Master of Science (Banking)

UUM-IBBM

WBB 6013: SEMINAR IN BANKING

Financial Crisis: Credit Risks and Macroeconomics Dynamics

By

Pondoss Balakumar A/L P. Navamoney (Matric No: 89305)

_____

Abstract

This paper explores the relationship between credit risk and selected macroeconomic dynamics in the Malaysian Banking Sector for the period 1995 – 2007. Secondary macroeconomic data were evaluated using Statistical regression to explain the relationship. The results show that there is no significant relationship between the credit risk and macroeconomic dynamics studied in the Malaysian Banking. sector. Nonetheless, the study reaffirms the earlier research findings that the robust loan growth during periods of strong GDP are sometimes followed by increasing default rate, holds true in Malaysian Banking Sector.

Table of contents

1. INTRODUCTION

The financial crisis of the late 1990's better known as Asian Financial Crisis and current Global Financial Crisis prompted the search for indicator of Financial System Soundness.

1.1 Asian Financial Crisis (AFC)

More than half a decade has passed since the onslaught in 1997 Asian Financial Crisis, yet its devastating impacts on currency, stock market, income growth, employment and all walks of life are still felt in many countries. This AFC came fast without due warning and spared no one on its path. Within a 6-month period after it first started in Thailand, the contagion effect swiftly spread across all the emerging market economies of Asia.

1.2 Definition -Credit Risk

The risk that a borrower will be unable to make payment of interest or principal in a timely manner.

1.3 Development in Banking Sector

In the late 1990's, discussions concerning the design of the new international bank capital accord, usually known as Basel II, generated a renewed interest in credit risk modeling.

The new capital accord (Basel Committee on Banking Supervision 2004)[1] proposes the use of credit risk models to determine banks capital requirements. Banks can use internal (or external) rating models to classify borrowers according to their risk.

Under the new regulatory set up, it becomes crucial to accurately measure credit risk. On the one hand, bank must hold enough capital to limit risk for depositors and to reduce

---

[1] Basel Committee on Banking Supervision, 2004. International convergence of capital measurement and capital standards: A revised framework. BIS report, June 2004.

insolvency risks. On the other hand, holding excessive capital is costly and limits efficiency.

1.4 Definition: Macroeconomic

Analysis of a nation's economy as a whole, examining aggregate data, such as inflation, industrial production, price levels, and unemployment. Contrast with *microeconomics,* the analysis of business sectors and industry groups.

2. RESEARCH

2.1 Research Objective

Discussions resulting from the implementation of Basel II make clear that credit risk varies over time and, most notably, it varies with over all macro economic conditions. It is interesting to understand if credit risk measured by default (Non performing loan) is driven by macroeconomic developments.

The main objective of the paper is to look at the credit risk using the macroeconomic variables to arrive at default correlation between credit risk and macroeconomic variables. The second objective is to discuss the implications of the results on Banking sector.

Malaysian Financial Institutions can than utilize the results to formulate appropriate strategies to predict the probability and timing of default and make critical decision including their lending and pricing directions.

2.2 Theoretical Framework

The recent surge in credit risk modeling to some extend is attributed to the importance associated to the development and implementation of Basel II.

A brief overview of some of the most important contribution in this field may be found in Crouhy et al (2000)[2], in Gordy (2000)[3] or more recently, in Saunders & Allen (2002)[4] or Duffie and Singleton (2003)[5]

In order to simplify the description of these recent models, we can try to group them according to their required inputs. We can identify three different groups of models, using these criteria:

(I)   Models which rely mostly on accounting variables

(II)   Models which are mostly market information

(III)   Models which are mostly on Macroeconomic variables or which consider default correlation issues.

The theoretical framework of this paper is based on the third set of credit risk models; those which use macroeconomic variables or consider default correlation issues.

Discussions resulting from the implementation of Basel II made clear that credit risk varies over time , and, most notably, it varies with overall macroeconomic conditions. The main idea is that most risk is built up during upturns, when banks apply looser credit standards. However, most of the risk materializes only when the economy hits a downturn.

Macroeconomic and financial series include information on national accounts, inflation, labor market data, loans, loan loss provisions, interest rates and stock market

---

[2] Crouhy, M., Galai, D., Mark, R., 2000. A comparative analysis of current credit risk models. Journal of Banking and Finance 24, 59–117.
[3] Gordy, M., 2000. A comparative anatomy of credit risk models. Journal of Banking and Finance 24, 119–149.
[4] Saunders, A., Allen, L., 2002. Credit Risk Measurement: New Approaches to Value at Risk and Other Paradigms. John Wiley & Sons, New York.
[5] Duffie, D., Singleton, K., 2003. Credit Risk: Pricing, Measurement and Management, Princeton University Press.

prices. All time series, studies in the past mostly considered at a quarterly frequency, were detrended using the Hodrick–Prescott filter.

In this study, in order to better understand some of the links between credit risk and macroeconomic developments at an aggregate level, a correlation analysis and a statistical regression analysis framework are used .

Macroeconomic variables studied are : :

    i)   Gross Domestic Product (GDP)

    ii)   Inflation

    iii)   Base Lending Rate

    iv)   Loan Growth.

2.3 Literature Review

Some authors, such as Pederzali & Torricelli (2005)[6], Jinenez & Sauring (2006)[7], Kent & D'Arcy (2001) or Borio et al (2001) argue that high default rates during recession are just a materialization of the risk that is built up during expansion. Most notably when strong economic growth is accompanied by the creation of unsustainable financial imbalances.

Wilson (1998)[8], who developed Credit Portfolio view (McKinsey's credit risk model) was one of the first authors to emphasized the role macroeconomics variables could have in explaining credit default, using a multi-factor model of systematic default risk.

---

[6] Pederzali & Torricelli (2005) Capital requirement and business cycle regimes; Forward looking modeling of default probabilities. Journal of Banking and Finance 29,3121-3140
[7] Jinenez & Sauring (2006) Collateral, type of lender and relationship banking as determinants of credit risk. Journal of Banking and Finance 28, 2191–2212
[8] Wilson,T (1998) Portfolio credit Risk, Federal Reserve Board of New York Economic Policy review.

Caprio & Klingebiel,, Gonzalez-Hermasillo, Pazarbasioglu & Billings (1997)[9] Demirtuc-Kunt & Detragiache (1998)[10], Eichengreen & Rose (1998), Hardy & Pazarbasioglu (1998)[11] & Kaminsky (1998)[12] focus on the role of macroeconomics variable inn explaining specific episodes in banking crisis. Conversely, a number of studies investigating the causes of the 1997-1998 Asian Financial Crisis, notably Radelet and Sachs (1998), Chang & Velasco (1998) focus on the adverse consequence for macroeconomic stabilization of a weak financial sector.

More recently, Cihak & Schaek (2005) in corporate Financial Soundness Indicators (FSI) in an early warning model of banking crisis to access what, if any, role FSI may play in predicting banking crisis. They conclude that on their own, FSI have limited use as early warning indicators.

Initial efforts were aimed at identifying a broad set of macro prudential indicators comprising prudential indicators, macroeconomic variable associated with financial system vulnerably and market based indicators to support periodic financial system. Along these lines, a parsimonious useful set financial soundness indicators (FSI) were identified by the IMF (International Monetary Fund) (Sundararajan et al (2002)[13].

Due to their wide range, FSIs are able to capture a range of factors that may pose risks to the financial system as a whole. (Sundararajan et al (2002)[14].

---

[9] Caprio, Jr. G. and D. Klingebiel, 2003, "Episodes of Systemic and Borderline Financial Crises," (Washington: World Bank), mimeo

[10] Demirguc-Kunt, A., and E. Detragiache, 1998a, "The Determinants of Banking Crises in Developing and Developed Countries," Staff Papers, International Monetary Fund, Vol. 45, No. 1, pp. 81-109.

[11] Hardy, D. and C. Pazarbaşioğlu, 1998, "Leading Indicators of Banking Crises: Was Asia Different?" IMF Working Paper 98/91, (Washington: International Monetary Fund).

[12] Kaminsky, G., 1998, "Currency and Banking Crises: The Early Warnings of Distress," International Finance Discussion Paper No. 629, (Washington: Board of Governors of the Federal Reserve System).

[13] Sundararajan, V., C. Enoch, A. San José, P. Hilbers, R. Krueger, M. Moretti, and G. Slack, 2002, "Financial Soundness Indicators: Analytical Aspects and Country Practices." IMF Occasional Paper No. 212, (Washington: International Monetary Fund).

[14] Ibid.

Podipiera (2004)[15] implicitly studied, on country basis the effects of macroeconomic conditions on some Financial Soundness Indicator (FSI) namely non-performing loans and net interest margins but the study is primarily concerned with the effects of the quality of regulation and supervision (measures by compliance with the Basel II care principles) as banking sector performance (measured as asset quality and profitability).

A number of country-specific studies have investigated the determinants of specific FSI, for example asset quality and profitability and more recently capital adequacy in Hong Kong (Wong et al, 2005)[16] provisioning in OECD (Bikker and Metzemakers, 2002)[17], but the analysis in these studies relies on bank level panel data.

Another study has sought to analyze the relationship between macroeconomic variable and indicators of financial stability over a sample of countries and period of time including but not necessary limited to, episode of banking crisis.

This study is mainly focused on impact between macroeconomic variable and non performing loans on country basis, specifically Malaysia.

2.4 Problem Definitions

Banks and other Financial intermediaries try to maximize their profits by increasing their market share (seen from loan growth) as the economy grows (seen from GDP and inflation), minimizing loan loss (seen from NPL), implementing the risk-based pricing (seen from BLR). However, understanding the main determinants of credit risk is a major issue for Financial Institution.

---

[15] Podpiera, R., 2004, "Does Compliance with Basel Core Principles Bring Any Measurable Benefits?" IMF Working Paper 04/204, (Washington: International Monetary Fund).
[16] Wong, J., K. Choi, and T. Fong, 2005, "Determinants of the capital level of banks in Hong Kong." Hong Kong Monetary Authority Quarterly Bulletin.
[17] Bikker, J.A. and P.A.J. Metzemakers, 2002. "Bank provisioning behaviour and procyclicality", Bank of Netherlands Research Series Supervision no. 50.

A clearer understanding of credit risk driver associated with macroeconomics dynamics may help to predict the probability and timing of default which will enable to strategies their lending, marketing and pricing directions.

Against this background, it is interesting to understand if credit default risk is driven by macroeconomic developments.

Under this setup, the main purpose of this paper is to empirically examine the macroeconomic determinants of credit default risk in Malaysia for period 1995 to 2007 (13 years) which comprise the Asian Financial Crisis and current Global financial crisis as well as the inherent nature of the credit risk.

2.5 Research Model

The purpose of the study is to test empirically the influence of Macroeconomics variables – Real Gross Domestic Product (GDP) and Inflation on the credit risk which is measured as credit and interest which have become three months overdue or Non Performing Loan (NPL). Other factors influencing the credit default that are studied are the Base lending Rate (BLR) and the loan growth in the Banking Sector.

To better understand some of the links between credit risks and macroeconomics, a research model (Figure 1) is built between credit default and macroeconomics variables. This is can be further investigated by the eight hypotheses.

Null Hypotheses

H_0 : There is no significant relationship between GDP and NPL

H_1 : There is no significant relationship between Inflation and NPL

H_2: There is no significant relationship between Base Lending Rate and NPL

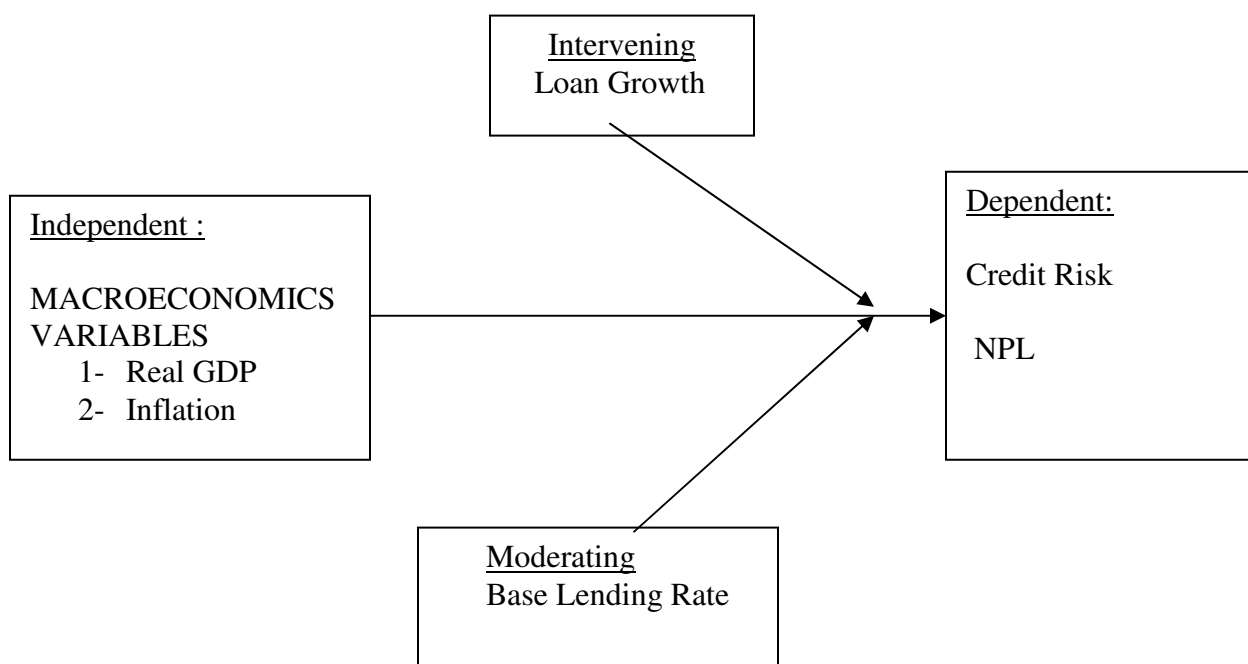H_3 : There is no significant relationship between Loan Growth and NPL

Alternative Hypotheses

H_4 NPL is positively correlated to GDP

H_5 :   NPL is positively correlated to Inflation

H_6 :   NPL is positively correlated to Base Lending Rate (BLR)

H_7:   NPL is positively correlated to Loan Growth

Figure 1 : : Research Model

2.6 Data and Methodology

In order to evaluate the relationship between credit risks and macroeconomics dynamics, we gathered set of secondary macroeconomics times series data adopted from the Bank Negara Annual report for 13 years period from 1995-2007 which covers period under the Asian Financial Crisis and the Current Global Crisis.

The data was restricted to credit extended by banking sector in Malaysia excluding Islamic Bank.

Credit risks is measured via non performing loans to total loans; it is calculated by taking the value of the NPL as the numerator and the total volume of the banking sector loan as the denominator.

Macroeconomics includes information on national basis on real gross domestic product, a standard measure of economic development. (GDP = consumption + investment + government spending + (exports – imports). This is a standard measure of economic development) and inflation (refers to composite price).

Base lending rate is averaged for the year and banking system loan growth is at year end. All time series are on annual basis.

To understand and test the hypotheses, multiple regressions are used. Statistically analyzed using SPSS. In addition one-way ANOVA analysis is performed to answer the slated hypotheses.

3. RESULTS

Table 1 : NPL and GDP
Since the probability (0.182) is more than 0.05, we accept the null hypothesis (H_0) that there is no significant relationship between the GDP and NPL.

Table 2 : NPL and Inflation
Since the probability (0.493) is more than 0.05, we accept the null hypothesis (H_1) that there is no significant relationship between the inflation and NPL.

Table 3 : NPL and Base Lending Rate

Since the probability (0.903) is more than 0.05, we accept the null hypothesis (H_2) that there is no significant relationship between the BLR and NPL.

Table 4 : NPL and Loan Growth

Since the probability (0.120) is more than 0.05, we accept the null hypothesis (H_3) that there is no significant relationship between the Loan Growth and NPL.

Table 5, 6 and 7 : Regression model

The relationship between the independent variables together and NPL , the value of R is 0.610 which suggest that there is a variance shared by the independent variables and dependent variables.

R Square of 0.373 indicates that the independent variable together explains only 37.3% of the variance in NPL (Banking Sector).

Table 7 : Regression Results

Table 7 shows the coefficient estimates of the macroeconomic variables' relationship with credit risks. The four macroeconomic variables do indicate interesting findings where three variables (GDP, Inflation and BLR) exhibits positive relationship whilst loan growth shows negative relationship. However, none are significant determinant of credit risk during the study period.

Chart 1 : P-P Plot Regression

The normal probability plot is a straight diagonal line, indicating that the analysis did not deviate from the normality line

Chart 2 : Scatter plot

From the scatter plot, we can see that the variables are wide spread and it indicates there is no clear relationship between the residuals and the predicted values.

4. DISCUSSION AND IMPLICATION OF RESULTS

Correlation

A correlation is useful when we want to see the relationship between two variables; express the degree that two variables change correspondingly.

From table 1 to 4, we see only NPL and inflation are positively correlated at 0.209 . When the interest increases, the cost of borrowings increases. This increase in the financial cost effects the net cash flow which ultimately diminishes the repayment capability and in the worse case culminate in Non Performing Loan.

The rest of the variables are negatively correlated. When we square the correlation, the number yields shows that NPL share 20% of its variability with loan growth and 15% with GDP; though both are not strongly correlated. The above results suggest that when the loan growth or GDP increases, the NPL decreases. Ample liquidity in the market, less stringent credit assessment by Financial Institution making credit easily available, strong earning capacity of borrowers (enhance repayment ability to meet financial commitment) thus resulting in drop in NPL.

Regression

Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.309	5.698		.405	.696
	REAL GDP %	.140	.354	.179	.395	.703
	INFLATION %	.999	1.170	.337	.854	.418
	BLR	.599	.768	.329	.780	.458
	LOAN GROWTH %	-.315	.193	-.850	-1.634	.141

a. Dependent Variable: NPL (BANKING SECTOR)%

The regression equation:

$$CR = \beta + \beta_1 GDP + \beta_2 INF + \beta_3 BLR + \beta_4 LGR + eit$$

$$CR = 2.309 + 0.140 GDP + 0.999 INF + 0.599 BLR - 0.315\ LGR + eit$$

The results suggest:

0.14 % increase in GDP results in 1% increase in credit

0.999 % increase in INF results in 1% increase in credit

0.599 % increase in BLR results in 1% increase in credit

0.315 % decrease in LGR results in 1% increase in credit

All the variables do not show significant relationship. Nonetheless, one interesting observation is that when the loan growth decreases the credit increases. This could be due to the sharper decrease in the total volume of the banking sector loan vis-à-vis the NPL which is on cumulative basis.

The graph, NPL vs. Independent variables, supports the negative relationship between the loan growth and NPL as seen for the period – 1995 to 1999 – shows strong loan growth until 1998 when the loan growth plummeted to 3.28 % (the lowest in the 13 years study) and the NPL was 13.6% (the highest in the 13 years study). The cause of such

drastic extremes is the Asian Financial Crisis. This affirms the early study by Pederzali & Torricelli (2005)[18] that high default rate during recession are just a materialization of the risk that is built during expansions. Jinenz & Sauring (2006)[19] findings that most risk is build up during upturns, when banks apply looser credit standards, only for the risk to materialize when the economy hits a downturn, further reaffirms the negative relationship between loan growth and NPL.

However, the period 2000 – 2002, interestingly shows the loan growth and the NPL moving in tandem. The banking system demonstrated greater resilience despite adverse economic conditions. Measures to accelerate corporate restructuring have improved the balance sheet of the corporate sector, contributing to greater resilience of the banking system. At 2001, the banks' risk-weighted capital ratio stood at 12.8%, well above the Basel Capital Accord requirement of 8%. Danamodal, the special purpose vehicle set up in 1998 to recapitalize viable banking institutions, received repayments amounting to RM2.3 billion in 2001 of the RM4.4 billion that was outstanding at the end of 2000. As at end-2001, the cumulative amount of NPLs restructured or approved for restructuring amounted to RM47.7 billion or 99.9% .

Since 2004 -2007, the NPL has been declining steadily and the loan has been growing at an average growth rate of 8%. Going by earlier findings by Pederzali & Torricelli (2005)[20] and Jinenz & Sauring (2006)[21], are the credit risk which exist at the birth of a credit are building-up to materialize by the new Global Economic Crisis which is triggered by increasing sub prime loans, easy availability of consumer loans, innovative packages, loan interest (graduated interest / multi-tiered rates), all of which are prevalent in the Malaysian Banking sector? Or is the Government with its various packages and

---

[18] Pederzali & Torricelli (2005) Capital requirement and business cycle regimes; Forward looking modeling of default probabilities. Journal of Banking and Finance 29,3121-3140
[19] Jinenez & Sauring (2006) Collateral, type of lender and relationship banking as determinants of credit risk. Journal of Banking and Finance 28, 2191–2212.
[20] ibid 18.
[21] Ibid 19.

initiatives able to manage given its past experience able to thwart the repeat of another financial crisis in Malaysia?

5. CONCLUSION

The hypotheses testing reveals that the variables do not significantly support the alternative hypothesis.

The result obtained shows that there are no significant relationship between credit risk represented by NPL and the four macroeconomic development variable namely GDP, Inflation, BLR and Loan Growth for the Banking sector in Malaysia. The results obtained do not allow us to conclude that macroeconomic dynamics have an important contribution in explaining credit default.

Nonetheless, it is interesting to note that macroeconomic variables researched are positive though it is not significant. Loan Growth and GDP appears to have the most positive impact on the NPL vis-à-vis the BLR and Inflation.

The chart on the NPL vs. Independent variables reaffirms the earlier research findings that robust loan growth during periods of strong GDP, are sometimes followed by an increasing default rate. Credit risk is built up during periods of strong credit growth materializing only when the economy hits a downturn.

Result is not representative of the whole credit risk phenomenon due to several limitations namely :

   i)   Small sample size
   ii) The results maybe due to time specifics example due to Government intervention especially during the financial crisis.
   iii) No treatment of the raw data used.

Further research can be conducted in the study of the relationship between credit risk and macroeconomic developments to see :

      i)   If in the periods of economic growth there may be some tendency towards excessive risk-taking as a consequence of management direction.

      ii)   If the credit risk are formed during period of strong loan growth and only surface upon triggered by a crisis. What could be the possible trigger factors?

It is recommended that future research on credit risk and link with macroeconomics incorporate the lag effect as even as the credit risk starts with the birth of a credit, default is normally not immediate.

REFERENCES

Basel Committee on Banking Supervision, 2004. International convergence of capital measurement and capital standards: A revised framework. BIS report, June 2004.

Bikker, J.A. and P.A.J. Metzemakers, 2002. "Bank provisioning behaviour and procyclicality", Bank of Netherlands Research Series Supervision no. 50.

Caprio, Jr. G. and D. Klingebiel, 2003, "Episodes of Systemic and Borderline Financial Crises," (Washington: World Bank), mimeo.

Crouhy, M., Galai, D., Mark, R., 2000. A comparative analysis of current credit risk models. Journal of Banking and Finance 24, 59–117.

Demirguc-Kunt, A., and E. Detragiache, 1998a, "The Determinants of Banking Crises in Developing and Developed Countries," Staff Papers, International Monetary Fund, Vol. 45, No. 1, pp. 81-109.

Duffie, D., Singleton, K., 2003. Credit Risk: Pricing, Measurement and Management. Princeton University Press.

Gordy, M., 2000. A comparative anatomy of credit risk models. Journal of Banking and Finance 24, 119–149.

Hardy, D. and C. Pazarbaşioğlu, 1998, "Leading Indicators of Banking Crises: Was Asia Different?" IMF Working Paper 98/91, (Washington: International Monetary Fund).

Kaminsky, G., 1998, "Currency and Banking Crises: The Early Warnings of Distress," International Finance Discussion Paper No. 629, (Washington: Board of Governors of the Federal Reserve System)

Podpiera, R., 2004, "Does Compliance with Basel Core Principles Bring Any Measurable Benefits?" IMF Working Paper 04/204, (Washington: International Monetary Fund).

Saunders, A., Allen, L., 2002. Credit Risk Measurement: New Approaches to Value at Risk and Other Paradigms. John Wiley & Sons, New York.

Sundararajan, V., C. Enoch, A. San José, P. Hilbers, R. Krueger, M. Moretti, and G. Slack, 2002, "Financial Soundness Indicators: Analytical Aspects and Country Practices." IMF Occasional Paper No. 212, (Washington: International Monetary Fund).

Wilson, T., 1998. Portfolio credit risk. Federal Reserve Board of New York Economic Policy Review, October 1998.

Wong, J., K. Choi, and T. Fong, 2005, "Determinants of the capital level of banks in Hong Kong." Hong Kong Monetary Authority Quarterly Bulletin

Correlations

Table 1

Correlations

		NPL (BANKING SECTOR)%	REAL GDP %
NPL (BANKING SECTOR)%	Pearson Correlation	1	-.395
	Sig. (2-tailed)		.182
	N	13	13
REAL GDP %	Pearson Correlation	-.395	1
	Sig. (2-tailed)	.182	
	N	13	13

Table 2

Correlations

		NPL (BANKING SECTOR)%	INFLATION %
NPL (BANKING SECTOR)%	Pearson Correlation	1	.209
	Sig. (2-tailed)		.493
	N	13	13
INFLATION %	Pearson Correlation	.209	1
	Sig. (2-tailed)	.493	
	N	13	13

Correlations

Table 3

Correlations

		NPL (BANKING SECTOR)%	BLR
NPL (BANKING SECTOR)%	Pearson Correlation	1	-.037
	Sig. (2-tailed)		.903
	N	13	13
BLR	Pearson Correlation	-.037	1
	Sig. (2-tailed)	.903	
	N	13	13

Correlations

Table 4

Correlations

		NPL (BANKING SECTOR)%	LOAN GROWTH %
NPL (BANKING SECTOR)%	Pearson Correlation	1	-.453
	Sig. (2-tailed)		.120
	N	13	13
LOAN GROWTH %	Pearson Correlation	-.453	1
	Sig. (2-tailed)	.120	
	N	13	13

Regression

Table 5

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	LOAN GROWTH %, INFLATION %, BLR, REAL GDP %[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: NPL (BANKING SECTOR)%

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.610[a]	.373	.059	3.4673	.373	1.188	4	8	.386

a. Predictors: (Constant), LOAN GROWTH %, INFLATION %, BLR, REAL GDP %

b. Dependent Variable: NPL (BANKING SECTOR)%

Table 6

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	57.122	4	14.281	1.188	.386^a
	Residual	96.175	8	12.022		
	Total	153.297	12			

a. Predictors: (Constant), LOAN GROWTH %, INFLATION %, BLR, REAL GDP %

b. Dependent Variable: NPL (BANKING SECTOR)%

Table 7

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.309	5.698		.405	.696
	REAL GDP %	.140	.354	.179	.395	.703
	INFLATION %	.999	1.170	.337	.854	.418
	BLR	.599	.768	.329	.780	.458
	LOAN GROWTH %	-.315	.193	-.850	-1.634	.141

a. Dependent Variable: NPL (BANKING SECTOR)%

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.557	11.231	6.885	2.1818	13
Residual	-4.8522	3.0944	.0000	2.8310	13
Std. Predicted Value	-1.984	1.992	.000	1.000	13
Std. Residual	-1.399	.892	.000	.816	13

a. Dependent Variable: NPL (BANKING SECTOR)%

Charts

Chart 1 : P-P Plot Regression

Normal P-P Plot of Regression Standardized Residual
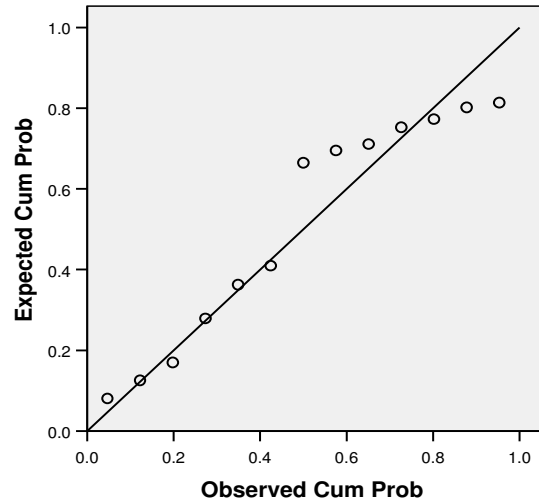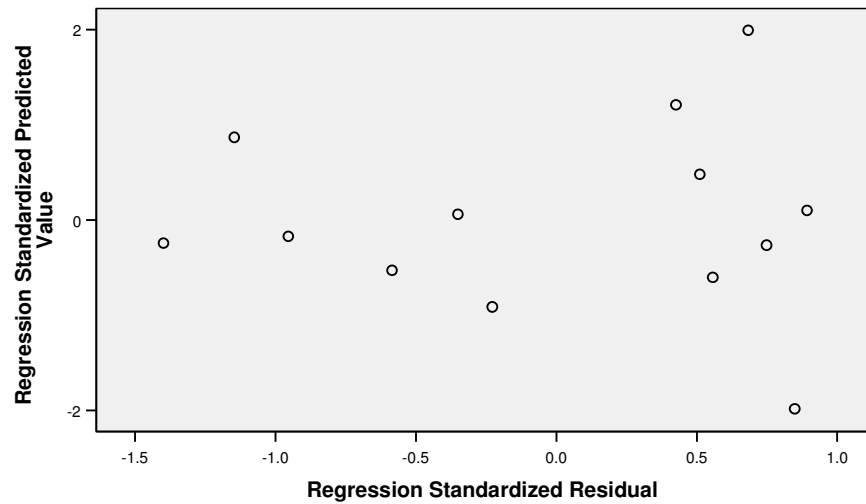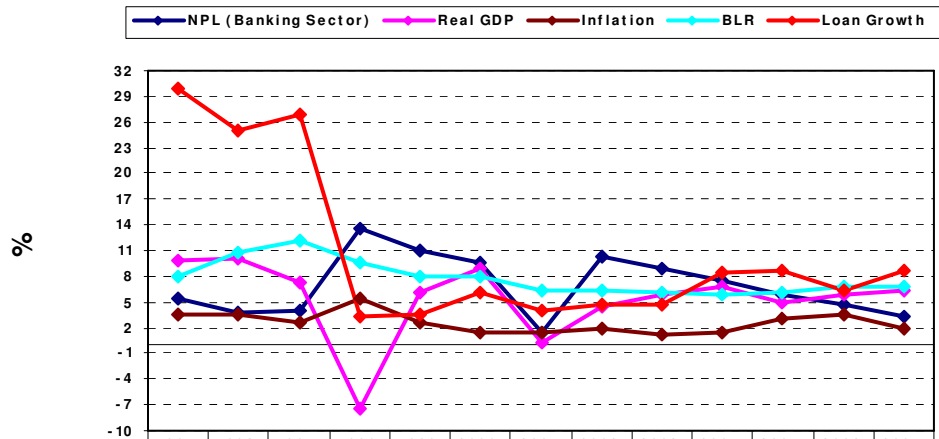
Dependent Variable: NPL (BANKING SECTOR)%

Chart 2 : Scatter plot

Scatterplot

Dependent Variable: NPL (BANKING SECTOR)%

NPL vs Independent Variables

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
NPL (Banking Sector)	5.5	3.7	4.1	13.6	11	9.7	1.5	10.2	8.9	7.5	5.8	4.8	3.2
Real GDP	9.83	10	7.32	-7.4	6.1	8.9	0.3	4.4	5.8	6.8	5	5.9	6.3
Inflation	3.5	3.5	2.7	5.3	2.7	1.5	1.4	1.8	1.1	1.4	3	3.6	2
BLR	8.03	10.66	12.22	9.5	7.95	7.95	6.39	6.39	6	5.98	6.2	6.72	6.72
Loan Growth	30	25	26.9	3.28	3.5	6	3.9	4.6	4.8	8.5	8.6	6.3	8.6

Year