

The Impact of Financial Liberalization on the Performance of Algerian Public Banks

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Abstract

This study aims to investigate the impact of financial liberalization on the performance of Algerian public banks. In order to achieve this goal, a quantitative analysis has been conducted for a panel data sample covering five public banks over the period (1997-2012). The model of this study includes the determinants of performance. This latter is estimated by using return on assets (ROA), return on equity (ROE), and net interest margin (NIM). Besides, the financial liberalization measures used are: the size of intermediation which is measured by both the ratio of M2 to GDP and CP to GDP, Real interest rate, and bank concentration. The study shows evidence that the size of intermediation impacts positively on the performance of Algerian public banks. It shows equally that bank concentration impacts positively on the banks' performance. In contrast, it shows that real interest rates do not impact on the performance of Algerian public banks.

Keywords: financial liberalization, banks' performance, public banks, panel data, Algeria.

الملخص

يتمثل هدف هذه الدراسة في استقصاء أثر التحرير المالي على أداء البنوك العمومية في الجزائر. وقصد بلوغ هذا الهدف، تم إجراء تحليل كمي لعينة مُشكّلة من معطيات بابل لخمس بنوك عمومية خلال الفترة 1997-2012. وقد تضمن نموذج الدراسة محددات الأداء التي تتمثل أساساً في متغيرات خصائص البنوك ومتغيرات اقتصادية كلية.

وقد تمّ التعبير عن أداء البنوك بثلاث مؤشرات هي: العائد على الأصول، العائد على حقوق الملكية وصافي هامش الفائدة. كما تمّ التعبير عن التحرير المالي أيضا بثلاث مؤشرات هي: حجم الوساطة، معدلات الفائدة الحقيقية والتمركز البنكي. انتهت الدراسة إلى وجود أثر ايجابي لكل من حجم الوساطة والتمركز البنكي على أداء البنوك العمومية الجزائرية وعدم وجود أي أثر لمعدلات الفائدة الحقيقية على هذا الأخير.

الكلمات المفتاحية: التحرير المالي، أداء البنوك العمومية، معطيات بانل، الجزائر.

1- Introduction

Following the recommendations of the authors of financial repression school, several countries undertook programs of financial liberalization. This recent wave of financial liberalization started in the mid-1980s, with rising cross border financial flows among industrial economies and between industrial and developing economies. This was spurred by liberalization of capitals in many of these countries.

The opening of financial services and the structural reforms of domestic financial sector are two interwoven processes: both aim at developing an efficient and competitive financial system to facilitate economic growth. The degree of financial integration has risen significantly in the 1990s when Algeria, like many other developing countries, made a significant progress in building a modern financial sector.

Algeria has embarked on economic and financial reforms in recognition that economic growth and stability are often associated with increasing financial deepening and adapting to rapid globalization. For the most part, the financial and monetary authorities have implemented financial sector liberalization programs. The Law on Money and Credit of 1990

was the first step to be taken by the Algerian government to adopt programs of financial liberalization. These programs have included deregulatory interest rates liberalization and the gradual opening up of the financial sector for foreign participation, increasing competition and reduction of credit control. Therefore, from these important reforms, the importance of this study is derived. The research project analyses the implications of liberalization of financial services on the performance of Algerian public banks. This entails determining the main components and measures of financial liberalization and how they affect these banks.

2- Literature Review

In theory, financial liberalization improves bank efficiency (Berger et al., 1997). Shaw (1973) stresses that financial liberalization can strengthen financial intermediaries among savers and investors, increase investment efficiency, and reduce the cost of borrowing. Increased savings allow banks to attain economy of scale, which in turn allows banks to diversify their portfolios, reduce their costs, and improve their operational efficiency.

Deepening allows real money and physical investment to be the determinants of total savings. Growth in real money, which increases as a result of price deflation or deposit rate, induces the real income. Shaw concluded that "variations in nominal money that do not affect real deposit rate are neutral, to be sure, and the rate of inflation does not matter if nominal deposit rate is adapted to it" (Shaw, 1973, 38).

Levine (1996), Walter et al. (1983), and Gelb et al. (1990) studied the potential benefits of foreign bank entry for the domestic economy in terms of better resource allocation and higher efficiency. Levine (1996) found that foreign banks may improve the quality and availability of financial services in the domestic financial market by increasing bank competition, and enabling the application of more modern banking skills and technology, serve to stimulate the development of the underlying bank supervisory and legal framework, and enhance a country's access to international capital.

The same benefits of the presence of foreign banks are shown in Claessens et al. (2001). But on the other hand there are, also, the costs and risks associated to the entry of foreign banks, costs that can consist of the increase of the systemic risk caused by the increase of competition and of the inclination towards risk of the banks in order to maintain or increase their market share (Hellmann et al., 2000).

Bonin et al. (1996) claim that banking efficiency has five determinants. First, competition between banks results in low interest rates on deposits and loans. Second, banks offer a variety of financial instruments and develop new products. Third, the financial market in which banks operate is stable and liquid. Fourth, the payment system is well developed and financial resources are allocated adequately. Fifth, financial transaction costs are low. They also point out that an efficient market-oriented banking sector requires the government to withhold direct control over banks' operations and participate only in developing financial markets.

McKinnon (1993) notes that abolishing usury constraints encourages moneylenders to extend their credit and hence promotes competition in the traditional credit market. Loans need to be available for all classes of borrowers and the expected rate of return on deposits should be increased to reduce money supply in the market. Historically, competition tends to reduce instability in the banking industry and lower market risk helps banks make better lending decisions. Schuler (1992) argues that interest rates on deposits and loans are similar in both market-oriented and centralized banking systems, but that free-market economies oblige banks to promote their services, to offer innovative financial products, and to open new branches. The result is a decline in financial transaction costs and an increase in the volume of investments (Dowd, 1992). Schuler notes that removing restrictions on banks makes their activities more sophisticated. "Invisible hand process can result in a sophisticated banking system as the product of step-by-step evolution whose origin stretch all the way back to barter"

(Schuler, 1992). However, small banks cannot survive in the new market if their capital is low. They may need to consolidate to become competitive and to benefit from economies of scale.

Empirically, few studies evaluate the direct impact of financial deregulation on bank performance in different developing countries. However, their empirical findings are largely controversial; some researchers - such as Denetriades et al. (2001), Papp (2002), Sathye (2008), Ayden et al. (2009), Marius et al. (2011), Fadzlan et al. (2012) and Acheampong (2013) argue that financial liberalization has a positive effect on the performance and efficiency of banks.

Other authors consider that deregulation has a negative impact on productivity of banks like Cook et al. (2000), Denizet et al. (2000), Yu et al. (2001), Wu et al. (2007), Fethi et al. (2009), Staub et al. (2009). In contrast, others found no effect of financial liberalization on banking performance such as Joumady (2000).

3- Data and Methodology

In this study, we use an empirical model in order to assess how the financial liberalization measures affect the performance of the Algerian public banks. For this purpose, the following independent variable is included: banking system liberalization measures. The dependent variable is the performance of the public banks. The performance is based on the following three variables: return on assets (ROA), return on equity (ROE), and net interest margin (NIM).

Our sample is a balanced panel data set. This latter comprises five Algerian public banks* for which the same variables were collected annually for sixteen years (1997-2012). Thus, this pooled data contains a total of eighty (5×16) observations. The study uses quantitative analysis; applying random panel data regression. In order to examine the long-term relationship between the variables of bank performance and financial liberalization, VAR model was used, in addition to Wald and Granger causality tests.

* These banks are : BADR, CPA, BEA, BNA, and BDL (at national level).

Data are analyzed referring to statistical regression analysis using Eviews 08 version.

3-1 Model specification

The relationship between financial liberalization and performance is examined applying a basic model, using banks' performance as depending variable. Besides, this model includes independent variables which are bank specific variables, macroeconomic variables, and financial liberalization measures. This relationship is defined by the following equation:

$$BP_{it} = \alpha_0 + \beta_1 BS_{it} + \beta_2 M_{it} + \beta_3 FL_{it} + \varepsilon_{it} \dots\dots\dots(5)$$

The explanation of the above variables is as follows:

- BP_{it} : bank performance indicators (ROA, and NIM),
- BS_{it} : bank specific variables (CA, CR, BL, and BS),
- M_{it} : macroeconomic variables (GDP growth, INF, RL, and PS),
- FL_{it} : financial liberalization variables (measures) (M2/GDP, CP/GDP, RIR, and BC)
- i : bank,
- t : year,
- ε_{it} : error term,
- α_0 is intercept coefficient, and β is the regression coefficient.

3-2 Variables and Indicators Used in the Study

In order to investigate the effect of financial liberalization on the performance of public Algerian banks and its determinants, dependent and independent variables are included:

A. The dependent Variables

The dependent variable in this study is mainly profitability. Theoretically and empirically, researchers have employed different measures of profitability to determine the factors affecting banks' performance. For this study, bank profitability is proxied by return on assets (ROA), considered as the key proxy for bank profitability, and net interest margin (NIM) is also used in this study as a measure of performance; while (ROA) measures the profit earned on assets and reflects how well bank management uses the bank's real investment

resources, the (NIM) focuses on the profit earned on lending, investing and funding activities.

B- The Independent Variables

Prior literature on bank profitability explains profitability through internal and external variables, where Short (1979) and Bourke (1989) provide the first studies on bank profitability. Internal, or bank specific factors, are under the control of bank management. External variables trace the effect of the macroeconomic environment on bank performance.

There are common factors influencing profitability identified by several researchers. These determinants, which will be taken into consideration in our study, subdivide into three main sub-categories: bank-specific (internal variables), macroeconomic determinants (external variables), and financial liberalization measures.

B-1 Bank Specific Independent Variables

- Capital Adequacy (CA): The ratio of equity to total assets is considered as one of the basic ratios for capital strength. It is expected that the higher this ratio, the lower the need for external funding and the higher the profitability of the bank.
- Credit Risk (CR): Credit is broadly defined as the risk of financial loss arising from borrowers' failure to honour their contractual obligation for banks; credit risk arises basically from lending activities. A proxy for credit risk that will be used is the proportion of provisions for loans losses over total loans. Theory suggests that increased exposure to credit risk is normally associated with decreased firm profitability. Hence, we expect a negative relationship between profitability and loan loss provision ratio.
- Bank Liquidity (BL): Liquidity implies how a bank can quickly convert its assets into cash at face value to satisfy its maturing liabilities (those of positions and borrowers) as they fall due even under adverse conditions. The ratio of net

loans to total assets is used in this study as a measure of liquidity.

- Bank Size (BS): In most finance literature, total assets of the banks are used as a proxy for bank size. Bank size is represented by natural logarithm of total assets. The effect of bank size on profitability is generally expected to be positive.

B-2 Macroeconomic independent Variables

- GDP Growth: Gross domestic production is the total market value of all final goods and services produced in a country in a given year where $\text{GDPt}_2 \text{ growth} = (\text{GDPt}_2 - \text{GDPt}_1)/\text{GDPt}_1$.
- Inflation rate: This measures the overall percentage increase in consumer -price index (CPI) for all goods and services. Inflation affects the real value of costs and revenues; it is measured by annual country inflation rate.

Besides, we use three governance indicators developed by Kaufmann et al. (2006) to proxy institutional differences which are:

- Rule of law (RL): Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.
- Political Stability and Absence of Violence/Terrorism (PS): Political Stability and Absence of Violence/Terrorism captures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.

B-3 Measuring financial liberalization (FL indicators)

Methodologically speaking, the study of financial liberalization should take into account the three following aspects, as mentioned earlier:

- ✓ Banking sector liberalization,
- ✓ Financial market liberalization, and
- ✓ Capital account liberalization.

These components are represented in some indicators that measure the level of financial liberalization in Algeria, our case study. Moreover, they measure the intensity of restrictions on the financial sector.

I. Banking Sector Liberalization Indicators

Economists disagree about the quantity and quality of bank activity indices. For instance, Goldsmith (1969) and McKinnon (1973) measures only the size of the financial system, uses only one index that is M_2/GDP and do not take into account effectiveness.

Several important studies use a single indicator to analyze the process of financial liberalization. In their study about the increase of the risk level of banks due to financial liberalization, Gruben et al. (1999) use privatization of banks as an indicator of financial liberalization. In several studies, financial liberalization is identified with capital mobility. Esen (2000) studies financial deepening in Turkey, and Haque et al. (1991) looks at capital mobility in developing countries.

Also many studies tend to use individual indicators to date the onset of financial liberalization. For instance, Demirgüç-Kunt and Detragiache (1998) use the deregulation of bank interest rates as an observable policy change to define the initiation of liberalization. Kaminsky and Reinhart (1999) also use this method in their study about banking crisis in order to date financial liberalization in their analysis.

According to Jbili et al. (1997), suitable measures of financial sector reform include: (1) the cost of capital (real interest rate), (2) the volume (size) of intermediation which is measured by both the ratio of M_2 to GDP, that is an indicator of the deposit mobilization role of the financial system, as well as

by the share of credit to the nongovernment sector in GDP (CP/GDP), and (3) the effectiveness of financial intermediation is proxied by both the ratios of reserve money to total deposits and of reserve money to quasi money.

For this study, M2/GDP, CP/GDP, and real interest rate (RIR) are used as proxy variables for banking sector liberalization measures. Besides, our study includes competitive and concentration indicator.

I.1. Size Indicators (the Volume of Intermediation)

a) M2/GDP ratio:

According to King and Levine (1993), “the traditional practice e.g. Goldsmith (1969) and McKinnon (1973) has been to use the size of the formal financial intermediary sector relative to economic activity to measure financial sector development or financial depth”. One measure of financial depth equals the ratio of liquid liabilities of the financial system to GDP. Liquid liabilities equal "M3" or line 551 from the international financial statistics, or when 551 are not available we use line 34 plus line 35, which equal "M2."^{*}

b) CP/GDP ratio:

King and Levine (1993) constructed a second financial development indicator that is designed to measure domestic asset distribution. A financial system that simply funnels credit to the government or state owned enterprises may not be evaluating managers; selecting investment projects, pooling risk, and providing financial services to the same degree as financial system that allocate credit to the private sector. Thus, they computed the ratio of private credit by commercial banks to GDP. CP/GDP ratio measures the financial activity of commercial banks and is an indicator of how the financial system is supporting economic activity (i.e. the private sector), it measures the ability of financial intermediaries to carry out their primary function.

^{*} Liquid liabilities consist of currency held outside the banking system plus demand and interest bearing liabilities of banks and nonbank financial intermediaries.

I.2. The Cost of Capital

The cost of capital is approximated by the real interest rate; in particular, a move from negative to positive real interest rates is indicative of progress in financial sector reform.

I. 3. Competitively and Concentration

Measures of concentration often have been used as indicators of competition.[^] Concentration is defined as the degree to which the financial sector is controlled by the biggest institutions in the market (as defined by market shares). For example, the three market bank concentration ratio measures the market share of the top three banks in the system, defined in terms of assets, deposits, or branches (World Bank, 2005).

II- Indicators for financial markets liberalization

Bekaert et al. (2000) and Lundblad (2001) developed *BHL index* to measure the effect of financial markets liberalization on growth. This index is a dummy variable that measures the level of financial markets openness for the foreign investors, where they develop different sets of equity market liberalization dates.

In the case of Algerian, evidence suggests that the stock market has not yet been liberalized. According to Benamraoui (2003), "Banks place a small amount of funds in the trading of shares on the Algiers Stock Exchange. Individuals are also unable to engage in equity market activities because of the scarcity of capital. Other barriers include a limited number of listed companies, underdeveloped telecommunication systems, and high country risk. Besides, foreign participation in the Algiers Stock Exchange (ASE) is still absent where foreign investors are prevented from taking part in the trading of shares on the ASE."

For these reasons, the indicator for financial markets liberalization could not be included in our model.

III- Indicators for capital account liberalization

[^] A more sophisticated measure of concentration is the *Herfindahl Index* (HI), which is the sum of squares of the market shares of all firms in a sector higher value of the index indicate greater market concentration.

To measure the level of capital account liberalization, *kaopen index* is used in this study. Kaopen is an index measuring a country's degree of capital account openness. The index was initially introduced in *Chinn and Ito* (2000). Kaopen is based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's annual report on exchange arrangements and exchange restrictions (AREAER).

Kaopen index contains a series for the period of 1970-2012 for 181 countries, it takes values ranging from approximately - 1.89 to 2.17. The more open is the country to cross-border capital transactions, the more this index takes on high values;

According to Chinn and Ito index 2012, the study excludes Kaopen index due to its steady state during the period of study (1997-2012). So, in this case using this index in the investigation of financial liberalization on banking system is meaningless.

4- Presentation and interpretation of empirical results

Using the econometric methods outlined earlier, this section is devoted for analysing the empirical results of the panel data study. The analysis is basically aimed at investigating the impact of financial liberalization on the performance of Algerian public banks.

4-1 Results of stationary tests

Before conduction of a panel data study, it is recommended to check first unit root tests in order to ascertain the stationarity of data series. In fact, a variety of procedures for the analysis of unit root in a panel context have been developed. Here we use both ADF (Dickey and Fuller, 1981) and PP (Philips and Person, 1988). The results of ADF and PP tests are shown in table 01.

Based on table (01) both ADF and PP tests suggest that all variables representing the five public banks are not stationary at level, except credit risk (CR) and GDP growth variables. Accordingly, first differences of the series are required for BL, BS, CA, INF, RL, PS, CP/GDP, M2/GDP, RIR, BC, NIM, and ROA variables. It is concluded that these variables are stationary

at first differences, thus “spurious regression” problem would not be encountered in any model formed in this study.

Besides, co-integration test is now possible since variables are stationary at the same level I (1), except those of CR and GDP.

4-2 Results of VAR, Wald and Granger causality test

The Hausman test result indicates that we should use random effect model to estimate panel data VAR of 1- ROA with CP, M2, RIR and BC for five banks as a group. 2- NIM with CP, M2, RIR and BC for five banks group. Besides, we implement the Wald and Granger causality tests.

According to table (02), Wald test indicates that joint causality does run from CP to ROA, as the test rejects the null hypothesis that there is no causality at 5% significance level, meaning that c (4): CP (-1) and c (5): CP (-2) are not equal to zero, which means that CP (-1) and CP (-2) jointly cause ROA. Wald test indicates also that joint causality does run from M2 to ROA, as the test accepts the null hypothesis that there is no causality at 5% significance level, meaning that c (4): M2(-1) and c (5): M2(-2) are equal to zero, which means that M2 (-1) and M2 (-2) jointly do not cause ROA.

VAR test shows, given to t-statistics, that CP (-1), ROA (-1) and ROA (-2) are positively associated with ROA. Besides, the model is significant given to F-statistic value (13.6). R^2 value equals to 0.56, which denotes that the independent variables explain 56% of the variation in the dependent variable (ROA).

On the other hand, causality Granger test, according to P values, indicates that M2 does not cause ROA, as well as ROA does not cause CP, and ROA does not cause CP, whereas CP causes ROA.

According to table (03), Wald test indicates that joint causality does run from CP to NIM, as the test accepts the null hypothesis that there is no causality at 5% significance level, meaning that c (4): CP (-1) and c (5): CP (-2) are not equal to zero, which means that CP (-1) and CP (-2) jointly do not cause NIM. Wald test indicates also that joint causality does run from M2 to NIM, as the test rejects the null hypothesis that there is no

causality at 5% significance level, meaning that c (4): M2(-1) and c (5): M2(-2) are not to zero, which means that M2 (-1) and M2 (-2) jointly cause NIM. VAR test shows, given to t-statistics, that only NIM (-1), M2 (-1) and M2 (-2) are positively associated with NIM. Besides, the model is significant given to F-statistic value (15.5). R^2 value equals to 0.59, which denotes that the independent variables explain 59% of the variation in the dependent variable (NIM). On the other hand, causality Granger test, according to P values, indicates that CP does not cause NIM, and NIM does not cause CP, whereas M2 causes NIM, but NIM does not cause M2.

According to table (04), Wald test indicates that joint causality does run from RIR to ROA, as the test accepts the null hypothesis that there is no causality at 5% significance level, meaning that c (4): RIR (-1) and c (5): RIR (-2) are equal to zero, which means that RIR (-1) and RIR (-2) jointly do not cause ROA. These results are also confirmed from VAR test, where t-statistics is less than 1.99, which means that RIR (-1) and RIR (-2) separately are not associated with ROA. The results indicate that only ROA (-1) and ROA (-2), given to t-statistics, are positively associated with the dependent variable ROA. Moreover, the model is significant given to F-statistics value (17.2). R^2 value equals to 0.51, which denotes that the independent variables explain 51% of the variation in the dependent variable (ROA). On the other hand, causality Granger test, according to P values, indicates that RIR does not cause ROA, whereas ROA causes RIR.

According to table (05), Wald test indicates that joint causality does run from RIR to NIM, as the test accepts the null hypothesis that there is no causality at 5% significance level, meaning that c (4): RIR (-1) and c (5): RIR (-2) are equal to zero, which means that RIR (-1) and RIR (-2) jointly do not cause NIM. These results are also confirmed from VAR test, where t-statistics is less than t-statistics table (1.99), which means that RIR (-1) and RIR (-2) separately are not associated with NIM. The results indicate that only NIM (-1), given to t-statistics, is positively associated with the dependent variable

NIM. Besides, the model is significant given to F-statistic value (17.2). R^2 value equals to 0.51, which denotes that the independent variables explain 51% of the variation in the dependent variable NIM. On the other hand, causality Granger test, according to P values indicate that RIR does not cause NIM, as well as NIM does not cause RIR.

According to table (06), Wald test indicates that joint causality does run from BC to ROA, as the test accepts the null hypothesis that there is no causality at 5% significance level, meaning that c (4):BC (-1) and c (5): BC (-2) are equal to zero, which means that BC (-1) and BC (-2) jointly do not cause ROA. These results are also confirmed from VAR test, where t-statistics is less than 1.99, which means that BC (-1) is not associated with ROA, as well as BC (-2). The results indicate that only ROA (-1) and ROA (-2), given to t-statistics, are positively associated with the dependent variable ROA. Besides, the model is significant given to F-statistic value (15.7). R^2 value equals to 0.49, which denotes that the independent variables explain 49% of the variation in the dependent variable (ROA). On the other hand, causality Granger test, according to P values, which are more than 5%, indicates that BC does not cause ROA, as well as ROA does not cause BC.

According to table (07), Wald test indicates that joint causality does run from BC to ROE, as the test rejects the null hypothesis that there is no causality at 5% significance level, meaning that c (4): BC (-1) and c (5): BC (-2) are not equal to zero, which means that BC (-1) and BC (-2) jointly cause NIM. VAR test indicates that BC (-1) is not associated with NIM, whereas BC (-2) is positively associated with NIM, given to t-statistics which are less than 1.99. The results indicate that only NIM (-1), given to t-statistics, is positively associated with the dependent variable NIM, and NIM (-1) as well as BC (-1) are associated with BC as a dependent variable. Moreover, the model is significant given to F-statistic value (22.1). R^2 value equals to 0.57, which denotes that the independent variables explain 57% of the variation in the dependent variable NIM. On the other hand, causality Granger test, according to P values

which are less than 5%, indicates that BC causes NIM, as well as NIM causes BC.

Conclusion:

In this study, we examine empirically the relationship between financial liberalization and the performance of Algerian public banks, taking into consideration the two measures of banking performance namely: return on assets (ROA), and net interest margin (NIM). For this purpose, an empirical model - specified in equations- is estimated using the random effects panel data approach. In order to examine the long-term relationship between the variables of bank performance and financial liberalization, the VAR model is used, in addition to Wald and Granger causality tests.

In light of the empirical results, we find three interesting causality relations for the five public banks as a group. They are summarized as follows:

- ✓ It is found that credit to private sector (CP) as a share to GDP impacts positively ROA (as a measure of banks performance). This indicates that the gradual withdrawal of the government from the banking sector as well as the removal of lending restrictions, both would improve the lending decisions of state owned banks and reduce their losses.
- ✓ It is found equally that M2 as a share to GDP impacts positively on NIM (as a measure of banks performance).
- ✓ It is found also that bank concentration (BC) ratio impacts positively on NIM (as a measure of banks performance). This indicates that there is a weak competition among the banks in the Algerian market, where the public banks still have the monopoly in financing state owned enterprises and government projects even after the financial liberalization.
- ✓ In contrast, it is found that real interest rates (RIR) do not impact on the banks' performance.

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Appendix:

Table (01): Results of panel unit root tests (significant at 5%)

Variable	Order	ADF		PP	
		Level	First difference	Level	First difference
BL	I (1)	12.1485	31.8677	6.47428	31.7193
BS	I (1)	0.63828	33.6490	0.56788	33.5965
CA	I (1)	6.92096	32.3548	7.74530	51.3820
CR	I (0)	29.9534	62.3584	28.7244	80.0342
GDP	I (0)	33.6156	94.7462	34.5609	95.6794
INF	I (1)	13.7232	30.4314	13.7232	52.2837
NIM	I (1)	12.8975	58.6596	12.7702	66.3152
PS	I (1)	7.81041	35.5246	6.55442	37.8751
RL	I (1)	4.83035	68.3702	114.487	92.1034
ROE	I (1)	8.84504	26.2943	33.1010	26.2943
ROA	I (1)	16.4217	79.4277	17.3421	93.9015
BC	I (1)	18.4958	57.0748	17.1541	57.5057
RIR	I (1)	7.44924	59.6201	78.0016	135.223

CP/GDP	I (1)	7.82285	24.5791	7.79042	24.7000
M2/GDP	I (1)	13.0798	41.4921	15.7243	43.5379

Source: E-views 8.0

Table (02): Granger causality test for S4

Vector Auto Regression								
Dep. Var.	constant	ROA(-1)	ROA(-2)	CP(-1)	CP(-2)	M2(-1)	M2(-2)	R ² F-sta
ROA	0.010980 [1.78443]	0.303509 [2.87691]	0.319393 [2.92463]	0.000992 [2.46542]	0.000131 [0.40341]	-0.000124 [-0.97273]	-0.00027 [-2.1222]	0.56 13.6
CP	7.03916 [3.7715]	-45.68368 [-1.42765]	-62.4703 [-1.8859]	0.922957 [7.56230]	0.249373 [2.53022]	0.137298 [3.55937]	-0.28788 [-7.2870]	0.90 96.0
M2	45.13792 [6.62908]	23.65376 [0.20262]	-150.082 [-1.2419]	1.544825 [3.4695]	0.266620 [0.74151]	0.285195 [2.02661]	-0.47443 [-3.2917]	0.66 20.4

1. Inside [] is t-statistic
2. The p-value is in the parenthesis ().
- 3.*denotes rejection of hull hypothesis at the 5% level of significance.
4. In Wald test, the null hypothesis is $c(4) = c(5) = 0$.

Table (03): Granger causality test for S6

Vector Auto Regression								
Dep. Var.	Constant	NIM(-1)	NIM(-2)	CP(-1)	CP(-2)	M2(-1)	M2(-2)	R ² F-sta
NIM	-3.29846 [-2.6539]	0.597920 [5.46002]	0.112454 [1.15991]	-0.05454 [-0.6903]	-0.122245 [-1.96402]	0.056597 [2.25099]	0.055875 [2.14924]	0.59 15.5
CP	5.69608 [2.8386]	0.055668 [0.31485]	-0.15187 [-0.97024]	0.899854 [7.05469]	0.155371 [1.54610]	0.145265 [3.57844]	-0.26704 [-6.3621]	0.89 85.0
M2	48.70077 [7.1899]	0.816966 [1.36886]	-1.15398 [-2.1840]	1.686763 [3.91752]	0.218148 [0.64309]	0.252938 [1.84587]	-0.52129 [-3.6792]	0.67 21.9

Table (04): Granger causality test for S7

Vector Auto Regression							Wald test
Dep. Var.	Constant	ROA(-1)	ROA(-2)	RIR(-1)	RIR(-2)	R2 F-stat	H0: P>5%
ROA	0.001884 [2.49142]	0.438316 [4.09010]	0.351361 [3.06495]	1.97E-05 [0.32842]	-4.79E-05 [-0.78194]	0.51 17.2	0.40229 (0.6704)
RIR	0.944810 [0.77630]	326.0906 [1.89034]	-449.0153 [-2.43325]	-0.284438 [-2.93871]	-0.360841 [-3.65717]	0.23 5.07	-----

Table (05): Granger causality test for S9

Vector Auto Regression							Wald test
Dep. Var.	constant	NIM(-1)	NIM(-2)	RIR(-1)	RIR(-2)	R ² F-stat	H0: P>5%
NIM	0.830294 [3.00404]	0.641722 [5.50414]	0.059775 [0.57936]	-0.004251 [-0.35426]	-0.004857 [-0.39929]	0.51 17.2	0.12961 2 (0.8787)
RIR	2.274765 [0.98502]	0.786776 [0.80766]	-1.34008 [-1.55444]	-0.258294 [-2.57602]	-0.369944 [-3.63993]	0.23 5.07	-----

Table (06): Granger causality test for S10

Vector Auto Regression							Wald test
Dep. Var.	Constant	ROA(-1)	ROA(-2)	BC(-1)	BC(-2)	R ² F-stat	H0: P>5%
ROA	0.003681 [0.48815]	0.429305 [4.03444]	0.339895 [2.97732]	-1.44E-06 [-1.57782]	1.19E-06 [1.36765]	0.49 15.7	1.53050 6 (0.2241)
BC	5695.967 [6.00710]	-4521.945 [-0.33799]	-17550.82 [-1.22275]	0.304225 [-1.57782]	-0.031464 [-0.28771]	0.18 3.71	-----

Table (07): Granger causality test for S12

Vector Auto Regression							Wald test
Dep. Var.	constant	NIM(-1)	NIM(-2)	BC(-1)	BC(-2)	R ² F-stat	H0: P>5%
NIM	4.458854 [3.35279]	0.618017 [5.71247]	0.102823 [1.04734]	-3.83E-05 [-0.22182]	0.000425 [2.62036]	0.57 22.1	5.06064 (0.0091)
BC	4552.710 [5.60202]	266.4786 [4.03066]	-172.7920 [-2.88013]	0.351638 [3.33105]	0.019764 [0.19922]	0.32 7.67	-----