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Review Article

What Have We Learned of Asian Crisis?

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Abstract

During the eighties and the beginning of the nineties, several countries experienced serious banking crises. Such proliferation of the problems of the large-scale banking sector has caused widespread concern. Indeed, banking crises undermine the functioning of the financial system and the economy in general. Most countries have tried to underpin the consequences of banking crises through various types of intervention ranging from the pursuit of accommodative monetary policy to the bailout of insolvent financial institutions with public funds. However, even when carefully designed, rescue operations have several disadvantages. The purpose of this paper is to assess the regulatory environment of banks, a decade after the Asian crisis. We will identify the factors relating to banking supervision contributing to the triggering of crises in emerging countries in the years 1990s and see if the countries ha**ve** improved their regulation in 2007 and which coincided with the subprime crisis. For this, we have studied a sample of 105 developed and emerging countries over two years, 1997 and 2007**.**

Keyswords: financial liberalization, banking crisis, Logit, supervision, financial stability.

INTRODUCTION

The literature on regulation and its effects on the economies of countries present mixed reviews. Some studies have concluded that good regulation**s** enhance financial development and contributes to economic stability [1].Others have found that strong regulation**s** can lead to banking crises over the decades [2]. This divergence of results can be explained by several reasons. Egan *et al*. [3-7]. Explain the negative influence of deposit insurance on the emergence of crises by the fact that the shareholders of a bank can benefit from the "deposit insurance subsidy" by increasing the leverage and risk of the deposit insurance bank, which can lead to the appearance of crises.

For example Mathonnat *et al*. [8] Angkinand *et al*. [3], Allen *et al*. [1], state that countries characterized by deteriorating macroeconomic factors such as GDP growth, interest rate, inflation, as well as capital flows are the most affected by banking crises. Crises can also be explained by the instability of the banking environment. In fact supervisors face several structural obstacles, such as the lack of transparency of information on financial system conditions due to the weakness of accounting and auditing standards [2]. In addition, the assessment of banking risks by the banks and their supervisors is not obvious given the low qualification of the teams. Credit risk assessment is conditioned by good information on borrowers that does not exist in the banking sector [9].On the other hand, banking crises are the consequences of slippages, corruption, non-compliance with laws**,** and the unreliability of regulatory corrective actions [10, 11], Klapper and al.[12].

This overview of the literature reveals that there is a real need to determine the factors that triggered the crises of the years 1997 and to verify if these same factors have improved and could confront the crisis of the subprimes. To do this, we have analyzed the impact of macroeconomic, institutional, and regulatory factors on the emergence of banking crises during the Asian crisis and during the subprime crisis. In fact, several countries have tightened capital rules and improved surveillance policy following the Asian crisis, but these reforms have not improved the stability and efficiency of banks.

Our results suggest that restrictions on insurance, the financial market, and the real estate sector are unrelated to the outbreak of banking crises in all our estimates. This leaves us to affirm that a good regulation leads to a banking stability. On the other hand, the regulation on the banking activity to hold non-financial companies has increased bank fragility. We can conclude that the banks that diversify their activities

will be able to widen their sources of income and become more resistant to shocks. This will have positive effects on the stability of the banking system.

Our work is structured around seven sections: a presentation of the elements of banking regulation (2), Bank risk taking (3), Entry of foreign banks (4) a empirical study (5) an interpretation of the results at the section (6) and the last section is devoted to the conclusion (7).

The Role of Banking Regulations

Prudential regulations aim to protect the banking system from all problems. Its purpose is to have a mix of transaction tracking with respect to capital requirements, entry restrictions for foreign banks, and restrictions on bank activity.

The Regulation of Own Funds

The regulation of own funds represents the funds that banks must hold as reserves with the central bank. These regulations are imposed by Basel's international standards. Cubillas *et al*. [13] analyze a sample of 4333 banks from 82 countries over the period stretching from 1991 to 2007. They find that capital requirements help reduce the negative impact of financial liberalization on the financial stability of both developed and developing countries. Indeed, the negative influence of the financial liberalization becomes positive in both groups of countries if the regulation of capital is respected. With the same idea Brinkmann and Horvitz [9] also find evidence of significant responses of credit supply to Basel I capital requirements. Wagster [14] reaches the same conclusion for Canada and the United Kingdom. It does not find support for this result in the cases of Germany, Japan, and the United States.

The Regulation of Market Discipline

The Basel II agreements explicitly insist on capital requirements (Pillar 1), formal supervision (Pillar 2) and strengthening of market discipline (Pillar 3) as tools to improve the stability of banks. Indeed, the aim of the Basel 2 reform is to better integrate the increased complexity of the banking business while leaving financial institutions certain autonomy in the choice of possible options to define the minimum capital required for the coverage of potential losses [15].

Banking Risk Taking

Financial liberalization was marked by weak banking supervision which encouraged the banking sector to take risks in order to ensure more profit. Lassoued *et al*. [16] have studied the impact of foreign and state ownership on bank risk. The authors analyzed panel data applied to a sample of 171 commercial banks in the MENA region using a least squares regression over the period 2006-2012.Findings show that state ownership encourages banks to take more risks. In addition, state-owned banks tend to increase the solvency ratio to guard against a high level of risk. They have also found that all classes of shareholders are adopting a cautious attitude that influences risk reduction after the 2008 crisis. Lassoued *et al*. [16] point out that the ownership structure is a corporate governance mechanism that affects banks' risk taking in emerging markets.

In addition, Amri *et al*. [1] have studied the importance of surveillance, in the presence of financial liberalization and its relationship with the financial crisis using a Probit mode[l][1].Thus, they took a sample of 65 developing countries from 1976 to 2005. They have reached the conclusion that financial liberalization leads to financial fragility as a result of excessive risk-taking.

Entry of Foreign Banks

The findings on the role of foreign banks and their impact on the host country's economy are mixed. For some, these banks play an important role in improving efficiency and competition. For others they constitute an indirect channel for spreading the crisis. Indeed, Baicu [17] finds that foreign banks have led to an increase in foreign currency liabilities, external debt and foreign currency borrowings before the crisis in Romania. Moreover all these factors have increased the vulnerability of Romania accompanied by strong regulation according to international standards.

Chen *et al*. [18] find that the entry of foreign banks increases competition in banking systems. In fact, following the global recession of 2008-2009, Latin American countries seem to benefit more from the penetration of foreign banks than emerging markets in Asia.

Empirical Study

The objective of this work is to analyze the determinants of banking crises. To achieve this, we will study a sample of 105 countries in 2 cross-sectional studies in 1997 and 2007. We have chosen to model the determinants of bank crises using the logit model that appears to be most used in economic studies. The logistic regression is based on the assumption of a latent, unobserved variable y_i^* _that shows a specific outcome that can be observed empirically as a dichotomous variabley_i. In our case, y_i is the CRISES' variable which measures the on sand of crises in a sand of countries? It takes the value 1 if y_i^* exceeds a threshold value τ . In logistic regression τ = 0 by assumption. The latent variable can be expressed in a linear model:

[1]. In statistics and econometrics, the probit model represents a binomial regression model. this model was introduced in 1934 it represents a special case of the generalized linear model

$$y_i^* = x_i'\beta + \varepsilon_i \ (1)$$

The explanatory variables, x_i, used to model bank crises relate to macroeconomic factors, institutional factors and regulatory factors. Taking into consideration what we mentioned, the objective of this modelling is to provide a response to our problem relating to the impact of regulatory, banking and institutional factors on the occurrence of crises. In order to derive the probability, we start by assuming the threshold mentioned above ($\tau = 0$) and set up the equation:

$$p(y_i = 1|x_i) = p(y_i^* > \tau) = p(y_i^* > 0) \ (2)$$

Substituting equation (1) leads to

$$p(y_i = 1|x_i) = p(x_i'\beta + \varepsilon_i > 0) \ (3)$$

Rearranging the right-hand side of the equation leads to

$$p(y_i = 1|x_i) = p(\varepsilon_i > -x_i'\beta) = p(\varepsilon_i \leq x_i'\beta) \ (4)$$

The right-hand side of the equation describes the probability of being smaller or equal to a specific value. This kind of probability is given by a cumulative probability density function (CDF), noted by $G(.)$ and we can write

$$p(y_i = 1|x_i) = \ p(\varepsilon_i \leq x_i'\beta) = G(x_i'\beta) \ (5)$$

In logistic regression it is assumed that the errors follow a logistic distribution with expectation $E(\varepsilon_i) = 0$ and variance$v(\varepsilon_i) = \ \pi^2/3$. We can write

$$p(y_i = 1|x_i) = \frac{\exp(x_i'\beta)}{1+\exp(x_i'\beta)} \ (6)$$

Therefore, the conditional probability $p(y_i = 1|x_i)$ measures the probability of having a crisis given exogenous variables. The coefficient β is the marginal effect measure on the conditional probability when there is unit change in data x_i. The estimator $\hat{\beta}$ could be calculated through maximizing the following log-likelihood function.

$$\ln L = l = \sum_{i=1}^{n} [y_i \ln G(x_i'\beta) + (1 - y_i) \ln(1 - G(x_i'\beta))]$$

Using CRISES, the variable to be explained indicating whether or not there is an outbreak of crises and*i* represents each country in the sample.A detailed description of the variables selected for our econometric study will be presented below.

Presentation of Data

To analyze the decisive effects of banking crises. The variables selected relate to supervision indicators and banking regulations, macroeconomic and institutional factors. Our study is based on a sample of 105 developed and developing countries presented in Appendix 1, and in 1997, the triggering period for emerging market crises and 2007, and the triggering period for the subprime crisis. Our choice of explanatory variables reflects the theory, the availability of data**,** and the determinants of bank crises summarized in the previous sections. In addition, for the construction of the dummy bank crisis variable, we identified and dated distress episodes of the banking sector in both the 1997 and 2007 periods using mainly the database of Laeven and Valencia [19]. The explanatory variables are presented in the following table hereafter.

6-Interpretation of Results

Macroeconomic Variables

The results of the regressions show that the weak GDP growth for the year 2007 is clearly associated with a high probability of a banking crisis. This confirms that shocks to the economy have been a major source of systemic problems in the banking sector in the years 2007. However, the variable measuring growth is not significant in 1997.For Thakor, A [20] to achieve financial stability and growth, it is necessary to increase the capital requirements in order to reduce solvency risk.

Moreover, the coefficient of the credit variable is positive, and highly significant in the year 1997.This is consistent with the results of Dong-EunRhee *et al.* [21] which have concluded that the expansion of domestic credit increases banking crises. As an indicator of the vulnerability of the financial system, the ratio of M2 to foreign exchange reserves of the central bank does not seem to increase the probability of crises in our model in 1997. Indeed, this ratio is significant in 2007, which leaves us to conclude that the growth of the commitments, not covered of the banking sector, was one of the causes of triggering banking crises in 2007.

As for the variable measuring the banking development "credit to the private sector" is not significant in 2007 but it explains the crises in 1997. It seems that supervision was stronger in 2007.What joins the results, from Demirguc Kunt, *et al.* [22], who suggest that regulatory and supervisory policies of banks that encourage private sector control improve the efficiency of banks**.**

Institutional Variables

Nos estimations ont montré que la variable loi présente un effet significativement négatif sur les deux périodes. Ce qui montre que les crises se sont apparues dans les pays qui ne respectent pas la loi. Pour la variable mesurant la Corruption et contrairement à nos attentes, elle ne présente pas un coefficient significatif pour les deux sections.

Our ratings have demonstrated that the law variable presents a significantly negative effect on both periods. This shows that crises have emerged in countries which do not respect the law. For the variable

measuring the corruption, unlike our expectations, it does not display a significant coefficient for both sections.

Regulatory Variables

The variable z score is significantly negative. This shows that the higher the banking risk, the more banking crises are expected. Thus, the instability of banks has a significant effect on the appearance of banking crises. As for the concentration of the big five banks, our results have shown that there is no clear correlation between concentration levels and the crisis for both dates. Indeed, concentration reduces banking competition, thus having a positive effect on banking stability. Our findings are consistent with those of Fosu *et al.* [26]

Loss of unrealized securities shows a positive sign in 1997.Indeed, banks are allowed to intervene in a number of activities and may engage in companies that may be sub-optimal for investors [23], which confirm our results. Our results lead us to conclude that restrictions on insurance, the financial market, and the real estate sector were unrelated to the outbreak of banking crises in all our estimates. Indeed the size of some banks makes them difficult to monitor. Moreover, such banks can become so powerful politically and economically that they become « too big too fail » [24].

The coefficient of the variable measuring the exchange rate loss is significantly positive in 1997.It seems that an imbalance in the stock of exchange favors can trigger a banking crisis. Our results confirm the work of Kaminsky and Reinhart [25] who find that 56% of banking crises have been accompanied by currency crises within three years; with a percentage of 24% shifted by one year or less between the two crises, named by the authors by "twin crisis". The authors do not conclude that there is a unidirectional causal link between banking crises and currency crises.

In addition, the variable measuring the number of rejected foreign banking license applications positively and significantly affects the emergence of banking crises in 1997 in emerging countries.

This shows that the banking system of countries affected by the crisis was not open internationally. The fact that banks do not engage in new technologies will increase the bank risk and consequently the banking crises.

Table-1: The explanatory variables

Variables codes	Variables	Source
Bank macroeconomicfactors		
Growth	GDP Growthannual %	World Bank
Inflation	Inflation GDP déflatorannual %	World Bank
Crédit	Credit provided for the private sector as a percentage of GDP.	World Bank
M2_reserve	M2 ratio to foreign exchange reserves	World Bank
Debdt	Doubtfuldebts	World Bank
Institutional Indicators		
Rule of low	Index that measures compliance with contracts	World Bank
Corruption	Measuring the transparency of banks	World Bank
Indicators of Supervision and Banking Regulations		
regulatory barriers for banks that	Stock market activities, Insurance activities, Real estate activities and Ownership of non-financial enterprises	Barth *et al*. [2]
Concentration	the 5-bank concentration ratio	Barth *et al*. [2]
Z_score	Banking risk measurement	Bankscoope
insurance	Deposit insurance	Demirguc-Kunt *et al*. [22].
losses/loan	Market value of loan losses	Barth *et al*. [2]
losses/exchange	Unrealized foreign exchange losses	Barth *et al*. [2].
Nb of foreign applications	Number of foreign applications for banking licenses	Barth *et al*. [2].
Nb of domestic applications	Number of domestic applications for banking licenses	Barth *et al*. [2]

Table-2: Estimation results for all emerging and developed countries in 1997

Variables	Spécification (1)	Spécification (2)	Spécification (3)	Spécification (4)	Spécification (5)	Spécification (6)
Growth	0,055		0,096	0,079	0,044	
	(0,046)		(0,073)	(0,061)	(0,069)	
Inflation	0,008		0,004	0,004*	0,005*	
	(0,011)		(0,005)	(0,002)	(0,003)	
Credit	0,007		0,029**	0,031***	0,039***	0,042***
	(0,008)		(0,012)	(0,008)	(0,011)	(0,016)
M2_reserve	-0,071		-0,058	-0,067	-0,079	-0,115
	(0,056)		(0,067)	(0,053)	(0,053)	(0,093)
debt	0,021		0,057**	0,025	0,029	0,028
	(0,014)		(0,026)	(0,018)	(0,026)	(0,023)
Bank_Zscore		-0,053	-0,083**	-0,075*	-0,083	-0,114**
		(0,035)	(0,038)	(0,039)	(0,054)	(0,054)
Rule Law			-1,529***	-1,421***	-2,031***	-2,117***
			(0,435)	(0,428)	(0,459)	(0,501)
Security				0,026	0,016	0,297
				(0,306)	(0,334)	(0,415)
insurance				0,172	-0,160	-0,011
				(0,281)	(0,255)	(0,312)
Real Estate				0,054	0,386	
				(0,278)	(0,282)	
Non-financial firms				-0,648**	-0,826**	-0,744*
				(0,626)	(1,252)	(0,703)
Corruption			0,468			
			(0,333)			
Loss/Loans					-0,344	-1,122
					(0,610)	(0,755)
Loss/exchange					1,593***	0,811
					(0,615)	(0,778)
Concentration						-0,007
						(0,010)
Nb of foreign applications						-0,021
						(0,034)
Refused						0,251*
						(0,151)
Loss/share						0,011**
						(0,902)
Constant	-1,136**	1,893	1,147	0,588	-0,308	0,523
	(0,500)	(1,756)	(2,072)	(1,297)	(1,651)	(1,739)
Observations	105	105	100	102	102	98

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table-3: Estimation results for both groups of countries (emerging and developed) in 2007

Variables	Spécification(1)	Spécification (2)	Spécification (3)	Spécification (4)	Spécification (5)	Spécification (6)
Growth	0,141*		0,182**	0,200**	0,172**	
	(0,078)		(0,086)	(0,082)	(0,084)	
Inflation	-0,014		-0,066	-0,062	-0,023	
	(0,054)		(0,064)	(0,058)	(0,084)	
Credit	-0,008		-0,002	-0,002	-0,004	-0,010
	(0,006)		(0,007)	(0,007)	(0,006)	(0,007)
M2_reserve	0,083*		0,0821	0,091**	0,128**	0,129
	(0,047)		(0,068)	(0,040)	(0,063)	(0,080)
Creance	0,038**		0,079***	0,066***	0,054**	0,0318*
	(0,017)		(0,029)	(0,024)	(0,022)	(0,017)
		(0,028)				
bank_zscore		-0,074**	-0,088**	-0,083**	-0,0759**	-0,0719*
		(0,036)	(0,041)	(0,038)	(0,037)	(0,041)
Law			-0,960	-0,308	-0,376	-0,254
			(0,994)	(0,348)	(0,366)	(0,363)
securities					0.0772	0.974
					(0.604)	(1.030)
Insurance					0.867	1.018
					(0.724)	(0.756)
Real Estate					-0.266	-0.864
					(0.579)	(0.686)
Non-financial firms					0.0772	0.974
					(0.604)	(1.030)
Corruption			0,366			
			(0,958)			
Loss/ Loan					-0,266	-0,864
					(0,579)	(0,686)
Loss/Change					0,077	0,974
					(0,604)	(1,030)
Concentration						-0,0463
						(0,866)
Nb of foreign applications						0,416*
						(0,221)
refused						-0,422
						(0,281)
Loss/share						-1,014
						(1,067)
Constant	-1,333	-1,428	-0,019	0,187	-0,092	1,397
	(0,840)	(3,936)	(1,112)	(0,947)	(1,156)	(1,088)
Observations	105	84	84	101	89	89

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The ability of banks to own and control non-financial enterprises increases the fragility of banks in 1997.According to our results; many countries have allowed cross-ownership of shares between banks and non-financial companies. As a result, the regulation on the extent to which a bank may hold shares in a non-financial corporation has affected a bank's ability to diversify its sources of revenue. Consequently, the absence of diversification has clearly led banks to bank fragility and consequently to a banking crisis.

As a result, we can see that supervision and regulation of capital have not been enough to completely prevent banks from increasing their risk taking. On the contrary, banks are more restricted in terms of activities than they were allowed to do while less likely to take more risks. In the same ideas, Barth *et al*. [2] find that, in the early 2000s, the increase in activity restrictions imposed on banks led these institutions to take more risks.

CONCLUSION

The nineties were marked by the succession of financial crises: the Mexican crisis of 1994, the crisis of East Asia, Russia, and Brazil. These crises took place a few years after the financial liberalization, although the latter was seen as an essential condition for economic growth and development. It is important to point out that these crises have cost the liberalized countries dearly.

The objective is to know whether countries have been able to apply the Basel guidelines, and whether they have been able to reinforce capital regulations and official supervisors after the 1997 crisis. However, some countries have allowed private control of banks in accordance with Basel II Pillar III.

Our results showed that there is a difference between the two sections. The 1997 section presented better results since the crisis of the emerging countries was mainly in the nineties seven. As a result, the only common factors that accounted for the onset of crises for both dates were the law, Z-score, and the percentage of banking system assets in foreign-owned banks.

As for banking regulations, we cannot talk about the absence of the latter but we must point out a weakness of banking supervision that has led these countries to banking crises or international crises.

Our results also show that restrictions on insurance, the financial market, and the real estate sector are unrelated to the outbreak of banking crises in all our estimates. Which leaves us to affirm that a good regulation leads to a banking stability? On the other hand, the regulation on banks' ability to hold and control non-financial firm's increases the fragility of banks in 1997.We can conclude that the banks that diversify their activities will be able to widen their sources of income and become more resistant to shocks. This will have positive effects on the stability of the banking system.

For example, the regulation on the extent to which a bank may hold shares in a non-financial corporation has affected a bank's ability to diversify its sources of revenue. As a result, the absence of diversification has clearly led banks to bank fragility and consequently to a banking crisis. Another interesting observation that confirms the old theories is that an imbalance in the stock of foreign exchange also favors the occurrence of a banking crisis where currency crises favor banking crises.

In conclusion, our results are interesting and could be completed by the study of Tunisian banks after the jasmine revolution. We could deepen the idea of supervision and the controls and regulations imposed by the IMF. From an empirical point of view, we could consider setting up a banking risk management system that complies with international prudential standards.

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Annexe

Table-1: List of emerging and developed countries

Developed countries		
Australia	Germany	Netherlands
Austria	Gibraltar	New Zealand
Belgium	Greece	Portugal
Canada	Iceland	Slovenia
Cayman Islands	Ireland	Spain
Cyprus	Italy	Sweden
Denmark	Japan	Switzerland
Filand	Liechtenstein	United Kingdom
France	Luxembourg	United states
Emerging countries		
Argentine	Guyana	Peru
Aruba	Honduras	Philippines
Bangladesh	Hongray	Poland
Belarus	India	Puerto Rico
Bhutan	Indonesia	Qatar
Bolivia	Israel	Romania
Bostawana	Jamaica	Russia
Brasil	Jordan	Rwanda
Britshvirginislands	Kenya	St kitts
Burundi	Korea	Samoa
Cambodia	Kuwait	Saudiarabia
Chile	Latvia	Seychelles
China	Lebanon	Singapore
Croatia	Lesotho	Solomon Islands
Czechrepublic	Lithania	South africa
Egypt	Macau	Siri Lanka
El Salvador	Macedonia	Tajikstan
Estonia	Malawi	Thailand
Gambia	Malaysia	Tonga
Ghana	Maldives	Trinidad et Tobago
Guatemala	Malta	Turkey
Guersney	Mauritius	Turks and caicos
Népal	Mexico	Vanuata
Nigeria	Moldova	Venezuela
Oman	Maroco	Vietnam
Panama	Nambia	Zambia