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# Capital mobility, balance of payments constraints, and economic growth: an empirical dynamic analysis

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## Resumo

Este artigo analisa empiricamente a relação entre crescimento econômico e a abertura da conta financeira do balanço de pagamentos. O estudo considera a possível restrição imposta pelo balanço de pagamentos ao processo de crescimento bem como as dificuldades enfrentadas pela literatura empírica no que tange à mensuração da mobilidade dos fluxos de capital. Partindo de indicadores tradicionais para o grau de abertura, estimamos um modelo com dados em painel para 80 países, desenvolvidos e em desenvolvimento, no período 1979-2003. Os resultados sugerem que uma maior mobilidade de capitais afeta negativamente o crescimento nos países em desenvolvimento embora possivelmente favoreça o crescimento nos países desenvolvidos.

**Palavras-chave:** *Crescimento econômico, Mobilidade de capitais, Painel dinâmico*

## Abstract

This paper analyses empirically the relationship between economic growth and the openness of the financial account of the balance of payments. It takes into consideration the balance of payments' constrained growth, as well as the difficulties in the empirical literature in measuring capital mobility. Starting from traditional capital mobility indexes we estimate a panel across 80 countries, both developed and developing between 1979-2003. Results suggest that more capital mobility in developing countries affects growth negatively, whereas it possibly stimulates growth in developed countries.

**Key words:** *Economic Growth, Capital Mobility, Dynamic Panel*

JEL Codes: F41, F43

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## 1 INTRODUCTION

Conventional economic analysis on the relationship between international capital mobility and growth has a problem. Although there are several theoretical arguments supporting that free movement of capital is desirable to guarantee increased growth, empirical evidence is weak. An important difficulty in this literature is how to measure capital mobility in different economies over time. Furthermore, once the conception underlying the great majority of empirical studies on the subject, it is not surprising that the issues relate to the balance of payments constraints are improperly absent from this analysis. In this paper we make an effort to contribute on this issue.

In order to accomplish our objective, this paper is organized in three sections, besides this introduction and conclusions. First, we analyze the controversies of international capital mobility. We offer a brief panorama of the empirical literature on capital mobility and growth, discussing the different approaches and conclusions. Then we propose an econometric analysis based on the estimation of a dynamic model with panel data. The study utilizes observations of 80 developed and developing countries from 1979 to 2003. The regressions were specified so as to include external restriction on growth as a relevant issue in the relationship between growth and capital mobility. The system GMM estimator, originally developed by Blundell and Bond (1998), serves as a basis for this analysis. Preliminary estimates, carried out with pooled OLS, are also reported. The results suggest that greater openness to capital flows in developing countries have negative effects on economic growth, although it may encourage it in developed ones.

## 2 CONTROVERSIES ON MEASURING CAPITAL MOBILITY

Measuring capital flows is not an easy task. A first aspect to be considered refers to the fact that international financial transactions increasingly assume different forms. First of all, there are several instruments of intervention in these flows<sup>1</sup> used by the various countries with distinct objectives and arrangements, frequently complex and difficult to understand. Besides, control capitals present distinct degree of efficacy. There are two central issues that need to be analysed. First, the degree of rigour with which such policies are effectively administered and, seconde, the degree of evasion to which they are subject. In this context, various indicators

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<sup>1</sup> See, among others, Edwards (1999), Ariyoshi *et al.*(2000) .

have been proposed to capture the extent of international capital mobility in different economies over time. There are basically qualitative and quantitative indicators in this literature. The first group utilizes information relative to the current legislation in force as a resource to estimate the degree of capital movements. The quantitative indicators, on the other hand, estimate international capital mobility based on the effective behavior of these flows on strategic macroeconomic variables such as interest, savings and investment.

## **2.1 Some traditional qualitative indicators**

Some of the most used indicators in recent studies are built up from information compiled annually by the International Monetary Fund in their Annual Report on Exchange Arrangements and Exchange Restrictions.<sup>2</sup> This classification permits to create a dummy variable (IMF) used by some analysts as a capital control index (see, for example, EICHENGREEN; LEBLANG, 2002). This variable assumes a value equal to 1, in a particular year if, according to IMF, the country imposed restrictions on the capital account, and zero in the contrary case. The Share, measures the proportion of years in a particular period where the respective countries maintained their capital accounts free of restrictions.<sup>3</sup>

These indices possess serious limitations. Firstly, as pointed out by Quinn (1997), the information summarized by the IMF considers (up to 1996) only restrictions on transactions of residents, disregarding important aspects concerning the degree of loosening of financial controls of domestic economies such as, for example, the possible presence of restrictions on the entry of financial resources of non-resident agents. Second, they simply establish a classification of the on/off type, as if there are only corner solutions concerning the degree of capital account openness in a particular year, ignoring any other possibility of grading the desired control level.<sup>4</sup>

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<sup>2</sup> This document presents, since 1967 a summary table in a specific line (E.2) denominated Restrictions on Payments for Capital Transactions, informed if the respective member countries had made use of some form of exchange restriction in relation to the payments of external obligations deriving from the capital transactions of its residents.

<sup>3</sup> Or, alternatively, the proportion of years in the period in which the capital account was subject to restrictions.

<sup>4</sup> Similar indicators (also based on the information summarized annually by the IMF) were recently proposed in the literature, as possible advances in the sense of ameliorating such limitations. In general, such indicators seek to incorporate information relative to the existence of restrictions on payments into current account and multiple exchange rates as possible indicative factors of the efforts made by the local authorities to avoid evasion of capital control and guarantee its effective implementation.

In fact, indicators of the IMF and Share type tell us little about the intensity with which the existing mechanisms of intervention are effectively implemented and its effectiveness as regards the restriction of the mobility of capital flows. It should be noted that the information relative to the presence of capital controls, compiled by the International Monetary Fund in their Annual Report, is based essentially on standards, rules and laws communicated, periodically, by the respective member countries. Nevertheless, according to Edwards (1999, 2001), the historical evidence points to considerable disagreement between the degree of control described by the official restrictions and the degree of control over the capital flows effectively practiced by the various countries over time. It is easier to identify if there are capital controls *de jure* or *de facto*.<sup>5</sup>

An additional difficulty concerns the use of these indicators in the period after 1996 due to methodological changes employed by the IMF in the preparation of their annual report. Previously, as we have discussed, only one column (E.2 in IMF annual report) summarized the imposition of restrictions on capital account. However, since 1997, the report started to specify 11 categories of transactions capable of being controls, including operations in the stock markets and direct investment. It becomes necessary to harmonize these two methodologies so as to extend the series to the more recent period.

In favor of the qualitative indicators it can be stressed that the presence of restrictions on payments in capital account constitutes a good proxy for the existence of controls in more general terms. A second, and perhaps more decisive, argument refers to their availability on an annual basis for a large number of countries over a considerable time interval.

Also based on the IMF's Annual Report, Quinn (1997) proposes an alternative indicator for capital account liberalization (Quinn) that seeks to capture, not only the presence, but also the degree of rigour with which the existing controls are administered by the local authorities. Accordingly, the author goes beyond a binary categorization of the regime of convertibility of the capital account, suggesting a scale for the degree of openness from 0 to 4, in intervals of 0.5. This scale considers separately the restrictions on the entry and exit of funds. Each of these dimensions determines an index of openness from 0 to 2. A higher score means a greater degree of openness of the capital account (and less degree of capital controls). The construction of the index is carried out starting from the careful reading

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<sup>5</sup> Edwards (2001) stresses the over-invoicing of imports and the under-invoicing of exports of goods and services the evasion mechanisms more commonly utilized.

of the text (not of a specific line) of the Annual Report, by two individuals, separately, where each one of these coders attributes, for each country in each year, and based on predefined rules, a score in the scale of 0 to 4.<sup>6</sup>

The rules for the attribution of scores - (coding rules) - are, in some sense, arbitrary. Following Quinn (1997), restrictions of an administrative order (quantitative controls, for example) are, by definition, more restrictive than the control based on the charging of the respective operations (via price mechanism, accordingly). Basically, a score equal to zero,  $Q=0$ , means that the transactions in question are the object of summary prohibition;  $Q=0.5$ , where there is need of approval by the competent authorities, the same being occasionally obtained;  $Q=1.0$ , if approval is necessary and frequently obtained, as well as where approval is not required, but the transactions are the object of heavy taxing;  $Q=1.5$  if approval is not required and the transactions are moderately taxed. Finally,  $Q=2.0$  if there is no need of approval and the operations are not the object of taxing. The analysis contemplates information on 64 countries (of which 21 are members of the OCDE) from 1950 to 1994. Nevertheless, the index of openness is available for the total of this sample in only four years: 1958, 1973, 1982 and 1988. This limits the use of the indicator in panel data. In fact, Quinn utilizes this index in level to derive a measure that expresses the variation of the degree of openness in a particular period. Thus, for example,  $\Delta Quinn(1958-1988) = Quinn(1988) - Quinn(1958)$ . The author uses this measure of variation to study the effects of capital account liberalization on economic growth, as we shall discuss later.

Montiel and Reinhart (1999) suggest another procedure for measuring the level of control of international capital mobility. Based on specific information relative to the legislation of 15 emerging countries,<sup>7</sup> between 1990 and 1996, these authors developed an indicator (restricted to these countries) that establishes a graduation with three possible values, 0, 1, or 2, in ascending order with the degree of restriction imposed. On this scale, a score equal to zero, in a particular year, indicates that the country, for the greater part of the year, did not impose administrative restrictions and/or taxes on capital inflows or further, excessive control (international standards) on the external indebtedness of domestic financial institutions. A value equal to 1 corresponds to the case where the country used control of

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<sup>6</sup> Should there be disagreement in the score attributed by each one of these coders, these differences are subsequently made compatible, although Quinn (1997, p. 544) does not make clear the procedures for this.

<sup>7</sup> Indonesia, Malaysia, Philippines, Sri Lanka, Thailand, the Argentine, Brazil, Chile, Colombia, Costa Rica, Mexico, Czech Republic, Egypt, Kenya and Uganda.

prudential regulation of the external operations of these institutions. Finally, the index assumes a value equal to 2 if the country utilized explicitly steps to restrict the mobility of capital flows, such as prohibitions, deposit requirements and taxes on financial transactions.

This index, in addition to that proposed by Quinn (1997), is interesting to the extent that it seeks to reflect the level of rigour with which the capital controls are implemented and not only their existence from the legal point of view. However, both suffer from a serious limitation to the extent that they are subject to a considerable degree of subjectivity in their construction, notably with regard to the rules of codification defined by their authors. In addition, in spite of all the efforts, the potential discrepancy between the 'legal' and the 'effective' level of openness still constitutes a serious obstacle to the mensuration needs of capital mobility through indicators based on the statutes, above all as regards the question of the evasion of the control mechanisms. More specifically, it may possibly result that even in situations where the policies of capital controls are rigorously administered, the same are subject to some degree of evasion. The potential evasion of capital control is, however, a topic whose discussion requires reference to specific economic conditions and to the types of instruments, also specific, to the detriment of any type of generalization.

## **2.2 Quantitative indicators**

As an alternative to the indicators built based on the legislation, some indices exist derived from the effective behavior of economic variables, commonly called quantitative indicators or those based on results. Three principle types of measures can be singled out in this context.

The approach originally proposed by Feldstein and Horioka (1980) utilizes the correlation observed between the domestic rates of saving and investment as a proxy for the degree of mobility of capital flows. It states that, under conditions of free mobility, the referred correlation would be near zero as the savings generated internally would respond to the global opportunities for investment whereas the formation of domestic capital could be financed by external saving. Following the same logic, a strict correlation between the two series would reveal, on the other hand, the existence of severe impediments to international capital movements.

One criticism of this methodology, developed by Bayoumi (1990), points out that a high correlation between savings and investment can reflect the existence of targets, on the

part of local economic authorities, as regards the balance of current transactions rather than considerations relative to the imposition of capital controls. Reinhart and Rogoff (2004) observe, alternatively, that this correlation is particularly sensitive in relation to the level of aversion to risk present in the international capital markets, not reflecting, necessarily, the existence or otherwise of domestic restrictions on international capital flows. Another important aspect to be considered is that, in inferring the degree of correlation between savings and investment based on a regression analysis, the Feldstein-Horioka approach supposes the mobility of capital as constant over the period of estimation, a factor that limits considerably the scope for the indicator's use.

A second approach of a quantitative nature utilizes different conditions of arbitrage between the domestic interest rates and an 'international' reference rate as the basis for measuring capital mobility over time. Therefore, the deviation of the domestic rate in relation covered (or uncovered) interest parity constitutes a good measurement of the degree of restriction imposed on the free movement of international capital flows. However, this type of strategy also faces limitations. One obstacle is the insufficiency, or even the complete absence, of the data necessary for a significant set of countries. The problem is more serious when the covered interest parity is used considering that the existence of future exchange markets is restricted to the developed countries and to the more advanced emerging countries from the financial point of view.<sup>8</sup> Taking this aspect into account, some studies utilize as a reference the condition of uncovered interest parity.<sup>9</sup> Nevertheless, this alternative imposes other types of difficulties, among them the empirical definition of a variable that cannot be observed, that is, the expectation as regards the future value of the exchange rate that implies some degree of arbitrariness. Additionally, and above all when short periods of time are analysed, the possible interference generated by exchange rate management policies and/or the internal interest rates should be taken into account.

Finally, degree of openness on capital movements can be derived starting from the effective magnitude of the incoming and outgoing flows of financial resources of an economy during a particular period. The usual procedure is finding the sum of the incoming and outgoing capital flows (in absolute values) as a proportion of the GDP for a given year (flows). As noted by Kraay (1998), this indicator is analogous, in terms of its conception, to

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<sup>8</sup> This point is stressed by Eichengreen (2001) and Edison; Klein *et al.*(2002).

<sup>9</sup> See Montiel (1993).

the traditional indicator of openness to trade defined by the ratio between the sum of exports plus imports and the GDP of the economy in that year. Lane and Milesi-Ferretti (2001) suggest a variant for this procedure that utilizes the sum of the assets and external obligations of the economy, estimated on an annual basis from the series of flows taken cumulatively, divided by the GDP (stocks). The actual authors recognize, however, that the inventories estimated are particularly sensitive to exchange rate variations and of the prices of the financial assets. On the other hand, a possible objection to the indicator based on flows arises out of the fact that these flows are notably susceptible to a variety of influences that escape frequently from the control of economic policies, as in the case of external crises for example. This implies that the referred indicator can fluctuate from one year to the other for reasons independent of domestic policies relative to the degree of loosening of financial controls. However, this limitation is attenuated when one observes the average value of the indicator in successive years which, in this case, is facilitated by a full availability of data, supplied through the multilateral economic organisms.

### **3 THE EMPIRICAL LITERATURE**

Based on different approaches and methodologies, the empirical studies on the relationship between capital mobility and growth present a rich and varied set of results. In general it is possible to identify three central issues that guide this literature. The first and more general, investigates the existence of a robust statistical relationship between opening up to capital movements and long term economic growth in different groups of countries. The second question whether this relationship is different in developed and developing economies. Finally, in what extent the existence of differentiated effects could be explained as resulting from distinct stages of financial, institutional development and/or from the degree of stability of the environment and of the macro policies prevailing in the different economies.

In this debate, Grilli and Milesi-Ferretti (1995) do not find evidence of significant association between the existence of restrictions on capital movements and economic growth in the period 1966-1989, analysing a sample composed of 61 developed and developing countries. This study utilizes the traditional Share indicator for the degree of restriction on capital account, here complemented by two indicators, similarly built, reflecting the existence of restrictions in the current account and multiple exchange régimes. According to the

authors, this additional information is valid for obtaining a more wide-ranging mensuration of capital control of and capturing, even if imperfectly, the intensity or rigour with which these restrictions are implemented in the different economies.

Rodrik (1998) obtains similar results. Contemplating information relative to a cross-section of approximately 100 countries in the period between 1975 and 1989, the study does not find evidence that the countries more integrated to the international capital markets have grown more rapidly and concluded that, *coeteris paribus*, the existence of capital controls is essentially not correlated with long term economic performance.

Quinn (1997) points out that a strong positive causal relationship between the liberalization of the capital account and long term economic growth. Comparing these results with those obtained by Rodrik, Eichengreen (2001) suggests that the different conclusions may be, in part, related to the composition of the samples and more precisely to the lower relative weight of the developing countries in the sample analysed by Quinn, composed of 64 countries in the period 1960-1989.

Kraay (1998) highlights that the signs that the loosening of financial controls favors growth are shown to be weak, just as is the evidence that this relationship is significantly mediated by the existence of adequate policies and institutions. The paper proposes a study of a full sample of economies, in different stages of development, between 1985 and 1997. Three indicators of loosening of financial controls are considered, Share, Quinn and the quantitative indicator based on capital flows as a proportion of GDP. Only in this last case does there exist reasonable evidence of a positive impact of liberalization. In general terms the results seem to suggest that the impact of loosening financial controls is more favorable in the countries where the quality of local policies and institutions is lower.

Utilizing the Quinn indicators of openness, Edwards (2001) identifies evidence of a strong positive impact of financial integration on the average growth of 62 economies, developed and developing, throughout the 1980s. According to the study, this result is shown to be robust as regards the utilization of different estimation procedures, although the referred effect would not be statistically different from zero when estimated utilizing an index of openness of the Share type. The analysis also finds strong evidence that the effect of capital mobility on economic growth is more favorable to the developed economies *vis-à-vis* the

developing economies.<sup>10</sup> Concluding, the study suggests that this differentiated impact could possibly be a reflection of the different stages of financial development prevailing in these countries and that a certain minimum level of sophistication of the local financial markets would be a prerequisite for a favorable impact of free capital flow.

The validity of these conclusions is challenged by Arteta *et al.* (2001). Their results point out to a positive effect of greater capital mobility on long term growth. Such evidence, however, is revealed to be sensitive not only in relation to the indicator of the degree of openness used, but to the period analysed and to the method of estimation employed. Still more fragile, this study points out, is the evidence that the referred effect is different or even negative in the countries whose *per capita* income is, in principal, lower. The results are more favorable as regards the importance of an institutional environment that guarantees the adequate obedience to laws and respect for existing contractual obligations. Nevertheless, it is concluded that most important for ensuring a positive impact of financial integration on growth would be the prior elimination of accentuated imbalances or macroeconomic distortions, evidenced in the analysis in question by the existence of a high premium in the parallel exchange market.<sup>11</sup>

Eichengreen and Leblang (2002), utilizing panel data, present evidence that the impact of liberalization on growth is contingent on the degree of stability observed in the international financial system. Thus, in periods of greater stability in the external scene, the impact of the openness of the capital account would tend to be positive, its benign influence prevailing on the allocative efficiency in the domestic economies. On the other hand, at times of greater instability in the international markets, with frequent financial crises and accentuated risk of contagion, the net effect of unrestricted mobility of capital flows could prove to be unfavorable and the utilization of controls, accordingly, desirable. One other important conclusion in this study points out that the vulnerability to external crises would be greater in countries where the domestic financial regulation is deficient, its strengthening being, accordingly, a necessary condition for full integration to international markets to encourage growth.

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<sup>10</sup> The average effect estimated by Edwards (2001) is positive in the 21 developed countries of the sample and negative in the developing countries. In only five emerging countries is the estimated effect positive: Israel, Venezuela, Hong Kong and Singapore.

<sup>11</sup> Defined as the percentage premium figure over the official rate of exchange.

Unlike what occurs in other studies, the results of Edison, Klein *et al.* (2002) suggest that the positive impact of the openness to capital flows is more pronounced in the case of the less developed countries. Nevertheless, the work also finds strong signs that this conclusion is strongly influenced by the performance of the emerging countries of East Asia in the period analysed, comprising the interval 1976-1995.<sup>12</sup> The impact is less robust for the other countries of the sample. For the Latin American economies, in particular, the estimated effect of liberalization on growth is negative when the Share indicator is utilized as a proxy for the degree of loosening of financial controls.

Edison, Levine *et al.* (2002) conclude that there is modest statistical support for the hypothesis that the relationship observed between financial integration and growth is significantly restricted by the initial economic conditions, by the degree of financial and institutional development of the countries analyzed or even by the prevailing political and macroeconomic conditions.

This hypothesis is examined in a systematic way by Klein and Olivei (2005). The authors propose an analysis structured into two stages, based on data relative to 87 countries in the period 1976-1995. Initially, they investigate whether liberalization of the capital account is significantly associated with the deepening of financial intermediation as a proxy for domestic financial development.<sup>13</sup> Secondly, they study the relationship between financial development and economic growth. The results obtained show that greater mobility of capital exercises, in general, strong encouragement to local financial development. However this positive impact proves itself to be essentially restricted to the more developed countries of the sample. The estimates relative to growth, in their turn, suggest that the same is positively influenced by greater financial development. Based on the evidence obtained, Klein and Olivei (2005) conclude that the loosening of financial controls tends to encourage growth in the developed economies but does not in the developing economies. According to the authors, these results highlight the importance of guaranteeing strong institutions and healthy macroeconomic policies prior to the process of the removal of controls on capital flows.

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<sup>12</sup> It is interesting to note, regarding this point, that the period analysed is prior to the appearance of the violent exchange/financial crisis that affected the emerging countries of East Asia at the end of the 1990s, with severe losses for these countries' economies.

<sup>13</sup> This identification is standard procedure in the area of this literature. Two measures usually utilized in this context are: a) the net liabilities of the financial sector as proportion of the GDP; b) the credit granted to the private sector of the economy, also in relation to the GDP.

## 4 EMPIRICAL ANALYSIS

We carry out an estimation of a dynamic model with panel data following Blundell and Bond (1998). The essence is to analyze the relationship between capital mobility and growth. Besides, we intend to study this relationship in developed and developing countries, as well as the relevance of the balance of payments constrained economic growth in the fashion of McCombie and Thirlwall (1994). This last aspect is introduced in the analysis through two central variables, defined in harmony with the theoretical analysis previously presented. The first, and more general, the growth of exports, key variable in the models of economic growth with external restriction;<sup>14</sup> the second variable, in its turn, was constructed with a view to measuring the impact of external indebtedness on growth in the less developed economies.

### 4.1 Methodology

The sample covers 80 countries between 1979 and 2003. This interval was divided into 5 periods of equal amplitude excluding any future absence of data, so we have 5 observations for each country. The sample is subdivided into two groups of countries, developed and developing ones. The first group was composed of 22 countries, members of the OECD. The group of the developing countries, much larger, consists of 58 economies located in different regions.

#### 4.1.1 Material and Model

Following Baltagi (2005), economic relations are intrinsically dynamic, so that estimations in panel data is better than cross-section the estimated regressions in this work have as basis the following general specification:

$$\begin{aligned}y_{it} &= \alpha y_{i,t-1} + x_{it}\beta + \varepsilon_{it} & (1) \\ \varepsilon_{it} &= \mu_i + v_{it} \\ E[\mu_i] &= E[v_{it}] = E[\mu_i v_{it}] = 0\end{aligned}$$

where,  $x_{it}$  is a vector of explanatory variables of dimension  $1 \times K$  and  $\beta$  the coefficients vector,  $K \times 1$ , associated with these regressors. The error component of the model,  $\varepsilon_{it}$ ,

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<sup>14</sup> For a treatment of the recent evolution of this literature, consult McCombie & Thirlwall (1994).

comprises two orthogonal elements: one random idiosyncratic component  $v_{it}$  and constant individual fixed effects in the time,  $\mu_i$ .

The dependent variable is the average growth of the real GDP *per capita* in each of the five periods. The explanatory variables include: the average rate of investment; the rate of literacy of the population at the beginning of the period, used as a proxy for the state of education in the country; the average rate of inflation conceived as a proxy for the degree of macroeconomic stability; and the average growth of exports.

In the case of the developing countries, we also consider a new explanatory variable so as to measure the possible impact of external indebtedness on economic growth.<sup>15</sup> A growing body of theoretical and empirical work calls attention to the fact that progressive external indebtedness can effectively aggravate the restriction imposed by foreign restrictions on sustained growth. Precisely, such indebtedness implies the payment of interest, and possibly the growing fragility of the domestic economies in the face of external conditions. The new variable here proposed is defined by the product between the level of external indebtedness of the respective economies at the beginning of the period - END - and the average annual rate of interest (in real terms) observed in the United States in the corresponding period, as a measure of the external interest FINT. We assume that the average rate of interest US represents a good indicator for the level of liquidity prevailing in international markets, and the solvency of external indebtedness of the developing countries. The external indebtedness is defined by the ratio between total external debt and the GDP, both measured in current dollars at the end of the respective year. It should be stressed that it is possible to observe this variable from a more wide-ranging perspective, which is, as an approximate measure of the magnitude of external liabilities, although, as has already been stressed the composition of these liabilities has important implications.

Unlike what occurs in other studies, we do not use the influence of institutional factors or those relative to the level of domestic financial development. Because of their amplitude and complexity, these are aspects difficult to define and their proper mensuration also controversial. We suppose that institutional aspects are manifested through the impact of variables such as the rate of investment and the inflation rate. Individual fixed effects can help to solve the omission of relevant variables, which, plausibly, seems to be the case in question.

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<sup>15</sup> We include also time dummies as a means of control for possible aggregated temporal effect.

Capital mobility is measured and inserted as an explanatory variable through two alternative indicators, one of a qualitative nature, the other quantitative, following the classification criterion previously described. The qualitative indicator corresponds to that was before called Share. Based on the binary classification supplied by the IMF in their Annual Report, this index measures for each country the proportion of years in a given period where the capital account was free of restrictions. For the years later than 1995, due to the change of classification employed by the Fund, we use the methodology proposed by Ono *et al.*(2006) as the basis for the extension of the binary series and consequent obtaining of the referred indicator for all the periods covered by the analysis. The capital account is considered free of restrictions in a given year if, of the ten items specified by the report in 1997, the country utilized controls in less than five categories.

The quantitative indicator is estimated by the sum of the absolute amounts of the capital inflows and outflows in the year as a proportion of the GDP, excluding the transactions resulting in variation in the assets and external obligations of the monetary authorities and of the government in general. The exclusion of government permits a more precise mensuration of the effective degree of freedom on capital movements. The indicator obtained on an annual basis is introduced in the regression analysis in terms of its average value in each 5 year interval.

The selection of these indicators, keeping in view the controversies that surround this object and the non-existence of firm reasons established for the choice of a specific indicator as opposed to the other, conforms to practical criteria. Accordingly, we emphasize that both indicators proposed are spread in the literature.

There is a very complete literature that deals with the estimation of dynamic models with panel data. An important reference in this context, certainly, is the approach proposed by Arellano and Bond (1991). These authors were developing a procedure of linear estimation via a generalized moments method (GMM) that utilizes the successive lagged values of the endogenous variables as instruments for the first difference of these variables. The Gauss-Markov theorem demonstrates that, under the hypotheses of the classical multiple linear regression model, the Ordinary Least Squares (OLS) estimator presents minimum variance among the non-biased linear estimators.<sup>16</sup> However, there is an immediate problem with the

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<sup>16</sup> Greene (2003), chapters 2 and 4.

use of an approach of the pooled OLS type for the estimation of the dynamic model here considered. By construction, the lagged dependent variable is positively correlated with the fixed effect that is part of the model's error component, giving rise to a dynamic bias of the estimator. In particular, this element of endogeneity tends to generate an over-estimation of the coefficient associated with the dynamic component, attributing to it a predictive power that in reality belongs to the individual effects not observed.<sup>17</sup> Regarding asymptotic analysis, this correlation between an explanatory variable and the error violates a necessary condition for the consistency of the Ordinary Least Squares estimator.

One possible solution for the problem consists in transforming the data so as to eliminate the fixed effect. One usual procedure accordingly, incorporated by Arellano-Bond (1991), utilizes as the starting point the use of first difference. In terms of equation (1), we obtain in this case:

$$\begin{aligned} y_{it} - y_{i,t-1} &= \alpha(y_{i,t-1} - y_{i,t-2}) + (x_{it} - x_{i,t-1})\beta + \varepsilon_{it} - \varepsilon_{i,t-1} \\ \Delta y_{it} &= \alpha\Delta y_{i,t-1} + \Delta x_{it}\beta + \Delta v_{it} \end{aligned} \quad (2)$$

However, it can be observed that, with the transformation carried out, the lagged dependent variable presents also an endogenous component, in view of the fact that the term  $y_{i,t-1}$  is, by definition, correlated with  $v_{i,t-1}$ . In addition to this, the potential endogeneity of the other regressors of the model should be considered. In this context, the general solution consists in the utilization of instrumental variables.

The focus developed by Arellano and Bond utilizes the values in lags of  $y_{i,t-1}$  as instruments for  $\Delta y_{i,t-1}$  under the hypothesis that serial correlation in  $v_{it}$ .<sup>18</sup> does not exist. With this condition satisfied,  $y_{i,t-2}$  is related to  $\Delta y_{i,t-1}$  and, at the same time, not correlated with the first difference error  $\Delta v_{it} = v_{it} - v_{i,t-1}$ . As the panel advances in time, successive lags can be incorporated, generating thus a sub-set of instruments valid for each available period. The same basic principle applies in the case of the other regressors considered as potentially endogenous, observing the necessary exogeneity of the lags utilized as instruments with regard to the residual differentiated disturbance.

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<sup>17</sup> See Roodman (2006).

<sup>18</sup> This type of focus, that goes back to the contribution of Holtz-Eakin, Newey, and Rosen (1988), chooses not to assume that good instruments are available outside the immediate data set. Nevertheless, it should be noted that external instruments can be incorporated in the analysis.

Blundell and Bond (1998) highlight, however, that, above all in cases of accentuated persistence in the time series, the past levels of one variable tend not to be very informative as regards its future variations. Accordingly, they developed an alternative approach to the problem of the dynamic bias, previously described, introduced by Arellano and Bover (1995). Instead of transforming the data, this approach instrumentalizes  $y_{i,t-1}$  (and other endogenous regressors) with variables supposedly orthogonal to the fixed effect. In more precise terms, the idea is to utilize the successive values of the first difference as instruments for the variable at the level under the hypothesis of exogeneity of the differences with regard to the composite error  $\varepsilon_{it} = \mu_i + v_{it}$ , in (1). Thus, on the contrary to Arellano and Bond (1991), this focus utilizes instruments in first difference for the regression equation at the level.

So as to obtain a GMM estimator with the maximum efficiency and least bias possible, Blundell and Bond (1998) then conjugate the two approaches in a unique framework of estimation. Accordingly, they combine in a system the equation at first difference (2) and the equation at the level (1), duly instrumentalized as previously described.

The resulting, estimator denominated GMM system, serves as a basis for the econometric study presented in this work. Considering the joint validity of the instruments, this estimator, set up in two steps, is asymptotically efficient and robust as to the presence of heteroscedasticity and autocorrelation in the error component (composite) of the model. For the purposes of comparison, we present, as a complement, estimates carried out with pooled OLS.

In exploring an additional set of restrictions of the moment, the GMM estimator system can permit accentuated gains in efficiency *vis-à-vis* the classical GMM difference estimator. However, as observed by Roodman (2006), there do exist, on the other hand, statistical problems associated with the excess of instruments. In the first place, the number of elements in the variance matrix of the moments is quadratic with regard to the number of instruments, one finite sample not being able to contain sufficient information to estimate fairly a matrix of such dimension. In the limit, the matrix becomes singular forcing the use of a generalized inverse to obtain the GMM estimator. Although this does not compromise the consistency of the estimator, it results in loss of efficiency. A second potential problem is that a very large number of instruments can imply an overfit of the endogenous variables, accordingly compromising the elimination of the component of endogeneity. Finally, the

utilization of a numerous set of conditions of moment compromises severely the reliability of the Sargan/Hansen test for the joint validity of the instruments.<sup>19</sup>

The referred test of specification is a common procedure in dealing with estimations of the GMM type. However, as has been demonstrated by Bowsher (2002), their statistical power tends progressively to zero with the increase in the number of instrumental variables incorporated by the estimator.<sup>20</sup> According to Roodman (2006), in the context of estimation by GMM system, prudence recommends distrusting very high p-values, near 1,000, and of very low values, less than 0.1. The wide amplitude of the interval between these two values points out the limited reliability of the Sargan/Hansen test in the case in question.

In view of the inexistence of good parameters defined in the literature as regards that which, exactly, could be considered an excessive number of instruments in this context, an important practical rule, observed in this work, consists in not allowing the number of instruments to exceed N, the number of individuals (groups) included in the panel.<sup>21</sup> This, in its turn, points out that the econometric approach here considered is more suitable to situations where the number of periods, T, is small in relation to N.

Finally, it is necessary to test for the absence of serial correlation in the idiosyncratic error  $v_{it}$ , a necessary condition for the consistency of the GMM estimator. We utilize the test procedure developed by Arellano and Bond (1991), applied to the residuals in differences. Under the null hypothesis of absence of serial correlation of second order in the disturbances at first difference,  $\Delta v_{it}$ , there is no first order correlation in the disturbances at the level. Considering that the disturbances are non-correlated between individuals and in compliance with the theorem of the central limit, the statistics of test follows, asymptotically, the normal standard distribution.<sup>22</sup>

## 4.2 Results

We estimate the equations in three blocks, whose results are respectively presented in tables 1, 2 and 3. First, we estimate the full sample, consisting of 80 countries (developed and

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<sup>19</sup> The statistics of the test is *qui-quadrado* with degrees of freedom equal to the degree of over-identification of the system.

<sup>20</sup> Following Baltagi (2005), the rate of rejection of the test (both under a null as under the alternative) tends to zero by virtue of the under-estimation of its theoretical variance.

<sup>21</sup> In practical terms, we observe this rule limiting the number of lags (lag range) utilized as instruments, when necessary.

<sup>22</sup>For the GMM estimates reported later, we do not reject the referred null hypothesis with a level of confidence of 95%. The calculated test statistics are presented in the respective tables.

developing ones).<sup>23</sup> The equation corresponds to what we here denominate the basic model, including as regressors: Lagged growth (L. GROWTH), the average rate of investment (INVEST), the variable relative to education (EDUC), the average rate of inflation (INF), the average growth of exports (EXPG) and, alternately, one of the indicators for capital mobility previously selected, the quantitative indicator based on effective capital flows (MOBFL) and the qualitative indicator derived from the binary classification of the IMF (DMOB).<sup>24</sup> This same framework of analysis was used in the second block of regressions where, however, we restricted the scope of the estimation to the 58 developing countries that comprise the full sample. Finally, in a third stage, also restricted to the developing economies, we expanded the basic model through consideration of the impact of the external indebtedness (FINTEND) as well as of the interaction of this variable with capital mobility.<sup>25</sup>

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<sup>23</sup> **Full sample:** South Africa; Germany; Algeria; Argentine; Australia; Austria; Bangladesh; Belgium; Bolivia; Botswana; Brazil; Cape Verde; Canada; Cameroon; Chile; China; Colombia; South Korea; Côte d'Ivoire; Costa Rica; Denmark; Egypt; El Salvador; Ecuador; Spain; Ethiopia; USA; Philippines; Finland; France; Gambia; Ghana; Greece; Guatemala; Haiti; the Netherlands; Honduras; India; Indonesia; Ireland; Iceland; Italy; Jamaica; Japan; Jordan; Lesotho; Malaysia; Malawi; Mali; Morocco; Mauritius; Mexico; Mozambique; Nicaragua; Nigeria; Norway; New Zealand; Pakistan; Paraguay; Peru; Portugal; Kenya; United Kingdom; Republic of the Congo; Dominican Republic; Ruanda; Senegal; Syria; Sri Lanka; Sudan; Sweden; Switzerland; Thailand; Togo; Trinidad and Tobago; Tunisia; Turkey; Uruguay; Venezuela; Zimbabwe.

**Restricted sample:** South Africa; Algeria; Argentine; Bangladesh; Bolivia; Botswana; Brazil; Cape Verde; Cameroon; Chile; China; Colombia; South Korea; Côte d'Ivoire; Costa Rica; Egypt; El Salvador; Ecuador; Ethiopia; Philippines; Gambia; Ghana; Guatemala; Haiti; Honduras; India; Indonesia; Jamaica; Jordan; Lesotho; Malaysia; Malawi; Mali; Morocco; Mauritius; Mexico; Mozambique; Nicaragua; Nigeria; Pakistan; Paraguay; Peru; Quênia; Republic of the Congo; Republic Dominicana; Ruanda; Senegal; Síria; Sri Lanka; Sudão; Thailand; Togo; Trinidad and Tobago; Tunisia; Turkey; Uruguay; Venezuela; Zimbabwe.

<sup>24</sup> All the regressions also include a constant and time dummies

<sup>25</sup> Indebtedness can be here conceived in a more wide-ranging way, as a possible proxy for the magnitude of the external liabilities, in more ample terms. In this case, FINTEND would measure the impact associated with the evolution of these liabilities.

**Table 1: Result of regressions with full sample = 80 countries (1979-2003)**

<b>Dependent Variable = Average Growth of real GDP per capita</b>				
<b>Independent Variables</b>	<i>Pooled OLS</i>		<i>System GMM</i>	
	1	2	3	4
L.GROWTH	0,1937514 ** (0,0828873)	0,170857 ** (0,0797983)	0,033696 (0,0744074)	0,007587 (0,0889475)
INVEST	0,0844755 *** (0,0268772)	0,099345 *** (0,0278283)	0,082963 ** (0,038746)	0,12920 *** (0,0458768)
EDUC	0,011802 ** (0,00563)	0,007212 (0,0063714)	0,016039 (0,0104212)	0,002902 (0,012001)
INF	-0,000919 *** (0,0002783)	-0,000954 *** (0,0002741)	-0,001226 *** (0,0003244)	-0,001195 *** (0,0003916)
EXPG	0,119121 *** (0,0255616)	0,122570 *** (0,0278332)	0,099817 *** (0,0261012)	0,098303 *** (0,0239818)
CONS	-0,019266 *** (0,0071253)	-0,027361 *** (0,0068774)	-0,019907 * (0,0114267)	-0,026420 * (0,0143179)
MOBFL	0,007945 * (0,0043167)		0,007293 (0,0069765)	
DMOB		0,005503 * (0,0029915)		0,011471 ** (0,0045969)
R <sup>2</sup>	0,4095	0,4083		
ARELLANO-BOND ( <i>z calc.</i> )			1,68	1,90
HANSEN (p-value)			0,256	0,265
NUM. OF OBSERVATIONS	293	296	293	296

Note:(\*\*\*) statistically significant with 1%; (\*\*\*)statistically significant with 5%; (\*) statistically significant with 10%. Corresponding standard error in parentheses. Pooled OLS estimates already corrected for potential heteroscedasticity.

Evidence obtained with the pooled OLS estimator is preliminarily presented in Tables 1 and 2. For the full sample, the estimated coefficients for MOBFL and DMOB are both positive and statistically significant, considering a level of confidence of 90%, suggesting, therefore, that greater capital mobility is, *coeteris paribus*, favorable to economic growth. The prospects as regards the impact of liberalization appear much less optimistic when the restricted sample is analysed (Table 2). In this case, the two coefficients do not differ statistically from zero to the conventional levels of significance, observing, in addition, that the coefficient obtained for MOBFL presents a negative sign.

**Table 2: Regressions with Restricted Sample = 58 developing countries (1979-2003)**

<b>Dependent Variable = Average Growth of real GDP per capita</b>				
<b>Independent Variables</b>	<i>Pooled OLS</i>		<i>System GMM</i>	
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
L.GROWTH	0,203113 ** (0,0853757)	0,167366 * (0,0858905)	0,060457 (0, 1012933)	0,038459 (0,0848605)
INVEST	0,095918 *** (0,0293762)	0,108094 *** (0,0307389)	0,087253 * (0,0454296)	0,110967 ** (0,0535773)
EDUC	0,011051 (0,0081689)	0,000933 (0,007764)	0,019224 (0,0148735)	0,003523 (0,0126785)
INF	-0,000879 *** (0,000316)	-0,000906 *** (0,0002971)	-0,001121 *** (0,0003354)	-0,001015 ** (0,0004539)
EXPG	0,109891 *** (0,0255483)	0,116009 *** (0,0275879)	0,100418 *** (0,0295259)	0,104138 *** (0,0280694)
CONS	-0,023550 *** (0,0077532)	-0,025570 *** (0,0079384)	-0,018265 (0,0126213)	-0,023176 (0,0146741)
MOBFL	-0,046048 (0,0304637)		-0,078303 ** (0,0329631)	
DMOB		0,005787 (0,0046206)		0,003194 (0,0070149)
R <sup>2</sup>	0,4160	0,4081		
ARELLANO-BOND ( <i>z calc.</i> )			1,84	1,91
HANSEN (p- value)			0,356	0,443
NUM. OF OBSERVATIONS	205	210	205	210

Note:(\*\*\*) statistically significant with 1%; (\*\*\*)statistically significant with 5%; (\*) statistically significant with 10%. Corresponding standard error in parentheses. Pooled OLS estimates already corrected for potential heteroscedasticity.

The estimations using *system GMM* (columns 3 and 4 of Table 1) present the results for the full sample, with MOBFL and DMOB respectively. In the first case, the coefficient associated with MOBFL is positive, although not significant at 10%. In the second regression, the coefficient estimated for DMOB is positive and statistically significant at 5%. Taking MOBFL and DMOB as complementary indicators in the context of the same causal analysis, it is possible to assume that the results under *system GMM*, for this sample, suggest a favorable effect or, in the worst hypothesis, a null impact of capital mobility on economic growth. In addition, the regressions exhibit notable harmony concerning the estimated coefficients for the other explanatory variables. In particular, both evidence strong positive impact of the rate of investment and, above all, of the growth of exports on the growth of *per capita* product. The coefficients for inflation are negative and also strongly significant from the statistical point of view.

Still considering the basic model, we estimated regressions with *system GMM* for the sample restricted to the less developed economies. The results obtained as regards the impact of capital mobility are in contrast to the evidence found for the full sample. Observing column 3 of Table 2, the coefficient estimated for MOBFL is now negative and highly significant. When considering the full sample, the estimated effect according to this indicator did not differ significantly from zero. In column 4 of this same table, we note that the

coefficient obtained for DMOB has as previously, a positive sign; however in this case the estimated parameter does not differ statistically from zero, considering normal levels of significance. As to the other regressors, the previous table is confirmed, there being no change worthy of note.<sup>26</sup>

Concluding, the estimates indicate that the impact of the loosening of financial controls on growth shows to be less favorable, or even negative, when we restricted the scope of the analysis to the case of developing economies, that is, when we excluded from the sample the 22 countries that make up the group of countries here classified as developed. Notwithstanding the known difficulties related to the mensuration of capital mobility, these results are compatible with the perception that the progressive movement of openness to the free movement of capital tends to encourage growth only in the richer economies.

Empirical results in this same direction have been previously presented by other authors. In this literature, the effect of capital mobility is justified as a reflection of aspects relative to the quality of the institutions, resulting from the distinct stages of financial development of countries or the degree of stability produced by macroeconomic domestic policies.

The balance of payments balance constitutes a central aspect between capital mobility and long term economic growth. Here, we encompass an effort, to incorporate this dimension to the analysis. A first step in this direction was taken when we introduced in the basic model, the growth of exports as an explanatory variable in the estimated regressions. Both in the full as in the restricted sample, the coefficients observed for this variable are highly significant in statistical terms, with level of confidence always over 99%. The estimated effect on economic growth is strongly positive, in line with the theoretical forecasts derived by the Kaldorian models of growth with external restriction.

Further, we analysed the impact of external indebtedness in the empirical relationship. The variable FINTEND, defined as the share between the indebtedness and external interest, was included into the basic regression model. For both indicators of openness of the capital account, we consider three alternative specifications as regards the estimated equation. In the first, we include, separately, FINTEND and the respective indicator of mobility; subsequently

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<sup>26</sup> It is interesting to note that in the regressions estimated with GMM the coefficients obtained for the dynamic variable L.GROWTH do not differ statistically from zero (in both the samples) whereas, when estimated with OLS, were strongly positive. These results are coherent with the existence of a dynamic bias associated with the *pooled* OLS estimator.

we added a term of interaction between these two variables; finally, we excluded FINTEND, keeping the interaction variable. This analysis was limited, as has already been pointed out, to the case of developing countries, where the problem of the external indebtedness is severe.

Table 3 shows the regressions results. Considering the first specification, in the first row the coefficient estimated for MOBFL is significantly negative. This result suggests that the to international capital flows openness tends to discourage growth in the less developed economies. In this regression, the parameter estimated for the variable FINTEND presents a negative sign, although it does not differ from zero in statistical terms. In the second row, , MOBFL has negative sign and FINTEND has a positive sign. However for both variables, the estimated parameters are not statistically significant.

**Table 3: Introducing FINTEND –Regressions estimated with System GMM- Restricted Sample (1979-2003)**

Dependent Variable = Average growth of real GDP per capita						
Independent Variables	1	2	3	4	5	6
L.GROWTH	0,048694 (0,1052984)	0,009274 (0,0986342)	0,004594 (0,1057284)	0,003470 (0,0868591)	0,024786 (0,0911999)	0,001911 (0,1053809)
INVEST	0,077659 ** (0,0364786)	0,094751 ** (0,0412969)	0,091972 ** (0,0422439)	0,105982 *** (0,0359667)	0,095428 *** (0,0366429)	0,082477 * (0,0444903)
EDUC	0,024024 (0,0184412)	0,017778 (0,0186859)	0,0165213 (0,0190595)	0,005245 (0,0179751)	0,003010 (0,0164829)	0,008838 (0,0172937)
INF	-0,001124 ** (0,0005656)	-0,001356 * (0,0007256)	-0,001052 ** (0,0004847)	-0,000473 (0,0005497)	-0,000459 (0,0004708)	-0,001322 ** (0,000662)
EXPG	0,102723 *** (0,0350929)	0,094515 *** (0,0341063)	0,105048 *** (0,0287217)	0,114472 *** (0,0317128)	0,111083 *** (0,0315702)	0,106101 *** (0,0291987)
CONS	-0,019244 (0,0150362)	-0,022189 (0,0163207)	-0,018091 (0,0150729)	-0,018567 (0,0173067)	-0,015134 (0,0166335)	-0,018571 (0,0177612)
FINTEND	-0,029291 (0,0501607)	0,061434 (0,0820444)		-0,106533 (0,0659732)	-0,098466 * (0,0561625)	
MOBFL	-0,079838 ** (0,0338551)	-0,023570 (0,051793)	-0,042025 (0,0422699)			
FINTEND*MOBFL		-0,936341 * (0,5315918)	-0,578287 * (0,2974992)			
DMOB				0,002547 (0,0068489)	0,005868 (0,0065346)	0,004536 (0,0094715)
FINTEND*DMOB					-0,069477 (0,1147202)	-0,096640 (0,1157127)
ARELLANO-BOND (z calc.)	1,83	1,40	1,54	1,70	1,81	1,78
HANSEN (p- value)	0,317	0,315	0,320	0,514	0,543	0,498
NUM. OBSERVATIONS	203	203	203	208	208	208

Note:(\*\*\*) statistically significant with 1%; (\*\*)statistically significant with 5%; (\*) statistically significant with 10%. Corresponding standard error in parentheses.

In its turn, the coefficient associated with the interactive variable FINTEND\*MOBFL is negative and significant, a result also obtained when the third variant of the model is estimated, as can be seen in the third row. Therefore, the causal relationship between capital mobility and economic growth is significantly conditioned by the variable FINTEND. When this variable assumes a value greater than zero, the estimated impact of liberalization on growth is negative. In addition, supposing positive real interest on the external scene, which is

the more plausible situation, and a given level (greater than zero) for capital mobility, we conclude that external indebtedness proves unfavorable to economic growth in the long term.

columns 4, 5 and 6 present the results of the regressions using DMOB as capital mobility. In the three cases here considered, the estimated coefficients for the variable DMOB do not differ from zero, in statistical terms. The same is observed in relation to the interactive variable FINTEND\*DMOB. However, the estimated coefficient for FINTEND is negative and significant in column 5, that corresponds to the second alternative specification of the model. This evidence shows, once again, that external indebtedness can be prejudicial to the growth of developing economies and that its influence should, necessarily, be observed when the relationship between international capital mobility and long term growth is analysed.

Also in this third block of regressions, the coefficients associated with the growth of exports are significantly positive, showing, as previously, a strong favorable impact of this variable on economic growth, emphasizing the robustness of the results. In all the regressions estimated in this work, without exception, the coefficients relative to the impact of this variable are, in addition to positive, significant with statistical level of confidence (always) equal to or greater than 99%. In our interpretation, these results constitute important empirical evidence regarding the importance of questions relative to the balance of payments in the ambit of the relationship under study.

## **5 CONCLUSIONS**

The empirical evidence of this study suggests that, although the progressive openness to international capital movements may favor growth in the developed countries, it tends to be negative for developing countries. In these countries, the relationship between capital mobility and growth is restricted by the accumulation of external liabilities, as well as by the behavior of foreign interest rate. We emphasize that impact of indebtedness on economic growth tends to be negative. There is also evidence that a tightening of foreign credit reflected in higher interest rates, would tend to result in slowdown in growth in the debtor economies. Besides, the greater the degree of capital flows, the more accentuated could be this slowing down. Analysing the experience of the developing countries, stimulus to economic growth due to increase in exports tends to be counteracted by harmful effects of the external funding,

whether as a result of the obligations with the payment of interest on debt, or as a direct reflection of a greater external vulnerability, or even as a combination of these issues.

The empirical study of the relationship between international capital mobility and growth remains also fertile ground for economic analysis. The problem of the proper mensuration of capital mobility is far from any definitive resolution. On the other hand, we should recognize that econometric analysis possesses its own limitations and that possible advances in this area are certainly welcome. This paper offers a contribution to this debate. A greater deepening of this analysis is, therefore, possible and necessary in future work.

In this sense, policies of capital controls are desirable for economic development. However, the specific condition of these instruments, that is, choosing adequate specific types of controls in different situations, requires a meticulous analysis with direct reference to the concrete conditions of each economy in a historical perspective. Accordingly, it is premature and mistaken to conclude, based on the particular experience of a determined country that capital controls - in their wider acceptance - are inefficacious or are subject to a high degree of evasion. As has already been emphasized, the potential evasion of the control of capital is a topic whose discussion requires reference to specific economic conditions and to types of instruments also specific, to the detriment of any type of generalization. A related discussion concerns the possible development of parallel exchange markets in this context. For this type of analysis a wide-ranging knowledge of the different modes of possible controls in the most diverse situations is of extreme importance, whose perfecting constitutes an important requirement for the advance of the theoretical and empirical studies on the consequences of this sort of policy.

The inherent instability of the international financial markets and the complications related to the accumulation of significant external liabilities are related issues in a realistic analysis of capital mobility and growth with external restriction. A deepening of this interface, paying special attention to the elements supplied by the Post Keynesian framework of financial fragility in market economies, constitutes, to our way of thinking, an important path to be explored in future theoretical contributions. In the same way, the role of direct foreign investment deserves special attention in this context. It is known that these investments do not always imply the increase of productive capacity in the receiving economies and can, in addition, represent unequal, and for this reason destructive,

competition for local companies. The interpretation of these and other relevant aspects is also at an initial stage so that further contributions in these areas are also certainly necessary.

## 6 REFERENCES

- ARELLANO, Manuel; BOND, Stephen. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies*, Oxford, v. 58, n. 1, p. 277-297, Jan. 1991.
- ARELLANO, Manuel; BOVER, Olympia. Another look at the instrumental variables estimation of error-component models. *Journal of Econometrics*, Amsterdam, v. 28, n. 1, p. 29-51, July 1995.
- ARIYOSHI, Akira *et al.* *Capital controls: country experiences with their use and liberalization*. Washington D.C.; International Monetary Fund, 2000. (IMF Occasional Paper, 190).
- ARTETA, Carlos *et al.* *When does capital account liberalization help more than it hurts?*, Cambridge: National Bureau of Economic Research, 2001. (NBER Working Paper Series, 8414).
- BALTAGI, Badi H. *Econometric analysis of panel data*. Chichester: Wiley, 2005.
- BAYOUMI, Tamim. Saving-investment correlations. *IMF Staff Papers*, Washington DC., v. 37, n. 2, p. 360-386, June 1990.
- BLUNDELL, R.; BOND, S. Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, Amsterdam, v. 87, n. 1, p. 115-143, Aug.1998.
- BOWSHER, C.G. . On testing overidentifying restrictions in dynamic panel data models. *Economics Letters*, Amsterdam, v. 77, n 2, p. 211-220, Oct. 2002.
- EDWARDS, Sebastian. *How effective are capital controls*. Cambridge: National Bureau Of Economic Research, 1999. (NBER Working Paper Series, 7413).
- EDWARDS, Sebastian. *Capital mobility and economic performance: are emerging economies different?*, Cambridge: National Bureau Of Economic Research, 2001. (NBER Working Paper Series, 8076)
- EICHENGREEN, Barry; LEBLANG, David. *Capital account liberalization and growth: was Mr. Mahathir right?* Cambridge: National Bureau Of Economic Research, 2002. (NBER Working Paper Series, 9427).
- EDISON, Hali; KLEIN, Michael *et al.* *Capital account liberalization and economic performance: survey and synthesis*. Cambridge: National Bureau of Economic Research, 2002. (NBER Working Paper Series, 9100).
- EDISON, Hali J.; LEVINE, Ross *et al.* *International financial integration and economic growth..* Cambridge: National Bureau Of Economic Research, 2002. (NBER Working Paper Series, 9164).
- FELDSTEIN, Martin; HORIOKA, Charles. Domestic saving and international capital flows. *The Economic Journal*, Los Angeles, v. 90, n. 358, p. 314-329, June 1980.
- GREENE, William H. *Econometric analysis*. New Jersey: Prentice Hall, 2003.

- HOLTZ-EAKIN, D. *et al.* Estimating vector autoregressions with panel data. *Econometrica*, Chicago, v. 56, n. 5, p. 1371-1395, Sept.1988.
- KLEIN, Michael W.; OLIVEI, Giovanni. *Capital account liberalization, financial depth, and economic growth*. Cambridge: National Bureau of Economic Research, 2005. (NBER Working Paper Series, 7384).
- KRAAY, Aart. *In search of the macroeconomic effects of capital account liberalization*. Washington D. C.; The World Bank, 1998. Unpublished manuscript.
- LANE, Philip R.; MILESI-FERRETTI, Gian Maria. The external wealth of nations: measures of foreign assets and liabilities for industrial and developing countries. *Journal of International Economics*, Amsterdam, v. 55, n. 2, p. 263-294, Dec. 2001.
- MCCOMBIE, J. S. L.; THIRLWALL, A.P. *Economic growth and the balance-of- payments constraint*. New York: St. Martins Press, 1994.
- MONTIEL, Peter. *Capital mobility in developing countries: some measurement issues and empirical estimates*. Washington D.C.: World Bank, 1993. (Policy Research Working Paper Series, 1103).
- MONTIEL, Peter; REINHART, Carmen. Do capital controls and macroeconomic policies influence the volume and composition of capital flows? Evidence from the 1990's. *Journal of International Money and Finance*, England, v. 18, n. 4, p. 619-635, Aug. 1999.
- ONO, Fábio Hideki *et al.* Uma avaliação empírica da proposta of conversibilidade do real. In: SICSÚ, João; FERRARI FILHO, Fernando (Org.). *Câmbio and controles of capitais: avaliando a eficiência of modelos macroeconômicos*. Rio of Janeiro: Elsevier, 2006. p. 105-124.
- QUINN, Dennis. The correlates of changes in international financial regulation. *American Political Science Review*, Washigton D.C., v. 91, n. 3, p. 531-551, Sept. 1997.
- REINHART, Carmen M.; ROGOFF, Kenneth S. Serial default and the “paradox” of rich-to-poor capital flows. *The American Economic Review*, Nasville, v. 94, n. 2, May 2004.
- RODRIK, Dani. Who needs capital-account convertibility? *Essays in International Finance*, Princeton, n. 207, p. 55-65, May 1998.
- ROODMAN, David. *How to do xtabond2: an introduction to “difference” and “system” GMM in Stata*. Washington: Center for Global Development, 2006. (Working Paper, 103)