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Determining the Short-Run and Long-Run Effects of Macroeconomics and Banking Variables on the Volume of Non-performing Loan of Banks Accepted by Tehran Stock Exchange (2007- 2017)

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Abstract

Due to the importance of non-performing loan banking in the health of the banking system and the role of banks in financing the country's enterprises in this study was tried to use the study of Abid et al. (2014) in which the effect of economic and banking variables on non-performing loan banking of Tunisia has been studied, To evaluate the effect of macroeconomic variables (GDP, Government dept, exchange rate, and liquidity) and banking (bank size, moral hazard, and bad management) on the volume of non-preforming loans bankings, accepted banks in Tehran stock exchange during the period 1396-1386 to be paid. In this study, the two-step Generalized Method of Moments (GMM) and panel data have been used. Finally, the accuracy of the results was checked by Sargan tests and serial autocorrelation. The statistical population of the study is the banks accepted by tehran stock exchange (Saderat, Mellat, Tejarat, Sina, Sarmayeh, Saman, Parsian, Pasargad, Hekmat Iranian, Ansar, Eghtesad Novin, Dey, Khavaremianeh, Ayandeh, Gardeshgary, Shahr, Karafarin, Post Bank and Tosee Etebari). Macroeconomic variables such as liquidity, government debt and exchange rates have a significant effect on the volume of non-performing loan. The relationship between liquidity and government debt variables and the volume of non-performing loan is positive. The relationship between the exchange rate and the volume of non-performing loan was reported in most negative coefficients. Also, banking variables such as bank size have a negative relationship with the volume of non-performing loan and the relationship between bad management and the volume of non-performing loan is positive.

Keywords: Non-performing loan, Banking variables, Macroeconomic variable, Stock exchange.

JEL Classification: E44, G21

1. Introduction

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The banking system, along with the capital market, can play an important role in accelerating a country's economic growth. In recent years, due to the lack of development of the capital market in the country, the banking network has played a greater role. Non-performing loans create uncertainty and affect the willingness and ability of banks to maintain lending power. So it ultimately affects aggregate demand and investment. On the other hand, non-performing loans have many social and economic consequences because they reduce production (Guarda, Rouabah & Vardanyan, 2012). Blocking a large part of banks 'monetary resources, reducing the number of non-performing loans and increasing the receivables collection period, reducing the ability to provide services to customers and increasing the bank's credit risk and increasing banks' operating costs are among the effects of increasing non-performing loans. Shows overdue bank receivables. On the other hand, in the current situation of the country's banks, the volume of non-performing loans to credits is very high, and this doubles the importance of this issue.

2. Background

Lending performance is strongly related to the economic cycle (Beck, Jakubik & Piloiu, 2013). According to studies, non-performing loans can take the bank out of its intermediary role in the real economy and become an obstacle to economic growth (Yang, 2017). Among the macroeconomic theories that point to the close relationship and cycle of influence of different parts of the economic system, the financial accelerator theory examines the relationship non-performing loans and economic stability (Bernanke et al., 1999; Saurina & Jiménez, 2005).

Factors affecting the formation and development of these non-performing loans can be divided into two categories. In fact, non-performing loans are affected by external (economic) and internal (banking) factors (Scardovi, 2015).

3. Research Methodology

To investigate the factors affecting the volume of non-performing loans, the basic model is specified as (1):

$$\Delta NPL_{it} = \alpha\Delta NPL_{it-1} + \sum_{j=1}^{2}\alpha_{1j}\Delta GDP_{t-j} + \sum_{j=1}^{2}\alpha_{2j}\Delta M_{t-j} + \sum_{j=1}^{2}\alpha_{3j}\Delta EX_{t-j} + \sum_{j=1}^{2}\alpha_{4j}\Delta Dept_{t-j} + \sum_{j=1}^{2}\alpha_{4j}\Delta X_{t-j} + \delta_i + \varepsilon_{it} \quad (1)$$

In the above equation, ΔNPL_{it} is a dependent variable and represents changes in the volume of non-performing loans of banks. non-performing loans here include all facilities that are more than 6 months and less than 18 months old (Abid et al., 2014).

ΔGDP: GDP changes

$\Delta Dept$: changes in public sector debt

ΔM: Liquidity volume changes

ΔEX: exchange rate changes

Variable X indicates banking factors. In this study, each of the banking agents enters the model with three interruptions. On the other hand, the results in four models, in the first model there are only economic variables and, in each model, a banking variable is placed next to the economic variables. long-run coefficients are calculated as (2):

$$\alpha_4 = \sum_{j=1}^{3} \alpha_{4j} \ /(1-\alpha) \qquad (2)$$

4. Research results and discussion

The results of the four models are given in Table 1:

Table 1: Results of estimating equations

The explanatory variables	Model 1	Model 2	Model 3	Model 4
	Coefficients	Coefficients	Coefficients	Coefficients
ΔNPL_{t-1}	0.54 (0.06)	0.61 (0.093)	0.68 (0.136)	0.51 (0.15)
$\Delta DEPT_{t-1}$	0.0003 (0.0035)	0.0085 (0.0077)	0.0007 (0.0047)	0.0016 (0.005)
$\Delta DEPT_{t-2}$	0.001 (0.0028)	0.0063 (0.0051)	0.0014 (0.004)	0.0025 (0.0037)
ΔM_{t-1}	2.04 (4.46)	10.27 (8.1866)	2.2321 (6.23)	4.49 (5.93)
ΔM_{t-2}	3.2 (2.8)	-4.5928 (7.67)	2.39 (3.717)	5.62 (4.77)
ΔEX_{t-1}	-238.84 (218/09)	-611.13 (358.87)	-297.90 (333.88)	-521.34 (499.88)
ΔEX_{t-2}	19.14 (82.37)	-92.73 (217.58)	-100.04 (293.006)	70.77 (303.1)
ΔGDP_{t-1}	-1.355 (3.63)	5.49 (7.52)	0.2819 (5.77)	-1.49 (5.07)
ΔGDP_{t-2}	-0.97 (2.22)	2.4001 (3.72)	-0.51 (3.58)	-1.04 (3.28)
ΔROA_{t-1}		1298224 (2547675)		
ΔROA_{t-2}		3033304 (3361105)		
ΔROA_{t-3}		1893428 (2221502)		
ΔSR_{t-1}			-0.44 (0.31)	
ΔSR_{t-2}			-1.07 (2.59)	
ΔSR_{t-3}			-0.7 (2.13)	
$\Delta SIZE_{t-1}$				-8.23 (18.33)
$\Delta SIZE_{t-2}$				7.2 (6.52)
$\Delta SIZE_{t-3}$				-18.49 (11.3)

Source: Research Findings

According to the results obtained in Model 1, the effect of changes in the volume of non-performing loans with one lag, changes in public sector debt and changes in liquidity on changes in the volume of non-performing loans is positive. No correct judgment can be made about the effect of exchange rate changes on changes in non-performing loans. The effect of changes in GDP on changes in non-performing loans is negative.

In Model 2, changes in non-performing loans with one lag, changes in public sector debt, changes in liquidity, GDP and changes in bad management have a positive effect on changes in non-performing loans in the current period. Exchange rate fluctuations show a decreasing effect on changes in non-performing loans. The effect of bad management changes on changes in non-performing loans is positive and very large.

In Model 3, changes in non-performing loans with one lag, changes in public sector debt, changes in liquidity, GDP have a positive effect on changes in non-performing loans in the current period. The effect of exchange rate changes on changes in non-performing loans is negative. The effect of changes in moral hazard on changes in non-performing loans is negative with one and two lags, and positive with three lags.

In Model 4, changes in non-performing loans with one lag, public sector debt and liquidity have a positive effect on changes in non-performing loans. The effect of exchange rate changes with one lag is negative on changes in non-performing loans and the second lag has a positive effect on changes in non-performing loans. The effect of GDP and changes in bank size on changes in non-performing loans is negative. The results of Sargan test and serial autocorrelation test for the four models studied in this study show that all variables are significant for all four models.

The results of estimating the long-term coefficients of the model are shown in Table 2:

Table 2: Results of estimating long-term coefficients of the model

The explanatory variables	Model 1	Model 2	Model 3	Model 4
	Coefficients	Coefficients	Coefficients	Coefficients
ΔDEPT	0.0033 (0.0003)	0.03 (0.009)	0.0068 (0.0029)	0.0086 (0.32)
ΔM	11.71 (1.13)	14.6 (3.49)	2.55 (6.44)	20.66 (782.97)
ΔEX	-473.138 (45.86)	-1809.09 (423.009)	14.8 (554.74)	-920.39 (34872.56)
ΔGDP	-5.1 (0.49)	20.28 (4.85)	-1273.91 (1.11)	-5.18 (196.57)
ΔROA		15999516.8 (3829490)		
ΔSR			-8.31 (3.62)	
ΔSIZE				-39.89 (5.17)

Source: Research Findings

According to the results, the effect of changes in public sector debt, changes in liquidity on changes and changes in bad management in non-performing loans is positive in all models. The effect of exchange rate changes on changes in non-performing loans in three models 1, 2 and 4 is negative. The effect of changes in GDP on changes in non-performing loans is negative in models 1, 3 and 4 and positive in model 2. The effect of changes in moral hazard and changes in bank size on changes in non-performing loans is negative.

5. Conclusion

According to the results, the effect of macroeconomic variables such as liquidity, public sector debt and exchange rate in both short-term and long-term periods on the non-performing loans of banks listed on the Tehran Stock Exchange is significant. Stability in the economic environment and economic activities is one of the most important reasons for the stability of the banking system. For this reason, it is recommended that economic policymakers aim to stabilize the foreign exchange market and control the growth of liquidity and reduce public sector debt. Among the banking variables, bad management and moral hazard are more effective, both of which are directly and indirectly related to bank managers. Therefore, it is recommended to develop the necessary tools to monitor the performance of managers by implementing the plan and forecasting.

References:

Abid, L., Ouertani, M. N., Zouari-Ghorbel, S. (2014). Macroeconomic and bank-specific determinants of household's non-performing loans in Tunisia: A dynamic panel data. *Procedia Economics and Finance*, 13, 58-68.

Beck, R., Jakubik, P., & Piloiu, A. (2013). Non-performing loans: What matters in addition to the economic cycle?.

Bernanke, B. S., Gertler, M., Gilchrist, S. (1999). The financial accelerator in a quantitative business cycle framework. *Handbook of macroeconomics*, 1, 1341-1393.

Guarda, P., Rouabah, A., Vardanyan, M. (2013). Identifying bank outputs and inputs with a directional technology distance function. *Journal of Productivity Analysis*, 40(2), 185-195.

Makri, V., Tsagkanos, A., Bellas, A. (2014). Determinants of non-performing loans: The case of Eurozone. *Panoeconomicus*, 61(2), 193-206.

Rajan, R., Dhal, S. C. (2003). Non-performing loans and terms of credit of public sector banks in India: An empirical assessment. *Reserve Bank of India Occasional Papers*, 24(3), 81-121.

Saurina, G. Jiménez, G., (2006). Credit cycles, credit risk, and prudential regulation. *Documentos de trabajo del Banco de España*, 3, 9- 34.

Scardovi, C. (2015). Holistic active management of non-performing loans. *Springer*.

Yang, C. C. (2017). Reduction of non-performing loans in the banking industry: an application of data envelopment analysis. *Journal of Business Economics and Management*, 18(5), 833-851.