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The Link between International Supervision and Banking Crises

Summary: Theoretical and empirical contributions of some economists have shown that a financial liberalisation policy implemented in a less developed institutional environment enhances the proliferation of banking crises. This leads to the conclusion that failure at the level of banking governance plays a significant role in the emergence of crises. By using multivariate logit, our empirical study samples of 12 emerging countries to study the relationship between banking supervision and banking crises during the period 1980-2003. Our results show a negative and insignificant association between banking regulation and the probability of occurrence of banking crises. We find the likelihood of banking crises is greater in countries with poor banking supervision. In short, the condition required for a sound banking system is to reinforce banking supervision during financial liberalisation phases.

Key words: Financial liberalisation, Banking crises, Prudential supervision and multivariate logit.

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In order to reinforce its beneficial role to the economy, the banking system is granted permission to proceed with financial liberalisation processes. Allowing the development of the real sphere through an optimal capital allowance within a freely emerging financial context, financial liberalisation aims at improving the degree of efficiency and profitability of the banking system. Nevertheless, a financial liberalisation initiative, doubtlessly one of the attractive facets of the world economy, strongly contributed to very significant banking malfunctions (Juncal Cuñado, Javier Gómez Biscarri, and Fernando Pérez de Gracia 2006; Romain Ranciere, Aaron Tornell, and Frank Westermann 2006; Betty Daniel and John Bailey Jones 2007; Mariassunta Giannetti 2007). The banking crises stream stipulates that financial liberalisation increasingly exposed banks to risks and changed the structures closely supervised by the government. Thus, the banking system has become the weakest link in the chain of financial systems. In order to solve banking crisis problems, prudential regulation mechanisms have been set up. This prudential regulation perspective is the subject of much research. Carolyn Currie (2006), Lukas Menkhoff and Chodechai Suwanaporn (2007), Aslı Demirgüç-Kunt, Enrica Detragiache, and Thierry Tressel (2008) show a financial liberalisation initiative implemented in an underdeveloped institutional environment reinforces the proliferation of banking crises. Failure at the level of banking supervision may be a source of aggravation in banking crises. Following this line, Hamid Mehram (2004) shows that adequate banking governance incites healthy and sustainable economic development. Likewise, Gerard Caprio, Luc Laeven, and Ross Levine (2007) conclude good governance guarantees efficient allocation of savings.

For Marco Amone, Salim Darbar, and Alessandro Gambini (2007), prudential banking regulation is positively linked to performance and stability.

However, other researchers conclude prudential regulation does not contribute to avoiding yet eliminating banking crises. In fact, André Icard (2002) and Andre Cartapanis (2003) show banking governance does not allow improvement of financial system security. Cartapanis (2003) observes banking governance cannot contain systemic risk, the ultimate risk for banks. These authors explain that crises spread with spectacular speed from one economy to another through the financial and business exchanges between countries. Finally, it is very useful to highlight the results of the different studies about the impact of prudential regulation on banking system security are most often mitigated. The result would be an absence of consensus. The first section of this article examines the theoretical considerations of financial liberalisation, prudential regulation, and banking crises. The second section exposes the econometric methodology chosen. Our conclusions are presented in the third section.

1. Financial Liberalisation, Crises, and International Supervision

A review of financial literature about bank crises shows two research paradigms attempted to determine the main reasons for these crises. The first paradigm claims bank crises rest on macroeconomic foundations and those conditions inappropriate to a financial liberalisation process constitute the principal reason behind bank crises. Alternatively, the second paradigm supports the idea that bank crises rest on microeconomic foundations. This latter stream supposes transformation of the banking environment in this new globalization era constitutes the second cause of bank crises. Hence, the necessity to improve the institutional environment - in order to guarantee bank solvency - constitutes an inevitable task to perform. This improvement may manifest itself in installing an effective banking governance system. The end of the last century was marked by the development of a vast theoretical and empirical literature treating the causality binding financial liberalisation and economic development. Reading this literature points to the conclusion that financial liberalisation is the way to improve developing countries' economic efficiency. This finding is explained by the fact that these countries suffer from the absence of banking intermediation, essentially linked to setting interest rates and rethinking the role of the government. Patrick Honohan (1997) affirms that public authorities' intervention, at the level of the banking system, is a financial distress signal for banks characterized by the deterioration of their assets. In addition, state intervention is an indicator of fragility if the banking sector is open and submitted to foreign competition.

In light of this observation, Geert Bekaert, Campbell Harvey, and Christian Lundblad (2005), Bonghoon Kim and Lawrence Kenny (2007), Laura Alfaro and Eliza Hammel (2007), among others, suggest developing countries must liberalize the banking system to ensure its proper functioning and to reinforce economic development. According to these authors, financial liberalisation defends the idea according to which a freely emerging financial sphere allows development of the real sphere through an optimal savings allocation and generates rapid economic development for developing countries. In the same vein, Saumitra Bhaduri (2005), based on a study conducted in India, concludes financial liberalisation, reducing the role of the

state in the economy, disrupts investments schemes. If the market ensures the determination of interest rates, financial liberalisation reduces market imperfections and improves allocation of resources. Also, according to Essahbi Essaadi, Jamel Jouini, and Wajih Khallouli (2009), financial liberalisation facilitates economic integration markets and interdependence between economies.

In order to achieve increased financial development and growth, financial liberalisation has been implemented. Nevertheless, the expected result was elusive. Financial liberalisation led to serious bank crises. Indeed, financial liberalisation is an internal and external factor increasing economies' fragility. The contribution of financial liberalisation in terms of financial development and economic growth is strongly questioned. This thesis is corroborated elsewhere by Daniel and Jones (2007), concluding financial liberalisation initiatives preceded the majority of banking crises affecting emerging economies. In this context, Ranciere, Tornell, and Westermann (2006) show the process of financial liberalisation may increase, at a high level of risk, the volatility of macroeconomic indicators and may raise the probability of starting banking crises. Other studies; particularly those conducted by Ray Barrell, Philip Davis, and Olga Pomerantz (2006) and Rangan Gupta and Andreas Karapatakis (2008) validate this conclusion.

The existence of a relationship between banking crises and policies of financial liberalisation, often radical in nature, has been validated as well by several researcher economists. Graciela Kaminsky and Carmen Reinhart (1999) conducted a study of a panel of 20 countries in Latin America, Europe, and Asia over the period 1970-1995. They conclude the number of banking crises strongly increased and policies of financial liberalisation precede these crises. Always within the frame of analysis of financial liberalisation and banking crises sensitivity, James Barth, Gerard Caprio, and Ross Levine (1999) examine the link between financial regulation, financial fragility, and economic performance. They affirm that countries with the most regulatory and restrictive systems are likely to eradicate banking crises. However, Klaus Fisher, Jean-Pierre Gueyie, and Edgar Ortiz (1997), on the basis of a study conducted on individual data collected on Malaysia, Thailand, and Taiwan, conclude banks are exposed to high risks during the process of financial liberalisation. Consequent liberalisation increases emerging economies' exposure to external disturbances, making local banks fragile. Aslı Demirgüç-Kunt and Enrica Detragiache (1998, 1999) and Ilan Noy (2004) affirm that liberalisation of the local financial sector raises the probability of the banking system becoming increasingly fragile due to a suppression of profitability, control of credits' interest rates, and barriers reduction for foreign banks. However, liberalisation of the domestic financial sector coupled with liberalisation of the financial market and the capital account constitute strong signals for the birth of a banking crisis in emerging countries.

Prudential regulation is the subject of several studies. Menkhoff and Suwanaporn (2007) state a financial liberalisation initiative undertaken in a less developed institutional environment increases the proliferation of banking crises, leading us to think the inefficiency of banking governance mechanisms may be a source aggravating banking crises. Hyman Minsky (1996) shows a weak institutional environment is at the centre of the dynamic of a crisis. In other words, the absence of banking go-

vernance fuels banking fragility (Shams Pathan, Michael Skully, and J. Wickramanayake 2008) under the effect of financial liberalisation, amplifying the euphoria of risk triggering. According to Apanard Angkinand's (2009), adequate banking supervision smoothes banking crises. Akiyoshi Horiuchi (2000) affirms that banking governance malfunction is at the origin of deep crises striking Asian countries. Mehram (2004) shows adequate banking governance incites healthy and sustainable economic growth. Likewise, Caprio, Laeven, and Levine (2007) conclude good governance guarantees an efficient savings allocation. Within these studies' framework, in order to show the important role banking governance can play in the attenuating banking crises, other studies question the efficiency of banking governance. They conclude prudential regulation does not contribute to reducing and avoiding banking crises. Icard (2002) and Cartapanis (2003) show prudential regulation does not allow improvement of financial system security. They note banking governance contains a systemic risk, the most serious that can strike banking. These authors explain crises propagate with spectacular speed from one economy to another via financial and business exchanges between countries. Finally, consensus is absent considering banking governance's impact on banking structure safety. Thus, the literature is highly ambiguous as to the efficacy of banking governance to prevent the problem of banking crises.

2. The Link between International Supervision and Banking Crises: A Panel Data Approach

Our research objective consists of testing the effectiveness of prudential regulation to attenuate banking crises. To do so, we proceed through three stages. First we present the model to test. Then we identify and measure our variables. Finally we discuss and interpret the results.

2.1 Presentation of the Model

Our objective is to validate some panel of emerging countries by testing the relationship between financial liberalisation, banking supervision, and crises. The selected sample is a panel of the following countries: Argentina, Brazil, Mexico, Chili, Columbia, Peru, Indonesia, Malaysia, Thailand, Tunisia, Morocco, and South Africa. Our study covers the period from 1980 to 2003. We use a general logit model to estimate the probability of banking crises, an approach used widely in studies on banking crises. The principal authors employing this technique are Demirgüç-Kunt and Detragiache (1998, 1999). Our model is:

$$y_{it} = \beta'X_{it} + \varepsilon_{it}$$

Our dependent variable y_{it} is the crisis dummy, taking a value of one when a country experiences a banking crisis and zero otherwise. X is the vector of explanatory variables including the constant term and β is the vector of unknown coefficients.

2.2 Variable Definition and Measurement¹

According to Kaminsky and Sergio Schmukler (2008), the variable financial liberalisation comprises three dimensions: Real Domestic Liberalisation, Financial Markets Liberalisation, and Capital Account Liberalisation. Within our study's framework, we retain three dimensions only: domestic financial sector liberalisation, financial markets liberalisation and capital account liberalisation. For each dimension, three regimes are identified: completely liberalized², partially liberalized³, and repressed. The degree of financial liberalisation is measured by the index composed of the domestic financial sector, the financial markets, and the capital account and varies between zero and two: for each component, a value of zero indicates no liberalisation, one indicates partial liberalisation, and two indicates full liberalisation.

For the variable banking crisis, we retain the definition of Caprio and Daniela Klingebiel (2003) where a banking crisis corresponds to a situation where the aggregate value of banking system liabilities exceeds the value of its assets. Crisis takes the value of one if the country is going through a systemic crisis and zero otherwise. The variable prudential regulation takes the values of zero in a period of financial repression, the unit in period of financial liberalisation, and two if an effort to reinforce prudential supervision follows financial liberalisation.

Recalling the empirical literature of banking crises, especially Demirgüç-Kunt and Detragiache (1998, 1999), Barry Eichengreen and Andrew Rose (1998), Kaminsky and Reinhart (1999), Ranciere, Tornell, and Westermann (2006), Jurgen von Hagen and Tai-Kuang Ho (2007), we retain seven control variables (Early Warning Indicators): economic growth, interest rate, inflation rate, M₂ over reserves, current account, banking credit growth, and short-term national debt over external debt.

2.3 Estimation and Interpretation of Results

Table 1 Financial Liberalisation, Banking Crises, and Prudential Supervision: Logit (Random Effects)

<i>Variables</i>	<i>Model 1</i>		<i>Model 2</i>	
	<i>Coefficient</i>	<i>St. Error</i>	<i>Coefficient</i>	<i>St. Error</i>
BANKING CRISIS				
Real interest rate	0,029 **	0,015	0,029 **	0,015
Economic growth	-0,380 ***	0,086	-0,410 ***	0,092
Inflation	-0,019 ***	0,043	-0,210 ***	0,046
Current account	0,082 **	0,039	0,084 **	0,041
M2 over reserves	0,210 *	0,126	0,192	0,130
Credit Gap	0,102	0,068	0,131 *	0,074
Short-term over external debt	-0,086	0,052	-0,074	0,052

¹ The Appendix lists all variables.

² A regime qualifies as completely liberalized if the three sectors are liberalized perfectly.

³ A regime qualifies partially liberalized if at least one of the three sectors is partially liberalized.

Financial liberalisation	+1,113^{***}	0,345	-	-
Financial Liberalisation combined with an effort of a reinforcement of banking governance	-	-	-0,146	0,140
Number of countries	12		12	
Log Likelihood	-139,71		-124,58	
Wald chi 2	39,46		38,38	
Prob > chi (2)	0,000		0,000	
P value of Hausman test	0,432		0,677	

Note: ^{***}, ^{**}, and ^{*} denote the significance level of 1%; 5%; and 10%, respectively

Source: Author's estimation.

Econometrically, we notice all these models are globally and statistically significant because the probabilities of *Wald's* test are largely less than 5%. Likewise, *Hausman's* test allows us to conclude the type of estimation we chose - estimation of random-based effects - is the most effective and efficient.

The probability of banking crises is statistically significant at the level of 1% and positively dependent on the dummy variable of financial liberalisation (+1,113) (Model 1). This result corroborates Kaminsky and Schmukler (2008) on a panel of industrialized countries and development countries in the process of development. In fact, this result confirms financial liberalisation has a negative short term effect. Kaminsky and Schmukler (2008) affirm, "The crises of the 1990s in Asia, Europe, and Latin America have re-ignited the debate on the effects of financial liberalisation. Many argue that the deregulation of financial markets was the main trigger of many of the crises observed since the 1970s". This effect disappears in the long term, once financial reforms familiarize themselves with new globalized finance. Thus, the country in question realizes a durable growth and its financial system stabilizes. Other empirical studies - such as those of Eichengreen and Rose (2000), Ranciere, Tornell, and Westermann (2006) and Giovanni Dell'Ariccia, Enrica Detragiache, and Raghuram Rajan (2008) - show financial liberalisation is the common cause of the banking crises observed these last two decades. This thesis is corroborated elsewhere by Daniel and Jones (2007), concluding financial liberalization precedes the majority of banking crises affecting emerging economies.

The results (Model 2) show the regression of the dummy variable of financial liberalisation combined with a reinforcement of prudential regulation on banking crises probability returns a negative and not statistically significant coefficient (-0,146). This implies adequate prudential supervision tends to lower banking crisis probability. This result corroborates Currie (2006) and Angkinand (2009), showing adequate banking supervision smoothes banking crises. Indeed, a reliable internal and external control is an essential condition to circumvent the excessive catch of risk by bankers. Our result corroborates the robust arguments of Michael Alexeev and Sunghwan Kim (2008), affirming, "The weakness of corporate governance has been cited as both a cause of the Asian crisis and a crucial factor in its severity". The

obtained result clearly shows good banking supervision reduces banking crisis probability.

In addition, the results emphasise that the variable economic growth is negatively dependent on the probability of occurrence of one banking crisis (-0,038 and -0,410). Our results corroborate those of Kim and Kenny (2007), who note a high growth rate is a good sign for the economy at large. Demirguc-Kunt and Detragiache (1998) and Kaminsky and Reinhart (1999) show banking crises tend to occur in times of weak or negative real growth. However, Claudio Borio and Philip Lowe (2002) object, showing economic growth could be an origin of banking crisis. Confirming theoretical predictions, the results show the ratio M_2 over reserves is positively dependent on probability of one banking crisis (+ 0,210). In other words, the higher this ratio, the more the country is vulnerable to shareholders' confidence crises if the banks' exchange reserves fall (Cartapanis 2002). M_2 over reserves forms a reliable indicator, also allowing measurement of central bank capacity to confront a fall in currencies reserves following a banking crisis. The ratio of short-term national debt to external debt is negatively dependent on banking crises probability (-0,086 and -0,074). This negative relationship is reasonable considering banks illustrate the capacity of a country to honour its financial engagements on the international capital market. Inflation is negatively dependent on the probability of a banking crisis (-0,019 and -0,210). This result corroborates the result of Caprio and Klingebiel (1996), arguing crises are likelier in countries with higher inflation. Also, like Demirguc-Kunt and Detragiache (1998), we find high real interest rates raise the likelihood of banking crises. These results suggest poor domestic micro and macroeconomic policies are the main early warning indicators of banking crises

3. Conclusion

This article aims to apprehend the role the institutional environment can play; more precisely, the impact of prudential regulation on the possibility of banking crises. Since the Basel Committee's work on prudential supervision, prudential regulation as an instrument of fighting against banking structures crises has been the subject of much research. The results are generally mitigated and sometimes even contradictory. Many studies show prudential regulation contributes to reducing the risk of banking crises and consequently to improve the performance and the profitability of banks. Mehram (2004) shows good prudential regulation ensures a healthy and durable economic growth. Along the same line, Noy (2004) and Menkhoff and Suwanaporn (2007) note a process of financial liberalisation concomitantly followed by a reinforcement of prudential regulation makes it possible to reduce banking crises probability. However, an examination of the literature also reveals prudential regulation cannot play a role in banking crises. Indeed, many studies note prudential regulation does not contribute to reducing and avoiding banking crises. These studies question the utility of the Basel Committee's work on prudential supervision. Within this analytical framework, Icard (2002) and Cartapanis (2003) show banking governance, seen from prudential regulation, does not allow for improving financial system safety in its macroeconomic form. Accordingly, banking governance cannot contain systemic risk, the most serious risk for banks given it propagates from one bank to

another. Our empirical study of ten emerging countries during the period of 1980 through 2003 confirms reinforcement of banking governance during the process of financial liberalisation constitutes a condition necessary and useful to an efficient banking system. Indeed, the results show banking governance is negatively correlated with the probability of occurrence of banking crises. Thus, a well controlled financial liberalisation process adopted in a favourable environment coupled with good banking governance ensures stability of emerging countries' banking systems.

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Appendix

Definitions and Data Sources of All Variables

Variables	Definition	Source
Banking crises index	Dummy variable: 1 if there is a crisis and 0 if not	Caprio and Klingebiel (2003)
Financial Liberalisation	To refer to Rebecca M. Neumann, Ron Penl, and Altin Tanku (2008), financial liberalisation takes: a value of 1 indicates no liberalisation, 2 indicates partial liberalisation, and 3 indicates full liberalisation	Kaminsky and Schmukler (2008)
Economic Growth	GDP growth	WDI
Inflation	Consumer price index	WDI
Real interest rate	Nominal interest - Inflation	IFS: line 60b and line 64
Current Account	Current account divided by GDP	WDI
M2/international reserves	M2 over international reserves	WDI
Credit gap	Credit to private sector divided by GDP	WDI
Short-term debt	Short-term debt over external debt	WDI
Prudential Regulation	This index takes zero in a period of financial repression, the unit in period of financial liberalisation and two if financial liberalisation was followed by an effort of reinforcement of prudential supervision.	Laeven (2003) and Kaminsky and Schmukler (2008)