of OLS against an IV-regression and, again, OLS resulted consistent. Thus, simple OLS seemed to be the proper econometric technique for the cross-section data.[16]

Table 1 shows that for the different regressions, unexpectedly, financial globalization reduces growth,[17] when the financial globalization measurement fg_3 and fg_4 are used. Notice that, as suggested by the facts, when controlling the countries' income level, financial globalization endorses growth in high- and middle-income countries, as shown by the coefficient estimates of the interaction variables $I(Fg_i{*}h)$ and $I(Fg_i{*}m)$ in regression 3. As for the standard repressors of growth models such us population growth rate and investment, resulted significant and with the expected signs. The financial depthness indicator resulted statistically significant, but wrongly singed. The fact that a country belongs to FLAR does not make a statistical difference in terms of growth.

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[16] For completeness, we ran IV regressions and the results were statistically poor.

Table 1: Cross-Section Growth Regressions Using OLS[1]

Dependent variable: Gy	1	2	3	4
Fg_1	-0.05	----	----	----
	(0.33)			
Fg_2	----	-0.03	----	----
		(0.24)		
Fg_3	----	----	**-0.10****	----
			(0.04)	
Fg_4	----	----	----	**-0.01***
				(0.08)
$y84$	-0.00	-0.00	-0.00	-0.00
	(0.76)	(0.81)	(0.91)	(0.89)
$hum84$	0.00	-0.00	0.00	0.00
	(0.66)	(0.94)	(0.49)	(0.44)
Gp	**-1.21****	**-1.03***	**-0.96***	**-1.14****
	(0.03)	**(0.09)**	**(0.09)**	**(0.03)**
Hum	-0.00	-0.00	-0.00	-0.00
	(0.51)	(0.92)	(0.32)	(0.29)
Inv	**0.15****	**0.18****	**0.28****	**0.23****
	(0.04)	**(0.03)**	**(0.00)**	**(0.01)**
$Open$	0.00	0.00	0.00	0.00
	(0.19)	(0.85)	(0.30)	(0.17)
Fd	-0.00	**-0.00***	**-0.00***	**-0.00***
	(0.17)	**(0.06)**	**(0.05)**	**(0.06)**
Gc	-0.04	-0.03	0.01	0.01
	(0.48)	(0.61)	(0.89)	(0.88)
$Icrg$	0.04	0.02	0.00	0.02
	(0.32)	(0.54)	(0.93)	(0.33)
$Flar$	0.00	0.00	0.00	0.00
	(0.66)	(0.85)	(0.68)	(0.68)
$I(Fg_i*h)$	0.03	0.02	**0.30****	-0.00
	(0.62)	(0.56)	**(0.01)**	(0.95)
$I(Fg_i*m)$	0.05	0.03	**0.11****	**0.01***
	(0.33)	(0.30)	**(0.04)**	**(0.08)**
Constant	-0.09	-0.06	0.03	-0.01
	(0.62)	(0.73)	(0.78)	(0.95)
Number of observ.	36	36	36	36
F-test	**65.6****	----	**65.6****	----
	(0.00)		**(0.00)**	
R^2	0.69	0.67	0.69	0.77

[1] It uses the *Huber/White/sandwich robust estimator of variance*. *Gy* is the growth rate of the real per capita GDP over the sample period; Fg_1, Fg_2, Fg_3, and Fg_4 are the indicators of financial globalization; *y84* is the real per capita GDP in 1984; *hum84* is the literacy rate in 1984; *Gp* is the population growth rate; *Hum* is the literacy rate; *Inv* is investment as a percentage of GDP; *Open* is trade openness; *Fd* is the indicator of domestic financial depth; *Gc* is government consumption as a percentage of GDP; *Icrg* is the indicator institutional quality; *FLAR* is a dummy for the FLAR member countries; $I(Fg_i*h)$ is the interaction variable between the *i*-th financial globalization indicator and the dummy 'high-income country'; and $I(Fg_i*m)$ is the same interaction variable but for 'middle-income country' (the base category is 'low-income country'). All explanatory variables but the "state" variables were averaged throughout the sample period. The number in parenthesis is the *p-value*. The symbols "*" and "**" mean statistical significance at the 10% and 5% level, respectively.

[17] We used STATA V.8.2 for all the calculations. Outputs not shown in the paper are available upon request.

Panel-Data Estimations

The linear panel-data growth regression model for the *i*-th country in the *t*-th time period is the following:

$$Gy_{it} = X_{it}\beta + \mu_i + \upsilon_{it}$$

(2)
$$i = 1,2,...,43 \qquad ,[18]$$
$$t = 1,2,3,4$$

where variables are defined as before, though they were averaged throughout non-overlapping five-years intervals (1984-1988; 1989-1993; 1994-1998; 1999-2003).[19] β is a 13x1 vector of parameters of the explanatory variables; μ_i is the country-specific effect, which is assumed random and *i.i.d.* with variance σ^2_{μ};[20] υ_{it} is the combined time series and cross-section error component, which is assumed to have zero mean and to be uncorrelated to the variables in X_{it}.[21]

Table 2 shows that only in the case of regression "3", when indicator Fg_3 is used, financial globalization reduces growth. For the other cases, financial globalization neither reduces nor increases growth. Again, when controlling the countries' income level, as it is captured by the interaction variables, financial globalization promotes growth. Regarding the standard repressors, investment, government consumption, and the indicator of institutional quality, resulted significant, with the expected signs, as well as robust to changes in the financial globalization indicator. Human capital and the financial depthness indicator

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[18] An *overall* constant term is added to this model.

[19] We also used ten-year intervals in order to avoid the "noise" introduced by business cycle variation in GDP, as argued by Rodriguez and Rodrick (1999). The results did not change significantly.

[20] The randomness of μ_i was tested using the Hausman test.

[21] Again, we ran endogeneity tests on the variables Fg_3, Fg_4, *Inv*, and *Open* using the standard Hausman's test and the Durbin-Wu-Hausman's augmented regression test. None of the tests for any of the variables rejected the null hypothesis of no systematic difference in the coefficients, except for the indicator Fg_3. Thus, for equation "3" we ran an IV panel-data regression.

resulted statistically significant, but incorrectly singed. Again, the dummy capturing FLAR member countries did not result statistically significant.

Table 2: Panel-Data Growth Regressions Using GLS Random-Effects Estimator[1]

Dependent variable: Gy	1	2	3[2]	4
Fg_1	0.00	----	----	----
	(0.92)			
Fg_2	----	-0.02	----	----
		(0.26)		
Fg_3	----	----	**-0.24****	----
			(0.02)	
Fg_4	----	----	----	-0.00
				(0.13)
Y84	-0.00	0.00	0.00	-0.00
	(0.88)	(0.79)	(0.18)	(0.91)
hum84	0.00	0.00	**-0.00***	0.00
	(0.11)	(0.26)	**(0.09)**	(0.12)
Gp	-0.51	-0.41	-0.13	**-0.79**
	(0.25)	(0.36)	(0.82)	**(0.04)**
Hum	**-0.00***	**-0.00***	**-0.00****	**-0.00****
	(0.04)	**(0.09)**	**(0.02)**	**(0.02)**
Inv	**0.12****	**0.13****	-0.06	**0.14****
	(0.00)	**(0.00)**	(0.65)	**(0.00)**
Open	0.00	0.00	0.00	**0.00***
	(0.36)	(0.59)	(0.21)	**(0.09)**
Fd	**-0.00****	**-0.00****	-0.00	**-0.00****
	(0.03)	**(0.01)**	(0.77)	**(0.01)**
Gc	**-0.08***	-0.07	-0.05	**-0.07***
	(0.07)	(0.15)	(0.35)	**(0.05)**
Icrg	**0.07****	**0.07****	**0.08****	**0.06****
	(0.00)	**(0.00)**	**(0.00)**	**(0.00)**
Flar	0.00	0.01	-0.01	0.00
	(0.63)	(0.95)	(0.41)	(0.62)
$I(Fg_i*h)$	-0.02	0.01	**0.35****	-0.00
	(0.33)	(0.69)	**(0.03)**	(0.88)
$I(Fg_i*m)$	-0.02	0.01	**0.25****	0.00
	(0.47)	(0.57)	**(0.02)**	(0.13)
Constant	**-0.23****	**-0.20****	**-0.15****	**-0.15****
	(0.00)	**(0.00)**	**(0.04)**	**(0.00)**
Number of observ.	132	132	108	132
Wald χ^2-test	**76.9****	**73.5****	**52.2****	**89.6****
	(0.00)	**(0.00)**	**(0.00)**	**(0.00)**
R^2: Overall	0.43	0.42	0.29	0.43

[1] Variables are defined in table 1. The number in parenthesis is the *p-value*. The symbols "*" and "**" mean statistical significance at the 10% and 5% level, respectively.
[2] It uses instrumental variables, the G2SLS implementation of Balestra and Varadharajan-Kishnakumar (1987), to estimate the two-stage least squares random-effect estimators. The instruments are the real interest

rate differentials between domestic and foreign rates, adjusted by the percentage change of the exchange rate expectations, and investment as a percentage of GDP in 1984, as well as their lags.

3.2 *Financial Globalization and Macroeconomic Volatility*

Cross-section and panel-data regressions, of the type of equations (1) and (2) are used respectively to evaluate the effects of financial globalization on the volatility of output, consumption, and investment. Here, the dependent variable will alternately be the average volatility of real GDP (output), private consumption, and investment (fixed capital), over the sample period. The explanatory variables are averages over the sample period of either Fg_1 (-), Fg_2 (-), Fg_3 (-), or Fg_4 (-) indicators of financial globalization, with their respective expected sign in parenthesis: volatility of investment as a percentage of GDP, $Vinv$ (-), for the case of evaluating output volatility; trade openness indicator, $Open$ (+);[22] volatility of domestic financial depth indicator, Vfd (+); inflation rate π (+); volatility of government consumption as a percentage of GDP, as an indicator of the volatility of fiscal policy, Vgc (+); and a dummy variable for the FLAR member countries, $Flar$ (?).

Cross-Section Estimations

Tables 3-1 and 3-2 report the cross-section results for indicators Fg_2 and Fg_4, respectively.[23] The estimations indicate that financial globalization does not seem to increase macroeconomic volatility, as it is commonly stated by policy makers and analysts. It does not reduce volatility, either; except for investment. Unexpectedly, investment volatility does not increase output volatility.

As expected, inflation consistently increases output volatility. Volatility of government consumption increases the volatility of consumption and investment. The findings indicate that whether a country belongs to FLAR does not make a difference on macroeconomic volatility.

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[22] The more open the economy is, the less volatile consumption and investment should be.

[23] The results for the other two indicators are not reported, but they are available upon request.

Table 3-1: Cross-Section Volatility Regressions for Fg_2 Using OLS[1]

Dependent variable: Volatility of the growth rate of:	Output[2] (Vy)	Private consumption (Vc)	Investment ($Vinv$)
Fg_2	-0.09	0.07	-0.04
	(0.94)	(0.97)	(0.99)
$Vinv$	-0.02	**---**	---
	(0.94)		
$Open$	0.02	-0.00	-0.00
	(0.27)	(0.89)	(0.84)
Vfd	**-0.13***	0.07	0.11
	(0.05)	(0.59)	(0.70)
π	**7.08****	2.22	0.29
	(0.00)	(0.67)	(0.98)
Vgc	0.00	**0.63****	**0.67****
	(0.99)	**(0.00)**	**(0.00)**
$Flar$	0.91	-3.64	-2.61
	(0.23)	(0.16)	(0.41)
$Constant$	1.31	0.38	**5.14****
	(0.59)	(0.68)	**(0.01)**
Number of observ.	31	35	35
F-test	**7.90****	**72.16****	**51.46****
	(0.00)	**(0.00)**	**(0.00)**
R^2	0.43	0.93	0.85

[1] It uses the *Huber/White/sandwich robust estimator of variance*. Fg_2 is the second indicator of financial globalization; *Vinv* is volatility of investment as a percentage of GDP, *Open* is the trade openness indicator, *Vfd* is the volatility of the domestic financial depth indicator, π is the inflation rate; *Vgc* is the volatility of the fiscal policy, *Flar* is a dummy variable for the FLAR member countries. All variables are averaged throughout the sample period. The number in parenthesis is the *p*-value. The symbols "*" and "**" mean statistical significance at the 10% and 5% level, respectively.
[2] It uses instrumental variables, the G2SLS implementation of Balestra and Varadharajan-Kishnakumar (1987), to estimate the two-stage least squares estimators. The instruments are the volatility of the domestic real interest rate, the volatility of the real exchange rate, and the real interest rate differentials between domestic and foreign rates, adjusted by the percentage change of the exchange rate expectations.

Table 3-2: Cross-Section Volatility Regressions for Fg_4 Using OLS[1]

Dependent variable: Volatility of the growth rate of:	Output[2] (*Vy*)	Private consumption (*Vc*)	Investment (*Vinv*)
Fg₂	0.00	0.00	**-0.00****
	(0.77)	(0.13)	**(0.02)**
Vinv	0.01	---	---
	(0.98)		
Open	0.02	-0.00	-0.00
	(0.21)	(0.94)	(0.82)
Vfd	**-0.14***	0.05	0.15
	(0.06)	(0.72)	(0.59)
π	**7.34****	3.12	-1.31
	(0.00)	(0.57)	(0.90)
Vgc	-0.02	**0.62****	**0.68****
	(0.92)	**(0.00)**	**(0.00)**
Flar	0.85	-4.45	-1.20
	(0.12)	(0.13)	(0.71)
Constant	1.12	0.48	**5.01****
	(0.53)	(0.35)	**(0.00)**
Number of observ.	31	35	35
F-test	**18.2****	**282.06****	**68.04****
	(0.00)	**(0.00)**	**(0.00)**
R^2	0.45	0.93	0.85

[1] It uses the *Huber/White/sandwich robust estimator of variance*. Variables are defined in table 3-1. The number in parenthesis is the *p*-value. The symbols "*" and "**" mean statistical significance at the 10% and 5% level, respectively.
[2] As stated in Table 3-1.

Panel-Data Estimations

Tables 4-1 and 4-2 report the panel data results for indicators Fg_2 and Fg_4, respectively.[24] Financial globalization neither increases nor reduces macroeconomic volatility, except for the case of investment, where the coefficient is positive and statistically significant, but its effect is nil. Volatility of investment and financial depth, inflation, as well as trade openness, do increase output volatility. It is worth noting that inflation reduces investment volatility, a finding for which we do not have an explanation. Again, volatility of

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[24] The results for the other two indicators are not reported, but they are available upon request. Again, the randomness of μ_i was tested using the Hausman test

government consumption increases the volatility of consumption and investment; however, it reduces volatility of output.

Table 4-1: Panel-Data Volatility Regressions for Fg_2 Using GLS Random-Effects Estimator[1]

Dependent variable: Volatility of the growth rate of:	Output (Vy)	Private consumption (Vc)	Investment ($Vinv$)
Fg_2	-0.32	0.40	1.62
	(0.45)	(0.81)	(0.49)
Vinv	**0.06****	---	---
	(0.00)		
Open	**0.01****	-0.00	-0.00
	(0.01)	(0.73)	(0.94)
Vfd	-0.00	**0.20****	**0.22***
	(0.81)	**(0.02)**	**(0.05)**
π	**1.67****	-2.29	-4.66
	(0.00)	(0.29)	(0.10)
Vgc	**-0.03****	**0.59****	**0.55****
	(0.00)	**(0.00)**	**(0.00)**
Flar	**0.72***	**-3.06****	-1.42
	(0.07)	**(0.03)**	(0.52)
Constant	**1.58****	0.35	**4.94****
	(0.00)	(0.77)	**(0.01)**
Number of observ.	129	129	129
Wald χ^2-test	**46.28****	**1200.44***	**565.31****
	(0.00)	**(0.00)**	**(0.00)**
R^2: Overall	0.32	0.91	0.82

1 It uses instrumental variables, the G2SLS implementation of Balestra and Varadharajan-Kishnakumar (1987), to estimate the two-stage least squares random-effect estimators. Variables are defined in table 3-1. The number in parenthesis is the *p-value*. The symbols "*" and "**" mean statistical significance at the 10% and 5% level, respectively.

An opposite result is found on the dummy capturing FLAR member countries, since it seems to have a small positive effect on output volatility, but a large negative effect on consumption. An interpretation for this behavior might be that the economies of the FLAR members were very unstable during the sample period; however, the fact that they belong to that "lender of last resort" might allow those countries to smooth consumption somehow and somewhat. Of course, this is a hypothesis that has to be analyzed and proved, which is out of the scope of this paper.[25]

Table 4-2: Panel-Data Volatility Regressions for Fg_4 Using GLS Random-Effects Estimator[1]

Dependent variable: Volatility of the growth rate of:	Output (Vy)	Private consumption (Vc)	Investment ($Vinv$)
Fg_4	0.00	**0.00****	-0.00
	(0.49)	**(0.04)**	(0.89)
$Vinv$	**0.06****	---	---
	(0.00)		
$Open$	**0.01****	-0.00	-0.00
	(0.00)	(0.70)	(0.90)
Vfd	-0.01	**0.20****	**0.22****
	(0.70)	**(0.01)**	**(0.04)**
π	**1.84****	-2.33	**-5.04***
	(0.00)	(0.27)	**(0.07)**
Vgc	**-0.04****	**0.58****	**0.55****
	(0.00)	**(0.00)**	**(0.00)**
$Flar$	**0.69***	**-3.58****	-1.52
	(0.07)	**(0.01)**	(0.49)
$Constant$	**1.41****	0.53	**5.72****
	(0.00)	(0.56)	**(0.00)**
Number of observ.	129	129	129
Wald χ^2-test	**49.17****	**1247.58****	**565.31****
	(0.00)	**(0.00)**	**(0.00)**
R^2: Overall	0.33	0.91	0.82

1 As stated in Table 3-1. The number in parenthesis is the *p-value*. The symbols "*" and "**" mean statistical significance at the 10% and 5% level, respectively.

4. Conclusions

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[25] Machinea and Titelman (2006) seem to offer some support for this argument.

The purpose of this paper was to evaluate the effects of financial globalization on economic growth and macroeconomic volatility for a sample of 43 countries, paying particular attention to those countries belonging to FLAR.

Regarding growth, the findings indicate that financial globalization endorses growth, once the countries' income level is controlled. This supports the evidence presented by Edison (2004), Klein (2005), and Mora and Rincón (2006).

As for macroeconomic volatility, the estimations indicate that financial globalization does not seem to increase macroeconomic volatility, as it is commonly thought. In general, it does not reduce volatility either, which supports the evidence showed by Mora and Rincón (2006) and is against the evidence presented, for example by Prasad *et al*. (2004).

Whether a country belongs to FLAR or not, does not seem to make a difference in terms of growth and macroeconomic volatility. However, it is worth to mention that a strong negative effect was found on volatility of consumption, which might be related to the fact that those countries have an insurer (FLAR) that has helped them to smooth consumption during periods of adverse external shocks.

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Appendix

A.1 Sample of countries

High income	Middle income	Low income
Australia	Argentina	India
Austria	Bolivia	Nicaragua
Belgium	Brazil	
Canada	Chile	
Denmark	Colombia	
Finland	Costa Rica	
France	Dominican Republic	
Germany	Ecuador	
Hong Kong	El Salvador	
Italy	Greece	
Japan	Malaysia	
Netherlands	Mexico	
Norway	Panama	
Singapore	Paraguay	
Spain	Peru	
Sweden	Philippines	
Switzerland	Portugal	
United Kingdom	South Africa	
United States	South Korea	
	Thailand	
	Turkey	
	Venezuela	

Source: World Bank. Greece, Korea, and Portugal were reclasified from high-income to
middle-income countries by the author to keep their status along the sample period.

A.2 Data and sources

Description	Units	Source	Observations
Nominal GDP	Millions of national currency	IMF - IFS	
Real GDP	Millions of national currency	IMF - IFS	GDP deflator (2000=100)
Nominal GDP	Millions of US dollars	IMF - IFS	
Real GDP	Millions of US dollars	IMF - IFS	GDP deflator (2000=100)
Population	Millions	IMF - IFS	
Volatility of the growth rate of real GDP	Standard deviation of the growth rate using a four period moving window (%)	Own calculations	GDP in national currency
Volatility of the growth rate	Standard deviation of the growth	Own calculations	Government

of government consumption	rate using a four period moving window (%)		consumption in national currency deflated by CPI
Volatility of the growth rate of private	Standard deviation of the growth rate using a four period moving window (%)	Own calculations	Private consumption in national currency deflated by CPI
Volatility of the growth rate of real gross fixed capital formation	Standard deviation of the growth rate using a four period moving window (%)	Own calculations	GDP deflator used
Real government consumption	Millions of national currency	IMF - IFS	CPI (2000 = 100)
Real private consumption	Millions of national currency	IMF - IFS	CPI (2000 = 100)
Real gross fixed capital formation	Millions of national currency	IMF - IFS	GDP Deflator (2000=100)
Current account balance	% of GDP	IMF - IFS	
Financial globalization indicators	Dummy averages by country and year for twelve different categories of "capital transactions"	Miniane (2004) IMF's AREAER, and own calculations	de jure indicators
Foreign direct investment	Millions of US dollars	IMF's BOP and own calculations	de facto indicator
Net portfolio equity investment	Millions of US dollars	IMF's BOP and own calculations	de facto indicator
Net debt	Millions of US dollars	IMF's BOP and own calculations	de facto indicator
Net foreign assets	Millions of US dollars	IMF's BOP and own calculations. Methodology from Lane and Milesi-Ferretti (2001)	de facto indicator
Exports FOB	Millions of US dollars	IMF – IFS	
Imports CIF	Millions of US dollars	IMF – IFS	
Public and publicly guaranteed debt	% of GDP	IFS & WDI	NGDP in millions of US dollars
Liquid liabilities (M3) as % of GDP	% of GDP	WDI	Financial depthness indicator
ICRG composite risk rating	0-100	WDI	Institutional quality
Literacy rate (% People ages 15 and above)	% people	WDI	Schooling
Consumer price index	Index (2000 = 100)	IMF - IFS	
GDP deflator	Index (2000 = 100)	IMF - IFS	
Real effective exchange rates	Index (2000 = 100)	IMF - IFS	

VARIABLES USED IN GROWTH ESTIMATIONS

Variable	Definition
Gy	Average growth rate of the real per capita GDP over the sample period
Fg_1	*de jure* indicator: dummy averages by country and year for twelve different categories of "capital transactions" from the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER), plus a dummy for the category "exchange rate structure.
Fg_2	*de jure* indicator: dummy averages by country and year for twelve different categories of "capital transactions" from the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER).
Fg_3	Net capital flows as a percentage of GDP
Fg_4	Net foreign assets as a percentage of GDP
$y84$	Real per capita GDP in 1984
$hum84$	Literacy rate in 1984 (% People ages 15 and above)
Gp	Growth rate of population
Hum	Literacy rate
Inv	Investment as a percentage of GDP
$Open$	Indicator of trade openness
Fd	Indicator of domestic financial depthness
Gc	Government consumption as a percentage of GDP
$Icrg$	Indicator of institutional quality
$Flar$	Dummy variable for the FLAR's member countries
$I(Fg_i*h)$	Interaction variable between the *i-th* financial globalization indicator and the category 'high-income country'
$I(Fg_i*m)$	Interaction variable between the *i-th* financial globalization indicator and the category 'middle-income country'

VARIABLES USED IN VOLATILITY ESTIMATIONS

Variable	Definition
Vy	Volatility of the growth rate of real GDP
Vc	Volatility of the growth rate of real private consumption
$Vinv$	Volatility of the growth rate of real gross fixed capital formation
Fg_1	*de jure* indicator: dummy averages by country and year for twelve different categories of "capital transactions" from the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER), plus a dummy for the category "exchange rate structure.
Fg_2	*de jure* indicator: dummy averages by country and year for twelve different categories of "capital transactions" from the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER).
Fg_3	Net capital flows as a percentage of GDP
Fg_4	Net foreign assets as a percentage of GDP
$Open$	Indicator of trade openness
Vfd	Volatility of the indicator of domestic financial depthness
π	Inflation rate
Vgc	Volatility of the growth rate of real government consumption
$Flar$	Dummy variable for the FLAR's member countries