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Empirical decomposition of the financial liberalization effects: Crisis versus Economic Growth

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Abstract

This paper aims to present an empirical decomposition of the financial liberalization effects on economic growth and on the incidence of monetary and banking crises. Our study presents the direct effect of financial liberalization on growth by using a dynamic panel model and multivariate probit model of ten emergent countries during1975-2009 by using macroeconomic and financial variables. This article consists to discuss the direct effect of financial liberalization on the growth, like their indirect effect in terms of the additional costs of the crisis. It confirms the results of previous studies that show the positive total effect of financial liberalization on economic growth.

Surprisingly, we conclude that the direct effect growth is superior compared of indirect effect crisis in our sample.

Keywords: financial liberalization, economic growth, financial and banking crisis, dynamic panel data, Probit model.

Introduction

There are two opposing views about the effects of financial liberalization. A first view, considering the financial liberalization as a means to strengthen the financial development and contributes to sustainable and

high growth. In a second view, liberalization leads to excessive risk-taking, increases macroeconomic volatility and leads to more frequent crises.

In this paper we propose an empirical framework that combines these two views. We decompose the impact of financial liberalization on the real economy in two effects: a direct positive effect on economic growth and a negative indirect effect on currency and banking crises. We note that the gain direct financial liberalization on growth is higher significant higher than the loss of growth in banking and currency crises. Really, the financial liberalization effect on economic growth is important: to increase about 1% of annual growth rate per capita.

The effect of financial liberalization on growth and its impact on financial fragility and the twin crises have been studied extensively in separate of the empirical literature. The literature financial crisis examines the relationship between financial liberalization and the risk of financial crises. Kaminsky and Reinhart (1998), Detragiache and Demirguc-Kunt (1998), show that, the number of banking and currency crises increases, after financial liberalization.

However, liberalization and growth literature focuses on effects of liberalization on the long term growth. For example, Bekaert, Harvey and Lundblad (2005) found that the liberalization of transactions led to an increase of 1% of GDP. Henry (2000) confirmed this result in business by showing that financial liberalization leads to a boom of investment in a decline in the cost of capital.

The objective of this paper is not to make another test of financial liberalization effect on growth. Our contribution is to develop an integrated empirical framework to measure and highlight the mixed effects of financial liberalization: First, financial liberalization tends to relax borrowing constraints, leading to higher investment and growth, second, it encourages risk-taking, a product of financial fragility and increases the probability of banking crises, which often have dangerous consequences too real activity.

We believe that the financial liberalization effect in a unified manner is important. The division of the empirical literature dealing with the financial liberalization between the analysis of crises and the effects of growth has several disadvantages. First, each field of investigation provides only a partial financial liberalization effect. The pessimistic approach highlights the severity of the financial crises costs, but largely neglects the benefits of growth during quiet periods.

The second disadvantage is that each field of analysis has produced its own set of implications and political or economic recommendations. Researchers emphasizing the effect of long term growth advocate of

financial liberalization policies, as researchers who focus on crisis warned against the total financial liberalization.

In the next section, we present the methodology of this study: our estimation methods, data sources, the econometric problems that arise and the results of our estimates. The third section is devoted to a theoretical presentation and discussion of our results. The last section concludes the study.

Financial liberalization, economic growth and twin crises. An theoretical and empirical overview

The empirical literature focusing to evaluate the impact of financial liberalization policies lead to review the content of their recommendations and conditions in which they positively affect economic growth.

In this framework, *Morisset J.* tried to test one of the basic assumptions of the paradigm of financial liberalization. For this reason, the center of its contribution is made by a structural model of investment in which he introduced the factors influencing the relationship between the real interest rate, the supply of domestic credit and private investment. Thus, the complexity of the *Morisset J.* model comes from the fact that it introduces multiple interactions that may better reflect the complexity of reality and the real impact of financial liberalization policies.

The principal results show that the increase in real interest rates does not necessarily have a positive effect on private investment. In addition, the positive effect of the increase in domestic credit, as suggested by *Mac Kinnon and Shaw*, may not take place due to the substitution of the acquisition of assets by the monetary and financial assets.

Regarding the impact of financial liberalization on the financing of the public sector requirement from the domestic banking system, it appears that these needs by increasing the limited available funds for the private sector.

Overall, the author concludes that the competent authorities must ensure three conditions to that the increase in real interest rates positively affect private investment.

The contribution of *Roubini N. and Sala-i-Martin X.* is, like *Morisset J.*, to attempt the empirically test of financial liberalization assumptions. Both authors have developed a model of financial

repression, financial inflation and endogenous growth to detect the impact of the financial liberalization policies on growth and other variables. The data cover 60 countries at period of 1960 to 1985.

Thus, the results of these two authors show that countries that repress their financial systems tend to grow faster than the others.

In *Khan A. and Hasan L*., the original thesis of Mc Kinnon and Shaw is that interest rates low or negative discourage savings and reduce the loanable funds available for investment which affects negatively the economic growth rate. In this framework, financial liberalization policies induce an increase in the level of investment in two ways. The first result of the increased volume of domestic credit available following the increase in savings intermediated stimulated by encouraging earnings reflected by high interest rates. The second way is through the effect of leading *Mac Kinnon*. The latter states that because of the indivisibility of investment projects and the predominance of internal financing of projects, the creation of money balances is a prerequisite for the realization of such projects. This reasoning shows the positive relationship between the accumulation of cash money and the investment rate.

The work of *Khan A. and Hasan L.* deals the Pakistani case using data covering the period 1959-1995. The objective of the authors is to test the relationship of financial repression paradigm. For that, they were careful to study the properties of stochastic variables before testing the long-term relationship between the variables. After that, they considered a correction model error, if validated, to capture the dynamic relationships between the variables.

The tests show the existence of cointegration in favour of the hypothesis of complementarity Mc Kinnon.

Many empirical studies, on representative samples of countries showed that banking crises were usually preceded by financial liberalization policies. However, the process of financial liberalization in emerging countries explains a significant increase in the number of banking crises. In 1996, *Kaminsky and Reinhart* have conducted a study covering 20 countries (Asia, Latin America, Europe and the Middle East), over the period 1970-1995. Their main findings are:

* The banking crises were rare and don’t have links with the account balance crises during the 1970s, when financial markets were controlled.

* Following the financial liberalization in the world, the number of banking crises has increased and most banking crises are preceded by financial liberalization policies.
* These authors estimate that in 18 of 25 banking crises that take place over the past two decades, the financial sector was liberalized in precedent five years.

More recently, *Demirgurc-Kunt and Detragiache (1998)* have identified a relationship between financial liberalization and financial fragility in a study of 53 countries in the years 1980-1995, using a panel data approach. They conclude that banking crises are more likely to occur in liberalized financial systems. But financial liberalization has a low impact on the fragility of the banking sector when the institutional environment is strong and powerful (low corruption, respect for the rule legislation). In their results, it appears that financial liberalization must be accompanied by changes in the institutional framework if it is not to lead to increased financial instability source of negative economic growth.

Similarly, *L. Miotti Plihon and D. (2001)* have announced different forms of banking crises more or less severe. Two scenarios are selected by recent studies:
* The existence of a bank panic involving the closure by the public sector or by other financial institutions (for example: Argentina in 1980 and 1994, Thailand in 1983, Venezuela in 1993),
* In the absence of panic bank closure or merger of institutions in difficulty, and the implementation of plans for the rescue of banks on a large scale (for example: Denmark in 1987, Finland and Sweden in 1991, Mexico in 1992).

The first type of crisis has caused a problem of bank resources suddenly reduced by a failure of the applicants. The second type of crisis that is the most comes from difficulties in the banking assets whose quality is intensively deteriorating.

In *Ranciere, Tornell and Westermann (2003)*, financial liberalization extends the borrowing constraints and increase growth, but also generates systemic risk of occasional crises. In Martin and Rey (2005), the stock market liberalization and financial frictions in asset markets act on each other to produce booms investment or financial crash.

Martin and Rey (2005) analyze the impact of stock market liberalization on capital flows, asset prices and investment. They show

that when there are transactions costs in international capital, the stock market liberalization may lead to two possible outcomes for an emerging economy. In normal events, running the liberalization of produce positive role of capital inflows, expansion diversification opportunities and lower the cost of capital, thus leading to a higher investment and growth. However, in certain circumstances pessimistic, liberalization led to a fall in the demand for assets capital, capital outflows and financial accidents related with low investment and low growth.

Allen F. (2005) develops a model where expansion of credit is a source of financial and banking instability. The introduction of financial liberalization policy leads to a continuous rise of asset prices and rapid expansion of credit. This price increase has led speculative bubble that could burst their cause banking crises.

In the models discussed above, financial liberalization reduces the impact of financial market imperfections, but increasing a cost of financial fragility. Therefore, the overall effect of financial liberalization on growth is ambiguous and depends on risk. A financially liberalized economy grows faster in normal times, but is exposed to disasters dangerous performance during financial crises. The direct effect of growth dominates under two conditions: First, financial liberalization should significantly reduce the financial and help firms to encourage investment. Second, the frequency of financial crises should be low enough for risk-taking sponge.

Financial liberalization, crises and growth: an empirical decomposition

Our object is to propose a methodology to decompose the financial liberalization effect in two channels: a direct channel of growth and an indirect channel of financial vulnerability.

The latter effect takes higher frequency of crises and associated costs with lower growth. The main advantage of this approach is that it allows us to quantitatively compare the expected benefits of financial liberalization to the growth costs from a greater financial vulnerability.

1. Empirical Specification

Our empirical consists to add a standard growth regression a financial liberalization variable and banking and currency crisis index. In then, we treat the twin crisis index as endogenous variable that depends on more variables, including financial liberalization. In this

situation, the impact of financial liberalization on the economy has two effects: (i) a direct effect on growth conditional on a standard set of control variables and the absence of the crisis, (ii) an indirect effect reflecting the growth cost was associated with a higher propensity to banking and currency crises.

Formally, the empirical specification combines a growth model and a crisis model. The growth model has the taking double indexation, individual and temporal, with i indexing the country and t index the time horizon:

$$Y_{i,t} = \alpha X_{i,t} + \beta IFL_{i,t} + \gamma Icrise_{i,t} + \varepsilon_{i,t}$$

With $Y_{i,t}$ is the per capita GDP growth rate, $X_{i,t}$ is a set of explanatory variables in the growth literature, $IFL_{i,t}$ is the financial liberalization index and $Icrise_{i,t}$ is the financial crisis index proxy taking 1 if the country i experienced a financial crisis in period t and zero otherwise, $\varepsilon_{i,t}$ is an error term.

It may suggest that there is an inverse relationship between the economic growth rate and financial crisis. Indeed, an economic growth best may also be due to banking and currency crisis, including by creating firms financial hardship.

The possibility of a both link between these two variables can biased the estimates coefficients. To resolve this problem, we consider a simultaneous equations model as follows:

We assume that the possibility of a banking and currency crisis is also determined by economic growth and a number of exogenous variables:

$$Icrise_{i,t} = \lambda X_{i,t} + \varphi IFL_{i,t} + \psi Y_{i,t} + \nu_{i,t}$$

Thus, the existing empirical literature on financial liberalization has focused on the evaluation of the growth model using linear techniques, or the model evaluation crisis using probit specifications. However, our process allows us to estimate jointly the linear regression growth model and the crisis probit model. Based on literature, for example *Bekaert and Harvey (2005)* and *Kaminsky and Reinhart (2000)* show that the direct effect of financial liberalization on growth is positive, while the indirect effect - through a greater probability of the

crisis - is negative. Non-linearity probit specifications is sufficient to identify the model and, in particular, to distinguish directly the indirect effect of financial liberalization.

Therefore, we present in the probit regression of variables that are excluded from growth. The choice of probit model specifications is made using the Aikaike information criterion. In the probit equation we introduce the financial liberalization index and all the control variables of the growth equation. We then choose the specifications that minimize the Aikaike criterion.

The specifications of the growth model and the crisis model at the same frequency are useful for annual evaluation.

2. Data source

Our sample comprises ten emerging countries of Asia and Latin America over a period of 35 years (1975-2009). Furthermore, we take into account information concerning the dates of banking crises, and monetary and financial liberalization. The full description of the sources and the construction of the variables used in the regression estimation are presented in Appendix A. Our data are annual, and come primarily from the database of the World Bank's "World Development Indicators (2010)".

The financial liberalization index is used as a financial liberalization proxy. A calculate of this index is a qualitative estimate based on the type and year of liberalization. Thus, construction of this index comprises six different elements of the process of financial liberalization (liberalization of interest rates, reserve requirements, prudential regulation, and barrier to entry, credit control and privatization of commercial banks). Appendix B provides the dates of liberalization for the countries of our sample.

We chose to focus on financial crises that are characterized by the coincidence of banking crises and currency crises. The main reason for this is that the twin crises are largely concentrated in financially liberalized economies. Appendix C provides the dates of the twin crises for countries in the sample.

The dependent variable in the growth model is calculated as the difference in logarithm of real per capita GDP. From this variable we calculate the rate of real per capita growth, by subtracting the logarithm of GDP at the time (t-1) to the logarithm of GDP of the time (t).

The explanatory variables for the standard growth equation includes the initial per capita income, investment is measured by the

ratio Logarithm (investment/ GDP), Logarithm of the inflation rate. High inflation characterizes economies where the financial repression is high.

The economy liquidity is measured by the logarithm of M2/PIB. Openness to trade ratio is calculated by the (exportation + importation / GDP). The capital human stock is measured by the ratio of secondary education enrolment and the amount of loans to private sectors is measured by the ratio of private credit to GDP.

The financial liberalization impacts: static and dynamic analysis

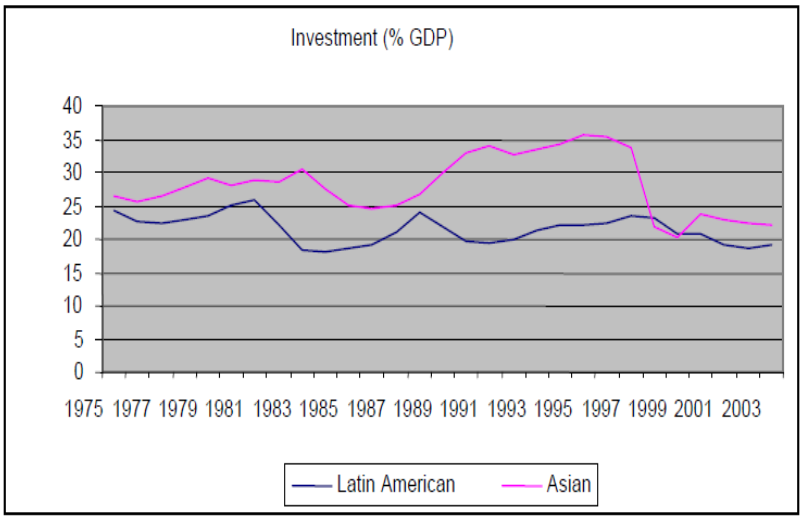
The objective of this study is to develop a theoretical and empirical overview of financial liberalization in emerging countries where the majority of their funding is effects by banks.

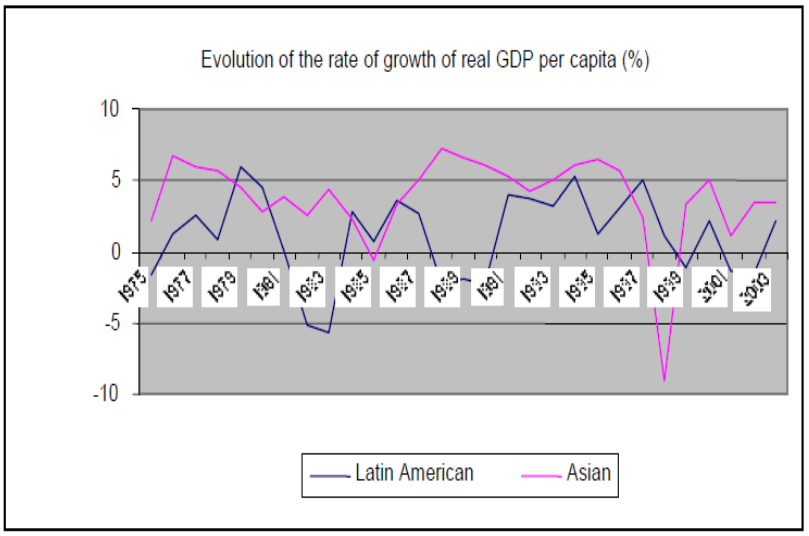
Thus, two opposite effects on the real economy appears. First, financial liberalization allows an increase in interest rates which increase the savings. A higher savings mobilization allows the financial sector of the economy to grow. The financial sector is different functions that improve the quantity and quality of investment and thus promote growth. Second, financial liberalization leads to additional costs in terms of banking and monetary crises to have adverse effects on the real economy.

1. Impact on investment and growth

The massive entry of capital in the south-east Asia have led to a rapid economic performance of these countries due to high growth of credit facilities and an effective transformation of savings into productive investments. Indeed, the GFCF increased from 37% of GDP on average over the period 1990-95 to over 42% in 1996 and the real per capita GDP growth rate is positive until 1997, when the financial crisis appears.

As against Latin American countries have unregistered a sharp deterioration on economic performance (decline in the investment rate and the fluctuation dangerous economic growth rate).





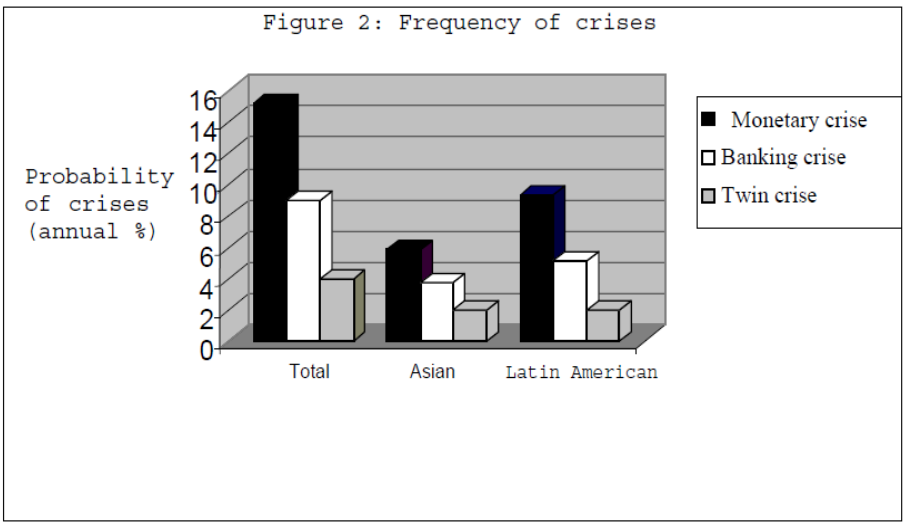
From this graph we can see that before 1996, for the South East Asia countries (Indonesia, Malaysia, Korea, Philippines and Thailand), financial liberalization has positive effects on growth and development economic. Recent events show that despite the good macroeconomic indicators Asian countries have moved from a situation of financial repression (repressed economy) to financial crash.

Today, several studies show that in the Asian countries financial liberalization has made too quickly and poorly applied. Now, the causes of banking and currency crises are explained by many attempts. The causes of these crises are many and include severe macroeconomic shocks external, high real interest rates, management and banking fraud, inadequate regulation and supervision of financial institutions and the implementation of new came with no experience of the bank.

2. Impact of Crises

Figure 2 shows the frequency of crises in our sample study in a context of financial liberalization over the period 1975-2009. This frequency is defined as the number of crises divided by the number of countries multiplied by the number of the period. Then, Latin American countries are most affected by a banking or currency crisis that the Asian countries.

In total, we note that the probability of persistence of a currency crisis is higher than a banking crisis.



3. Estimation results

The estimation results based on a growth model and a crisis model provided using annual data are presented in Table 1. The top panel (A) presents estimates of the growth equation, while the bottom panel (B) summarizes the estimates of the probit equation.

Panel A
Impact of twin crisis on economic growth: sensitivity analysis

variables	Arellano Bond dynamic panel data estimation
Pib_{t-1}	0.675
	(20.23)***
INV	0.125
	(6.43)***
INF	-0.017
	(-2.93)**
LIQ	-0.024
	(-1.96)*
Crisej	-0.0634
	(-4.07)**
CR	-0.075
	(-1.07)
OUV	-0.012
	(-1.42)
ILF	0.00195
	(1.23)
KH	0.053
	(0.87)
Constante	0.015
	(1.48)
Observations	350
Specification Tests (p-values)	
- Sargan Test	0.78
- 2nd order Correlation	0.85

Notes: t-stat in parentheses. *, ** and *** indicates significance at 10%, 5% and 1% respectively.

Panel B
Liberalization financial and twin crises: Probit estimation

variables	Probit estimation
Pib_{t-1}	0.026
	(0.56)
INV	0.625
	(1.03)
INF	0.247
	(2.86)**
LIQ	-1.014
	(-1.76)
CR	0.652
	(1.98)**
OUV	0.032
	(0.032)

ILF	**0.026**
	(2.43)**
KH	**-1.536**
	(-0.43)
Constante	**-0.687**
	(-0.87)
Observations	**350**
Pseudo R^2	**0.256**

Notes: t-stat in parentheses. *, ** and *** indicates significance at 10%, 5% and 1% respectively.

The main results can be summarized as follows. First, financial liberalization has a direct positive and not significant effect on per capita GDP Growth. The next testable hypothesis is that financial liberalization enhances financial deepening and hence directly increases an economic growth.

Several features are worth noting. First, the sign and magnitude of the coefficients of explanatory variables are as expected, and the coefficients are statistically significant in most cases: financial liberalization, openness and the investment/GDP ratio are positively associated with economic growth, whereas the crisis dummy, the initial GDP, and inflation are negatively related to economic growth.

Second, the incidence of twin crises is likely to decrease annual GDP growth rate by 4.9 percent point. This result is consistent with findings in the crises literature. The financial liberalization significantly creases the probability of a twin crisis.

Third, and most importantly, the point estimates of the FL dummy and the FL index suggest a substantial impact of financial liberalization on output growth through the deepening of a country's financial system. For example, financial liberalization appears to increase the annual GDP growth rate by 0.195 percent point for the whole sample.

The lower panel in Table 1 presents the results of probit regressions, of which main findings can be summarized as follows.

First, the FL dummy variable is positively related to the probability of crises as expected, and the coefficient estimate is statistically significant at the 1 percent level. This result reflects the fact that financial liberalization is expected to increase the likelihood of crises by inducing excessive risk taking behavior. The inflation rate and private credit are also likely to increase the probability of crises, while

other regressors including the bank liquid reserve ratio and human capital turn out to be less significant in the incidence of crises.

When the regressor is a discrete variable, one can easily find the marginal effects by computing the change in the predicted probability that is conditional on the (discrete) explanatory dummy variable.

A table 1 shows that the marginal effect of the FL dummy is 0.015, which implies that financial liberalization is expected to increase the probability of crises by 1.1 percent point.

Table 1: Marginal effect of financial liberalization

variables	Probit estimation df/dx
Pib_{t-1}	0.0025
	(0.87)
INV	0.035
	(1.27)
INF	0.0014
	(2.56)**
LIQ	-0.074
	(-1.87)*
CR	0.037
	(1.96)*
OUV	0.0021
	(0.137)
ILF	0.015
	(2.76)***
KH	-0.055
	(-0.45)
Observations	350
Pseudo R^2	0.196

Notes: t-stat in parentheses. *, ** and *** indicates significance at 10%, 5% and 1% respectively.

In our sample the annual unconditional probability of a twin crisis is:

$$probability\ twin\ crisis = \frac{twin\ crisis\ number}{\left(countries\ number\ x\ period\ number\right)} = \frac{12}{10\ x\ 35} = 3.428\%$$

The direct growth effect of financial liberalization is 0,195 percentage points. This indirect growth cost is -0,095 percentage points of annual growth.

Table 2: Liberalization and Crisis Effects on Economic Growth

Direct Growth effect	0.195%
Indirect crisis effect	-0.095%
Net effect	0.1%

Table 2 reports the net effect of financial liberalization. Recall that the crisis effect can be computed by multiplying the coefficient estimate of the twin crisis dummy in the random effects regression by the marginal effect from the probit regression. The results in Table 1 show that the liberalization effect dominates the crisis effect. It leads to a positive net effect of financial liberalization on economic growth. The total growth effect of financial liberalization a from 0.18 percentage points of annual GDP growth, that coincide with previous estimates in the literature.

Conclusions

Much work has requested that financial liberalization is not the most appropriate and adequate for growth because of the crises linked with it. However, it is the wrong lesson to draw. Our empirical analysis shows that financial liberalization leads to sustainable growth, but it also leads to occasional crises. We note that in more countries, financial liberalization leads specifically to the financial fragility and twin crises. Although crises are costly and have dangerous effects too, they are rare events. Therefore, a long-term effect of a developed financial system is structured and well above the negative effects of financial fragility, banking and currency crises.

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Appendix A: Sources and definitions of variables

Variable	Definition and construction	Source
Real per capita GDP	**Logarithm real per capita GDP**	**World Development Indicators 2010**
Investment rate	**(FBCF+ΔS)/GDP**	**World Development Indicators 2010**
Inflation rate	**Consumer price index**	**World Development Indicators 2010**
Trade openness rate	**(Exportations + Importations)/GDP**	**World Development Indicators 2010**
Humane capital	**Ratio of enrollment in secondary education**	**World Development Indicators 2010**
Private credit	**Private credit/GDP**	**World Development Indicators 2010**
Financial liberalization index	**Dummy variable**	**Divers rapports de FMI et working Papers**
Twin crisis index	**Dummy variable**	**Divers rapports de FMI et working Papers**
Economy liquidity	**M2/PIB**	**World Development Indicators 2010**

Appendix B: Some data of currency, banking and twin crises

Countries	Currency crisis	Banking crisis	Twin crisis
Argentina	**1975-1982-1984-1987-1989-1991-1995**	**1980-1984-1985-1989-1995**	**1984-1989-1995**
Brazil	**1987-1990-1998**	**1990-1994**	**1990**
Chili	**1975-1977-1982-1984**	**1976-1981**	
Mexico	**1976-1982-1983-1985-1990-1994-1995**	**1981-1994**	**1994**
Peru	**1975-1977-1983-1988-1990-1992**	**1983-1984-1985-1989**	**1983**
Korea	**1980-1997-1998**	**1997-1998**	**1997-1998**
Indonesia	**1978-1983-1986-1997**	**1994-1997**	**1997**
Malaysia	**1975-1997-1998**	**1985-1998**	**1998**
Philippines	**1982-1983-1986-1997**	**1981-1998**	
Thailand	**1981-1984-1997**	**1983-1987-1997**	**1983-1997**

Source: Divers rapports de FMI et working papers, divers rapports de la Banque Mondiale, working papers and discussion papers, divers rapports de FMI et working papers, divers rapports de Banque Mondiale, working papers and discussion papers, Demirgûc-Kunt and Detragiache (1998) et Luc Laeven (2000).

Appendix C: financial liberalization with respect to six measures

Countries	Interest rate	Barrier entry	Reserves requirement	Control credit	Privatization	Prudential Regulations
Argentina	1989	1977	1993	1993	1995	1994
Brazil	1989	1991	1988	1994	1997	1998
Chili	1985	1997	1980	1976	1986	1986
Mexico	1989	1993	1989	1991	1992	1994
Peru	1991	1996	1991	1992	1995	1993
Korea	1993	1989	1996	1996	1983	1992
Indonesia	1983	1988	1988	1990	1992	1997
Malaysia	1991	1994	1994	1991	1988	1989
Philippines	1985	1994	1994	1983	1996	1993
Thailand	1992	1995	1992	1992	1988	1997

Source: Divers rapports de FMI et working papers, divers rapports de la Banque Mondiale, working papers and discussion papers, divers rapports de FMI et working papers, divers rapports de Banque Mondiale, working papers and discussion papers, Demirgûc-Kunt and Detragiache (1998) et Luc Laeven (2000).