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BANKING SECTOR VULNERABILITY WITH FINANCIAL LIBERALIZATION: SOME EVIDENCE FROM MALAYSIA

Chow Fah Yee
UNIVERSITY TECHNOLOGY MARA, MALAYSIA

Eu Chye Tan
UNIVERSITY OF MALAYA, MALAYSIA

The link between financial liberalization and the instability of the banking sector is assessed here by mobilizing macroeconomic data and the logistic regression technique. The paper also specifically assesses the contribution of financial liberalization to the Malaysian banking crisis of 1997. Results suggest that financial liberalization, banks' lending rates and the ratio of M2 to foreign exchange reserves do contribute significantly to the 1997 banking sector crisis.

I. INTRODUCTION

A sound and efficient banking system is of utmost importance to a country, be it developing or developed. A case in point for the developing countries is the financial crisis that hit the East Asian region in 1997. Whilst, the yet unresolved sub-prime crisis that surfaced some time last year in the United States illustrates that even for a developed nation, a sound and credible banking system is also vital. On 18th March 2008, news of a fire-sale of Bears Stearns Cos Inc stunned Wall Street and pummeled global financial stocks.

The East Asian financial crisis (EAFC) of mid 1997 also highlighted the link between financial liberalization and instability of the banking sector. All the five countries (Thailand, Korea, Malaysia, Indonesia and the Philippines) had deregulated their banking systems some time before the onslaught of that banking debacle. The toll of the crisis was enormous as it persisted and spread to the real sector. On average, the economies of these affected countries shrank 7.7%, with many millions of people sustaining livelihood losses (Yellen, 2007).

In fact, Malaysia has so far been through two banking crises. The first crisis occurred in the mid 1980's and the second one being the 1997 EAFC. The crisis of 1980s was short lived compared to that of 1997. The latter was not just more drawn out but more severe as well. The ringgit (Malaysian currency) depreciated by nearly 50%, while the stock market contracted by more than 60%. This had a bearing on the real sector of the economy with significant numbers of people being retrenched.

Though it has been a decade since the EAFC and there exist a vast number of papers on this topic, there is still room for country studies, such as this related to Malaysia. Empirical studies on the impact of financial liberalization on the country's economy are scarce. A study of this nature would aid in understanding of what contributed to the severity of the

1997 crisis. This in turn would contribute to a better understanding of factors that are vital for the stability of the banking sector, and thus to avoid a recurrence of the crisis.

This paper aims to contribute to the literature on the link between financial liberalization and the instability of the banking sector by mobilizing macroeconomic data in conjunction with the logistic regression technique to assess the contribution of financial liberalization to the banking crisis of 1997.

The rest of the paper is organized as follows. In the next section, the financial liberalization process in Malaysia is described while Section 3 provides a brief survey of the literature. The empirical framework adopted is explained in Section 4. Section 5 presents and discusses the empirical results. The paper concludes with remarks in Section 6.

II. BANKING INSTITUTIONS AND FINANCIAL LIBERALIZATION IN MALAYSIA

The financial system in Malaysia consists of the central bank, i.e. Bank Negara Malaysia, banking institutions and other financial institutions as shown in Table 1. The banking system is the largest component, accounting for about 70 per cent of the total assets of the Malaysian financial system (Bank Negara Malaysia, 1999). The banking institutions are traditionally the largest mobilizers of deposits. Recent statistics show that they still are: in 2005, for example, the banking institutions mobilized around 83% of the total deposits of the financial system and held about 67% of the financial system's total assets.

The 1997 Asian financial crisis revealed the structural weakness of the Malaysian financial system. Strong loan growth between 1994 – 1997, which averaged about 25% per annum, had led to the high loan exposure of the banking system. In addition the underdeveloped bond market also resulted in the banking system providing a significant portion of the private sector financing, thereby increasing the concentration of risk in the banking sector. The crisis also exposed the vulnerability of the finance companies, whose business was mainly hire purchase financing and consumption credit. Thus the industry became highly vulnerable amidst rising interest rates and a slowdown in the economic activity. Hence a merger program for the finance companies was initiated in January 1998 to consolidate and rationalize the industry. In 1999, the domestic banks were given the flexibility to form their own merger groups and to choose their own group leaders to lead the merger process. By 2001, the domestic banking sector was subsequently merged into 10 banking groups.

Financial liberalization was introduced in Malaysia on October 1978. According to Awang (1994), the freeing of interest rates was a conscious policy measure by Bank Negara Malaysia (BNM) to promote a more liberal and competitive financial system. With this move, the commercial banks were free to set interest rates for deposits of 12 months and less, as well as the prime lending rates. However on several occasions, the deregulation process had to be put on hold or reversed when the economy faced adverse shocks. For example, the protracted global economic recession in the early 1980's affected the Malaysian economy adversely. Market determination of interest rates was suspended during the tight liquidity period from 1985 to January 1987.

Hence, effective October 21, 1985, all banks were required to tie their respective deposit rates (for deposits of up to 12 months maturity) to not more than 0.5 percentage points of the rates offered by the two leading domestic banks. This arrangement was dismantled in February 1987. However, in September 1987, BNM re-imposed controls on the interest

rates yet again. This time the restriction applied to the base lending rate (BLR). Commercial banks' BLR were required to be no more than 0.5 percentage points above the BLR of the two leading banks. The margin by which lending rates can exceed the BLR was limited to four percentage points. This arrangement remained in force until February1, 1991 when the BLR was freed from the administrative control of the central bank, Bank Negara Malaysia.

From Feb 1 1991 onwards, each commercial bank could set its own BLR according to its own cost of funds. Except for interest rates on lending to certain but limited priority sectors, all other interest rates were market determined. Commercial banks were allowed to declare their own BLR subject to a ceiling rate calculated in reference to their own cost of funds, including the cost of maintaining statutory reserves, meeting liquid asset requirements, staff and overhead costs, but excluding the cost of provisions for bad and doubtful debts.

Table 1
The Malaysian Financial System

Financial Institutions	*Financial Markets*
Banking System	Money & Foreign Exchange Markets
• Bank Negara Malaysia	• Money market
• Banking institutions	• Foreign exchange market
- Commercial banks (including Islamic Banks)	Capital market
- Finance companies	• Equity market
- Merchant banks	• Bond market
• Others	- Public debt securities
- Discount houses	- Private debt securities
- Representative office of Foreign banks	Derivative markets
- Offshore banks in Labuan	• Commodity Futures
	• KLSE CI Futures
Non-Bank Financial Intermediaries (NBFI)	• KLIBOR Futures
• Provident and pension funds	
• Insurance companies (including Takaful)	Offshore market
• Development finance institutions	• Labuan International Offshore Financial Centre
• Saving institutions	
- National savings bank	
- Co-operative societies	
• Other NBFI	
- Unit trusts	
- Pilgrims fund board	
- Housing credit institutions	
- Cagamas Bhd.	
- Credit guarantee corp.	
- Leasing companies	
- Factoring	
- Venture capital	

Source: Bank Negara Malaysia, The Central Bank and the Financial System in Malaysia, A Decade of Change, 1999

This BLR framework was intended to create a new interest rate regime whereby both deposit and lending rates would be determined by market forces besides being more responsive to liquidity conditions. This move was aimed at fostering greater flexibility for banks to pursue their own lending strategies. This framework was further liberalized in 1995. With effect form November 1995, each banking institution is free to quote its own BLR at any level subject to an industry ceiling rate determined in relation to the three-month inter-bank weighted average rate of each month.

III. FINANCIAL LIBERALIZATION AND BANKING SECTOR VULNERABILITY

As noted earlier, Malaysia has been through two banking crises. The first crisis occurred in the mid 1980's and the second one being the Asian financial crisis which hit the region in mid 1997. This means that both these crises took place after Malaysia embraced financial liberalization. It would be relevant to mention here that though financial liberalization started in 1978 however, it was only in Feb 1991 that interest rates were fully liberalized. Owing to data constraints and requirements of the model[1] used, quarterly data from 1990 until 2005 is used here to assess the contribution of financial liberalization to the Malaysian banking crisis in 1997.

More than two decades ago, Diaz-Alejandro (1985) warned against the dangers associated with financial liberalization. Specifically removing financial repression could invite a major crisis in the financial system. More recently, the link between financial liberalization and financial fragility seem to have been a topic of considerable discussion. This can be attributed to the recent episodes of financial turmoil in Asia, Argentina, Brazil, Russia and Mexico. A review of some of the relevant literature is furnished here.

Blundell-Wignell and Browne (1991) pointed out that liberalized financial markets have been associated with certain undesirable outcomes that may offset the benefits of financial liberalization. Amongst them include increased use of credit to purchase assets and finance consumption, asset price inflation and volatility, and financial fragility. Similar undesirable consequences were noted by Agrawal (1992), namely, that financial liberalization often leads to the prices of shares and real estate first rising sharply, inducing many people to invest or speculate in these markets with some funds borrowed from banks at very high real interest rates. The prices would later decline, making many people who had earlier borrowed at high real interest rates insolvent. This leaves the banks with a large portfolio of non-performing loans which eventually causes their insolvency.

Demirguc-Kunt and Detragiache (1998) and also Cole and Slade (1998) stressed that financial liberalization is a contributing factor to the banking crises that had occurred. Demirguc-Kunt and Detragiache explored empirically the relationship between banking crises and financial liberalization in 53 countries (including Malaysia) during 1980 – 1995 and found that banking crisis is more likely to occur in liberalized financial systems. Using a multivariate logit framework, they tested whether banking crises are likely to occur in liberalized financial systems when other factors that may raise the probability of a crisis are controlled for. The results derived showed a number of factors including adverse macroeconomic developments, bad economic policies and vulnerability to balance of payments crises as being the other potential explanatory variables. When these factors are controlled for, financial liberalization independently exerts a significantly negative impact on the stability of the banking system. However, Cole and Slade differ in opinion regarding

the role of macroeconomic developments in the crisis. They noted that when the financial crisis occurred in Latin America in the 1980s and then in Mexico in the 1990s, bad macroeconomic policies were named as the culprit. However, they also noted that the Asian countries had generally been following reasonably good policies in addition to liberalizing their financial systems. Given this seeming ambiguity, they strongly believe that these crises should provoke a searching re-examination of the risks inherent in the pursuit of liberalization and globalization strategies.

Subsequently Glick and Hutchison (1999) and Zhuang (2002) also tested empirically the link between financial liberalization and bank instability. The factors considered in these studies included both bank specific and macroeconomic variables. The ratio of M2 to foreign exchange reserves, total bank loans divided by the country's GDP and the current account balance have been found to affect bank stability.

Akyuz (2004) stressed that in developing countries, domestic financial cycles are often associated with sharp swings in external capital flows and exchange rates. Further, the great susceptibility of domestic financial condition in developing countries to currency instability is due primarily to the existence of large stocks of public and private debt denominated in foreign currencies. In his opinion, this is the main reason why currency crises in emerging markets could spill over to domestic financial markets, not bad macroeconomic policies He felt that the large majority of the countries in East Asia have track records of sustainable development and macroeconomic discipline.

IV. A LOGISTIC REGRESSION MODEL OF THE BANKING SECTOR CRISIS

The logistic model can be expressed as follows:

$$P(Y_i = 1) = \frac{1}{1+e^{-z}}, \quad i = 1,\ldots, N \tag{1}$$

where $Z = b_0 + b_1X_1 + b_2X_2 + \ldots + b_MX_M$

P = the probability that the observed value Y takes the value 1

N = the number of observations

X = the explanatory variables

M = the number of explanatory variables

Y = the dependent variable ; Y =1 for bank crisis period and Y = 0 for non crisis period.

It is a cumulative logistic distribution function with P representing the probability of a bank crisis which can be estimated. Logistic regression is appropriate when the dependent variable is grouped into discrete states.

The explanatory variables include the financial liberalization variable and other control variables. Like most studies on financial liberalization, the removal of interest rate controls is considered the centerpiece of financial liberalization. For Malaysia, it is only on February 1, 1991 that the BLR (base lending rate) was freed from the administrative control of the central bank.

In this study the control variables that capture the characteristics of the banking system namely, the ratio of M2 to foreign exchange reserves (an indicator of vulnerability to sudden capital outflows), lending rate and domestic credit growth are included.

The ratio of M2 to foreign exchange reserves is a measure of the country's ability to withstand the pressure of substituting foreign currency for domestic currency by investors. A rise in the M2/ Foreign Reserves ratio implies a decline in the foreign currency backing of the short-term domestic currency liabilities of the banking system. Hence this would make the banking system vulnerable to sudden capital outflows. This was found to be a significant factor in Demirguc and Detragiache (1998) and Zhuang (2002).

Lending-deposit rate spreads were used by both Chenard and Fischer (1997) and Zhuang (2002) as an indicator of distress and problems in the banking sector. Chenard opines that after financial liberalization, banks are free to set the rates charged on borrowing. Hence, banks could be motivated to profit from the new found freedom of setting interest rates, as long as interest gains are larger than the loss from the increased risk. The same has been expressed by Akyuz (1993). In essence, this means that unregulated financial markets could lead to higher interest rates and greater risk- taking. Hence, both the lending-deposit spread and the lending rate are used here in the analysis.

High rates of credit expansion have notably been prevalent in many of the countries that have liberalized their financial systems. Such rates of credit expansion may create an asset price bubble that when it bursts, could trigger a banking crisis. Thus credit growth is also included in this study as one of the independent variables.

Table 2
Logistic Regression Results (for All Models)

Model / *Predictors*	*1*	*2*	*3*	*4*	*5*	*6*
Constant	-13.59**	-14.97**	-38.00**	-16.06**	-37.90**	-14.56**
	[5.21]	[4.99]	[16.72]	[5.37]	[15.70]	[5.44]
Fin. Lib.	3.23**	3.71**	5.31**	3.59**	5.34**	3.52**
	[1.56]	[1.66]	[2.50]	[1.65]	[2.47]	[1.64]
Rgdpgrow			0.36	0.04	0.33	0.06
			[0.29]	[0.05]	[0.25]	[0.06]
Dcgrow	-0.12					-0.19
	[0.22]					[0.23]
Lagdcgro		0.02	-0.22			
		[0.17]	[0.31]			
M2tofor	1.05***	1.14***	1.50**	1.23**	1.58***	1.13***
	[0.41]	[0.39]	[0.71]	[0.43]	[0.724]	[0.43]
Lend			2.34**		2.17**	
			[1.15]		[1.00]	
Significance of model	0.000	0.000	0.000	0.000	0.000	0.000
Hosmer & Lemeshow	0.734	0.716	0.644	0.705	0.424	0.905
Nagelkerke. R^2	0.548	0.557	0.828	0.555	0.815	0.570
Predictive Efficiency	90.6	90.4	98.1	92.5	98.4	92.5

Notes: (i) values in parentheses are the standard errors of the regression coefficients
(ii) Model is statistically significant if $p \leq 0.05$.
(iii) Hosmer & Lemeshow gives the goodness of fit index, a good fit is indicated by a high p-value ($p \geq 0.05$)
(iv) Nagelkerke R^2 provides a logistic analogy to the R^2 in OLS regression
(v) * Indicates significance level of 0.10
** Indicates significance level of 0.05
*** Indicates significance level of 0.01

Apart from these variables, the rate of real GDP growth as a macroeconomic variable is also included, given that adverse shifts in the macroeconomic condition of a country could weaken its financial sector.

All the quarterly data needed are sourced from the International Monetary Fund's International Financial Statistics and Bank Negara Malaysia's Quarterly Economic and Monthly Statistical Bulletins.

V. ESTIMATION RESULTS

Various combinations of the control variables are used and the results (using SPSS) are summarized in Table 2 for the function mentioned in the preceding section. Three of the predictor variables; financial liberalization (Fin. Lib), ratio of M2 to foreign exchange reserves (M2tofor) and bank lending rate (Lend) are statistically significant. Whilst, both credit growth (Dcgrow) and its lag (Lagdcgrow) and real GDP growth (Rgdpgrow) are not.

Based on the criteria of goodness of fit and predictive efficiency of the model and statistical significance of individual predictor variables given by Menard (2001), Model 5 can be considered the most appropriate to address the banking crisis hypothesis of this study. Hence the following two tables furnish the results of further analysis made on Model 5.

An odds ratio (the exp (B) value in the last column of Table 3) that is greater than 1 indicates that the odds of experiencing a banking crisis increases when the independent variable concerned increases, while an odds ratio that is smaller than 1, indicates that the odds of experiencing a banking crisis decreases when the independent variable increases.

The odds ratio for the financial liberalization variable is 208. This implies that when all the other variables are held constant, the liberalization of the banking sector increases the odds of a banking crisis occurring. Specifically, with financial liberalization the banking sector is 208 times more likely to encounter a banking crisis. The other two variables, namely ratio of M2 to foreign exchange reserves (M2tofor) and lending rates of the commercial banks (Lend) could also raise albeit to a much smaller extent the odds of a banking crisis happening, as they rise. The odds ratio of the lending rate is 8.7. This implies that with a one unit increase in the lending rate, the banking sector is 9 times more likely to encounter a banking crisis.

Table 3
Logistic Regression Coefficients for Model 5

	B	*S.E*	*Wald*	*Df*	*Sig.*	*Exp (B)*
Fin. Lib.	5.34	2.50	4.52	1	0.033**	208.26
M2tofor	1.58	0.72	4.43	1	0.030**	4.85
Lend	2.20	1.00	4.69	1	0.030**	8.73
Rgdpgrow	0.33	0.25	1.84	1	0.180	1.39
Constant	-38.00	15.70	5.85	1	0.016**	0.0000

Notes: (i) B = the logistic regression coefficient
(ii) S.E. = standard error of the coefficient
(iii) Wald = Wald statistic to test the significance of the individual coefficient
iv) df = degree of freedom
v) sig. = the p-value for the Wald statistic
vi) Exp(B) = the odds ratio of the independent variable
vii) ** Indicates significance level of 0.05

The classification table (Table 4) shown above suggest that this model could predict the outcome (banking crisis) very well. The percentage of the non-occurrence of the crisis correctly predicted is 100 per cent, while the percentage of occurrence of the crisis correctly predicted is 87.5 per cent. This gives an overall success rate of 98.4 per cent.

Table 4
Classification Table for Prediction of Banking Crisis

Observed		*Predicted*		
		Crisis		*Percentage Correct*
		0	1	
Crisis	0	54	0	100.0
	1	1	7	87.5
Overall percentage				98.4

The impact of financial liberalization on crisis probability is illustrated by substituting the data values into the empirical models estimated. Column 3 of Table 5 shows the probability obtained by substituting the data for the third quarter of 1997 into the respective models. Other models beside Model 5 are used in the calculation of the probability of a banking crisis occurring, to illustrate that the magnitude of the impact of financial liberalization on banking crisis is very great, regardless of which model is picked as the "best" model. From the table below, it is quite evident that liberalization of the banking sector had a great impact on the probability of a banking crisis. When the financial liberalization variable is present (Fin.Lib = 1), the probability of a banking crisis ranges from 0.81 to 0.99 (as shown in column 3 of Table 5). Compared to the scenario where the effect of financial liberalization is left out (Fin. Lib = 0), the probability of a crisis is only from 0.12 to 0.27.

The logistic regression analysis conducted here shows that banking crises are more likely to occur in a liberalized environment when other factors (macroeconomic and bank specific factors) that may increase the probability of a crisis are controlled for. The other factors, beside financial liberalization that contribute significantly to a banking crisis are the M2 to foreign exchange reserves ratio variable and the banks' lending rates.

Table 5
Impact of Financial liberalization on Crisis Probability

Model	*Crisis Date*	*Prob. of bank crisisat crisis date (Fin.Lib=1)*	*Prob. of bank crisis hadthe country notliberalized at the crisisdate (Fin. Lib = 0)*
1	Q3 1997	0.81	0.14
2	Q3 1997	0.93	0.25
3	Q3 1997	0.97	0.12
4	Q3 1997	0.93	0.26
5	Q3 1997	0.99	0.27
6	Q3 1997	0.82	0.12

VI. CONCLUSIONS

The impact of financial liberalization on the vulnerability of Malaysian banks has been assessed based upon logistic regression analysis. The results reveal that financial

liberalization could independently exert a negative influence on the stability of the banking sector when other factors (macroeconomic and bank specific factors) are controlled for. Besides financial liberalization, the factors that could contribute significantly to a banking sector crisis are the M2 to foreign exchange reserves ratio and the banks' lending rates.

Hence, the results generally suggest that apart from financial liberalization, the banking crisis also has a lot to do with the banking sector's performance though not much with the country's macroeconomic condition. This is plausibly due to the adoption of financial liberalization without adequate financial regulation. In a liberalized environment, banks may be tempted to take excessive risks in their lending activities at higher interest rates in the absence of adequate monitoring. This brings up yet again the topic of prudential regulation. Supervision of banking institutions is just as important if not more than for non-financial public listed firms. Regulating agencies set up should ensure that financial institutions are transparent in their operations. Increased transparency would encourage these institutions to be more prudent in their activities. The importance of this cannot be overemphasized as they constitute the payments mechanism and the repository of financial resources of the country.

Notes

1. A logistic regression model requires that the dependent variable be sufficiently represented in both the 0 and 1 values, hence to get more of " 1" s; quarterly data is used. For Malaysia, quarterly data is available only from 1990 onwards.

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