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Shock Dating on Iranian Banking Network's Balance Sheet

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Abstract

The real macroeconomic instability and frequent changes in the monetary and banking regulations with financial contagion to the banks' financial statements in the banking network of Iran cause intensified instabilities in its financial behaviors. In this paper, using statistical analysis and three-dimensional charts, we have analyzed the behavior of the financial statements of consolidated balance sheets covering the banking network of Iran. The paper also uses a non-linear estimation to calculate the threshold value regarding financial statements such as the nonperforming loan ratio. Results indicate that the banking network financial statements must be restructured due to exogenous shocks. Also, in the recession periods of the year 2011 fourth period and 2012 first period, the recession has reached the banking network with lag and banks have been able to change the return on assets ratio regimes neither in the year 2011 nor in the beginning months of the year 2012. Furthermore, the banks have started a contracting policy in providing loans. As time passes, yields and the performing loans depict the fact that yields on assets as profit indicators are increased unless the interest earning and different periods of time changes are also augmented. Going beyond the critical threshold, generating loans will be likely to drive non-performing loans since these loans are not going to be reimbursed. Banks will have to extend their loans to new loan contracts to consider them as performing which will lead to identification of fake profits in their statements.

Key words: *Financial Statement restructuring, Nonlinear Estimation, Threshold value*

JEL Classification: *E21, G21, L2*

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1. Introduction

Macroeconomic instability in the real sector and the frequent changes in the supervisory regulations in the money and banking sector of the country are contagious to the financial statement of the Iranian banking network and lead to a strong and influential instability in the behavior of the Iranian banks' financial statements. Some of these changes which could be pointed out in the Iranian banks include the deep and continuous recession which has influenced the production sector of the economy. Henceforth, banks' assets, under the impact of deep recession, will confront delinquent debt increase and resource shortcomings. On the other hand, the exchange rate shock, sanctions in the foreign sector of the economy and the great embezzlements in several banks have led to sudden revenue fluctuations in the Iran banks' financial statements during recent years.

In the research we have carried out in this regard, we have attempted to find the answers to the following questions:

- Have the events occurred so far permeated from the real sector to the banking sector and since when has this contagion started? In other words, in this section we try to find a solution for dating the recession and boom in the banking network of the country.
- Article 28 of the budget rule in 2011 declares that in order to support production and employment, banks and financial institutions are allowed to extend and install their individual nonperforming loans once and up to 5 years and exclude from the deferred and delinquent loans.
- Do the laws like the one above result in an instability increase in banks' revenues?
- Do the sanctions result in changes in the off-balance sheet items?
- Regarding the occurred macroeconomic shocks, could equilibrium islands (different behavior) be confirmed in banks' financial statements?

Analyzing these changes is influential from two aspects: First, the consolidated balance sheet of the banking network is investigated and its fundamental changes are extracted. Second analysis is to monitor the banks' status individually or collectively. In this report we try to investigate structural

breaks (nonlinearity) of the Iranian banking network using monthly data (March 2007-September 2013) in the banking network's financial statements, specifically in the private banks.

Therefore, the algorithm which is technically considered for this objective is as follows:

- ✓ Determining some of the key financial ratios which seem to be strongly fluctuated by the investigated course of study
- ✓ Analyzing the movement trend and distribution function of these ratios and changes in important headlines if necessary
- ✓ Testing the structural break for the time series (The Hansen and Tsay Nonlinear test[1])
- ✓ Estimating the Nonlinear Threshold Autoregressive Models
- ✓ Datelining the Macroeconomic shock effect using the estimated model results
- ✓ Statistical 3-dimentioal analysis of the selected financial statements ratios

The rest of the paper is structured as follows: Section two reviews the literature on the impact of macro variable shocks on the banks' balance sheets; Section three briefly discusses empirical methodology and analytical discussion and the Last Section undermines the concluding remarks.

2. Literature Review

Extensive experimental and theoretical studies have been implemented on evaluating the factors affecting nonperforming loans and their assets portfolio. Much of this has been tried in the course of economic crisis as well. Generally,

1. According to the "Nonlinear Time Series Models", Tsay's approach centers on the use of an arranged auto regression with recursive least squares (RLS) estimation. Considering the SETAR model with zt = yt−d, since the threshold values ri are usually unknown, Tsay suggests to arrange the equations for t = max(d, p)+1, ··· , n, where n is the sample size, such that the equations are sorted according to the threshold variable yt−d which may take any value in Yd = (yh, ··· , yn−d) with h = max(1, p + 1 − d): yπi = Xπiφˆ + ˆσπi (18.6) where i = 1, 2, ··· , n0 , n0 = n − d − h + 1 is the effective sample size for the above arranged autoregression, and πi corresponds to the index in the original sample such that yπi−d is the i-th smallest value in Yd. For example, if y10 is the smallest value in Yd, then π1 = 10 + d; if y20 is the second smallest value in Yd, then π2 = 20 +d.

these researches can be divided into three groups: The first group has patronized-summarized linear models. The work done in this group include Arpa et al. (2001) for the Australian banks; Gerlach et al. (2005) have used Hong Kong banks' database in this regard. Quagliariello (2004) investigated this phenomenon as a case study in Italy. The second group has used Vector Autoregressive models in which the researches that have been done comprise of Baboucek and Jancar (2005) that have patronized the banking network's database of the Czech Republic as well as Hoggarth et al. (2005) and Heidari et al. (2012) who implemented a case study using the British banks data. The third group including Altman et al. (2002), Pesaran et al. (2006), Padilla and Segoviano (2006) studied the transmission mechanisms, focusing on default and losses from defaults. However, with respect to the work done, it can approximately be stated that among case studies of the countries around the world, Emerging Economies confront with shortages in this regard. Some of these reports can be the only IMF Global Financial Stability Report 2010 on the European emerging economies.

Researches done in this field can be mentioned as Heidari, Saberian and Nili (2011) and Heidari et al. (2012) that have used a dynamic simultaneous system of equations evaluating the effect of macroeconomic variables and other variables on the balance sheet of one of the Iranian banks, according to the Financial Soundness Indicators defined in the study as the ratio of short-term debt (with standard coefficients) to total debt ratio, total loans to total assets ratio and assets with high liquidity (including cash, bonds, receivables from the banking system, including the central bank and other banks) to total assets with relevant coefficients. Results showed that despite the low share of the bank in the banking industry of Iran, quite impressive macroeconomic conditions are influencing balance sheet components. In addition to some balance sheet exogenous variables such as the proportion of short and long term deposits to total deposits, some macroeconomic variables also affect the indices. The impact of added value of services and industry sectors, the consumer price index and housing price index have also been significant.

3. Empirical Methodology and Analytical Discussion

The real macroeconomic instability and frequent changes in the monetary and banking regulations with financial contagion to the banks' financial statements in the banking network of Iran cause intensified instabilities in their financial behaviors. Consolidated financial statements of the banks have been

graphically analyzed patronizing the database of 31 banks of the country in the course of 2006-13 in order to study the impact of macroeconomic shocks on the banking network of Iran. In this paper, by using statistical analysis and three-dimensional charts, we have analyzed the behavior of the financial statements as consolidated balance sheets covering the banking network of Iran. It also uses a non-linear estimation to calculate the threshold value regarding financial statements such as the nonperforming ratio. SETAR and Markov-Switching models look almost the same. The TAR model tells that AR parameters depend upon some critical threshold whereas the regimes in the Markov-Switching models are governed by Markov chain (Sharma, R; Indian Institute of Technology Ropar). However, the difference is that regime switches in a TAR model are "endogenous" while at least loosely speaking, those in a MS model are "exogenous". A TAR model switches regimes whenever the threshold variable crosses some value. For example, in a model of business cycles where the threshold and dependent variables are both GDP growth (i.e., a SETAR), recessions begin when growth slows below some critical rate. In contrast, recessions in a MS model could occur at any time, depending on the transition probabilities in the Markov chain. As to which is "better," that depends. You could test between the 2 using various model comparison methods (e.g. Bayes factors, forecasting, etc.). One attraction of TARs is that it can be easier to motivate such a model from economic theory (Summers, P; High Point University)[1]. Outcomes of the study are argued here as consolidated financial statements situation of the Iranian banking network, the structural break in some suggested ratios, and Multivariate statistical analyses of the banks' consolidated financial statements.

3.1. Consolidated Financial Statements situation of the Banking Network of Iran

The items regarding the given financial statement include 359 items of the assets, liabilities, profit and loss of the Iranian banks. The data used in this study are monthly and the main purpose and emphasis of this paper is the impact of macroeconomic shocks and datelining the Iran banking network situation, therefore, the ratios which are presented in this study contain items

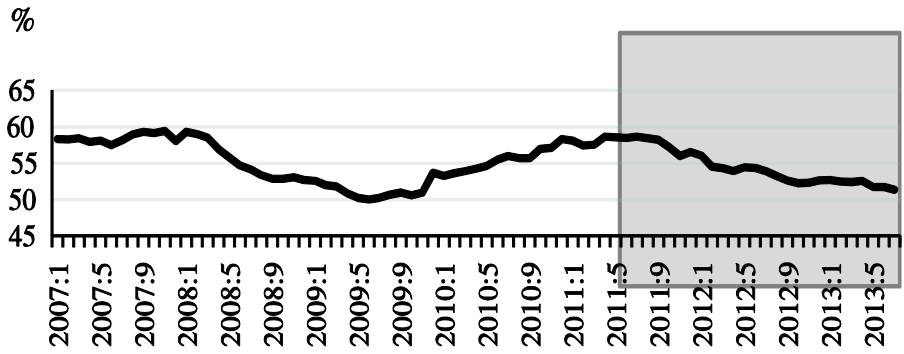
1 ..https://www.researchgate.net/post/What_is_the_technical_difference_between_the_markov_switching_AR_and_threshold_autoregressive_models

of the financial statements which are more often affected. These ratios are as follows:

- Current loans to total assets ratios
- Nonperforming loans to total assets ratios
- Off-balance sheet items to total assets ratios
- Future interest
- Return on assets (ratio of net revenue on total assets)
- Changes in the banks' net revenue to the same previous period

Regarding the selected ratios, it is assumed that the items which are apparently affected are bank assets, off-balance sheet items and ultimately bank profitability. Also, as it is introduced in the introduction of the ratios, the variation in the bank earning variable is used as the performance variable of the banking network of Iran which depicts the reaction of the banks' financial statements to these variations.

Figure 1. Current Loans of the Banking Sector of Iran



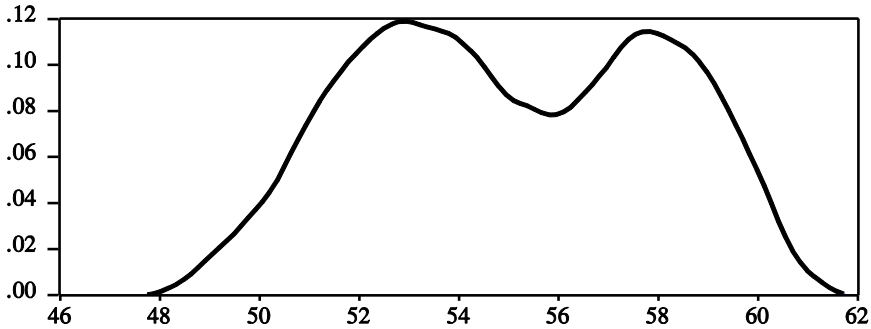
Source: Authors' calculation.

The moving trend of the current loans ratio is obviously illustrated with a background of the real sector's boom and recession in figure 1.[1] The darker background in the figure shows the real sector's recession. This figure

1. The results involving the real sector boom and recession is taken from the Macroeconomic Seasonal Reports of winter 2013 published in the Monetary and Banking Research Institute.

confirms that the banking sector has evidently taken a co-mmoving policy with the economic recession in allocating credits due to an increase in credit risk and also locking its financial resources. Moreover, these sudden variations in the banks' loans in the period of study in the banking sector of Iran shows a 10% fluctuation that causes a double-hump distribution function as shown in figure 2.

Figure 2. Distribution Function of the Current Loans Ratio

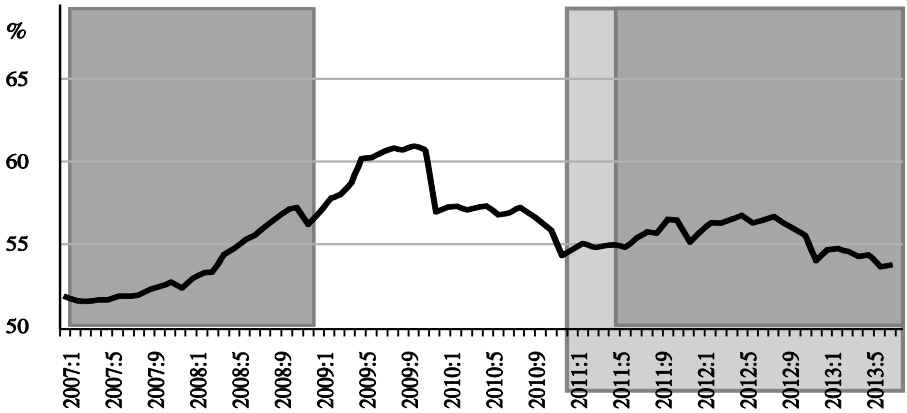


Source: Authors' calculation.

The nonperforming loans situation of the Iranian banks is drawn during the study period in figures 3 and 4. The distribution function of this ratio confirms that in the evaluation period, higher than ten percent of the banks' assets are involved in the nonperforming loans. The background in figure 3 not only highlights the economic recession but also includes the circular standard in the government budget bill of the year 2012 on banks nonperforming loans extension to the production sector and this circular causes fixing the deferred loans and rather than that in order for banks to stop diminishing their earnings, they have already promulgate the circular ingredient before notification.

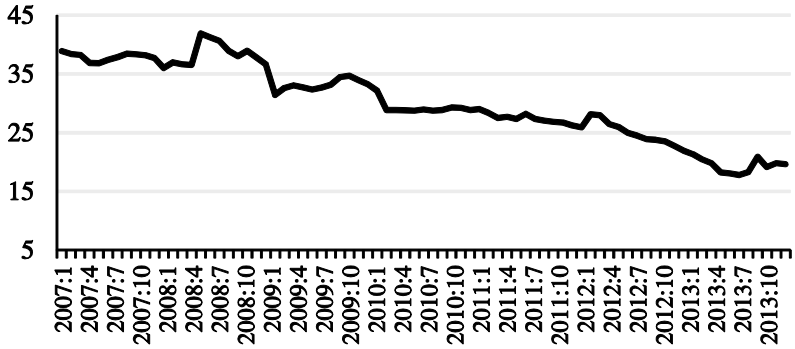
The off-balance sheet items that are taken account as the most important element of non-interest earnings of banks are strongly fluctuated in the recent years due to sanctions and financial embezzlement in the banking sector. The situation of off-balance sheet items summation ratio and its kernel distribution function in this period are also depicted in figure 4 and 5.

Figure 3. Trend of the Banks Nonperforming Loans



Source: Authors' calculation.

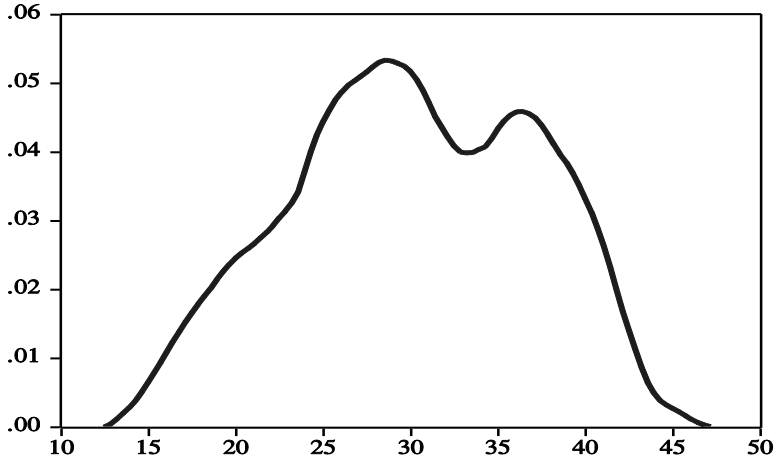
Figure 4. Off-balance Sheet Trend of the Banking Network



Source: Authors' calculation.

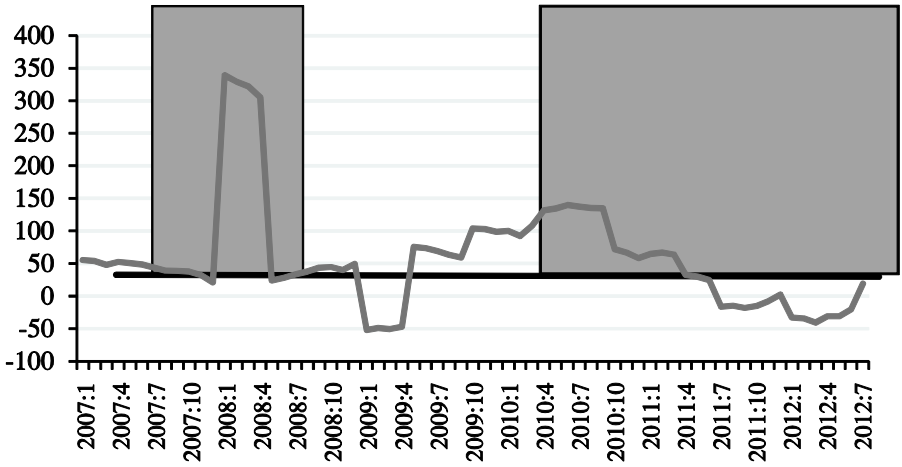
In order to observe the performance of the banking network and compare them in the recent years, the assets' return of the consolidated financial statements in the Iranian banks are also depicted in Figure 6. The figure of net revenue of the Iranian banking network in the first six months of the year 2010, the second six months of the year 2012 and the second six months of the year 2013 obtained negative amounts which show a decrease in banks' revenues in the so-called periods relative to the analogous months in the previous year. Moreover, as it is also depicted in the background of this figure, the decrease in the banks revenues have almost come up, in the economic recession years.

Figure 5. Off-balance Sheet Distribution Function



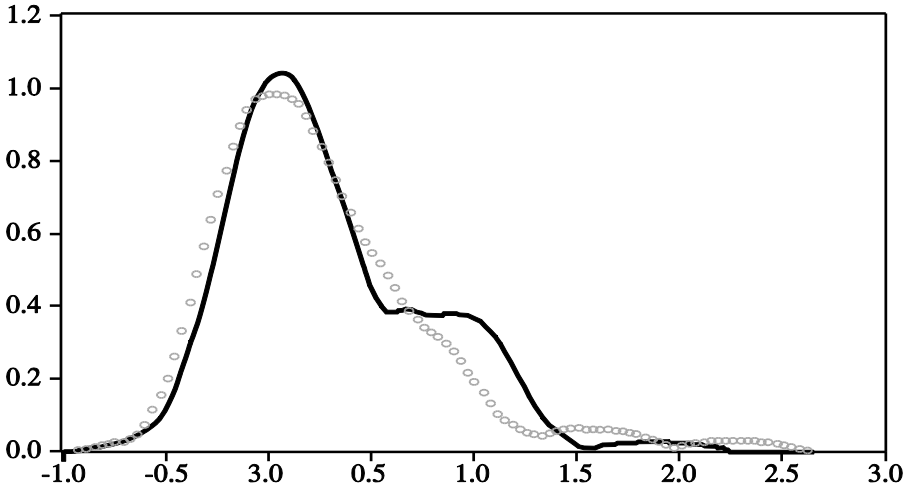
Source: Authors' calculation

Figure 6. Changes in the Net Revenue of the Private Banks Considering the Economic Recession



Source: Authors' calculation.

Figure 7. Assets' Return Situation of the Banking Network (the Continuous Line as the Private Banks and Dot Figure as the Total Banks)



Source: Authors' calculation.

3.2. The structural break in some suggested ratios

As it was mentioned in the introduction sector, we can use the Tsay or Hansen 1997 tests to confirm the existence of structural break. The test results are briefly depicted in table 1. In order to have more transparency in the financial statement in the current loans, we have used the private banks' current loans ratio[1]. Results of the Tsay test as a sample for one of the variables are illustrated in Figure 8 in which the threshold amount is depicted for the second lag of the Threshold Autoregressive model.

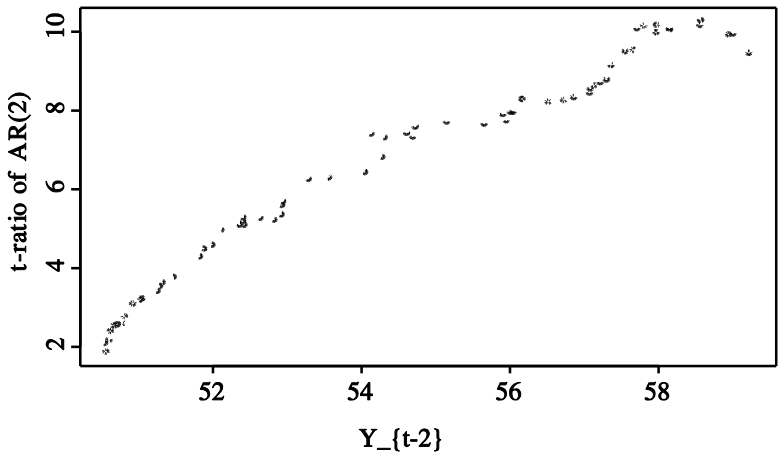
1. Eqtesad Novin, Ansar, Ayandeh, Parsian, Pasargad, Post bank, Tejarat, Hekmat Iranian, Dey, Saman, Sarmayeh, Sina, Saderat, Karafarin, Gardeshgari, Mellat.

Table 1. Results of the Hansen Test for Determining a Threshold of the Financial Ratios

Ratio Title	Threshold	Threshold with lags	Autoregressive Degree	p-value
Current Loans Ratios	53	2	3	0.03
Non-performing Loans Ratio	9	1	2	0.02
Off-balance sheet Items Ratio	34	2	2	0.06
Future Interest Ratio	14	1	2	0.01

Source: Authors' calculations.

Figure 8. Determining a Threshold of the Private Banks' Current Loans Using a Tsay Method



Source: Authors' calculation.

Results from the model estimation of SETAR (3) {Self- excited TAR} are depicted in table 2. t statistics of this evaluation in estimating the Autoregressive self-accelerating threshold model shows that the first lags in both regimes are significant but other lags do not include high significance.

Moreover, the degree of freedom of both regimes is about 34 which shows the given equal value in each regime. Other ratios which are introduced in the introduction also include the estimated-suggested models the results of which are given in the appendix.

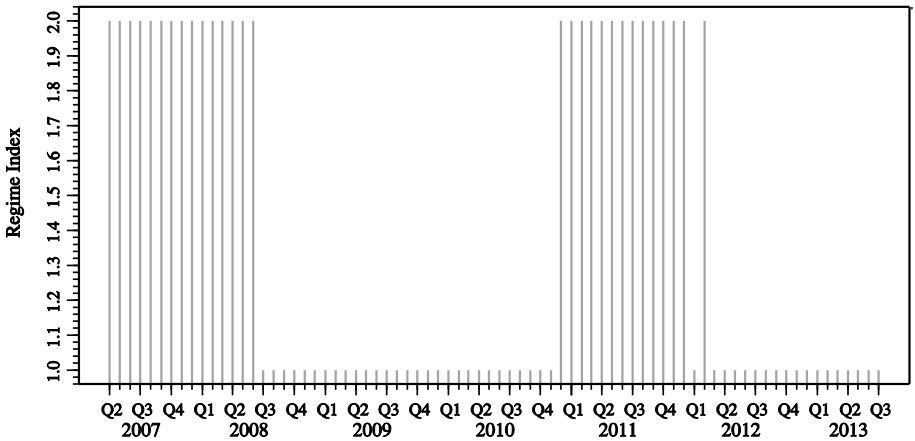
Table 2. Estimation Results of the SETAR(3) Model

Coefficients	Regime 1	Regime 2
Intercept	3.4	3.1
(Std. err)	5.2	4.6
(t.tat)	0.64	0.66
Lag 1	1	1.11
(Std. err)	0.17	0.16
(t.stat)	5.66	6.74
Lag 2	-0.009	0.1
(Std. err)	0.24	0.25
(t.stat)	-0.04	0.39
Lag 3	-0.06	-0.27
(Std. err)	0.15	0.17
(t.stat)	-0.38	-1.56
Std. Errors of the Residuals	0.6	0.79
Information Criteria	Log L	AIC
	-75.88	167.77
Degree of Freedom	total	Regime 1
	76	34

Source: Authors' calculations.

Figure 9 approves that for years 2007 and 2008, the current loans regime is the first type and the middle of 2008, 2009 and 2010 also include the first regime.

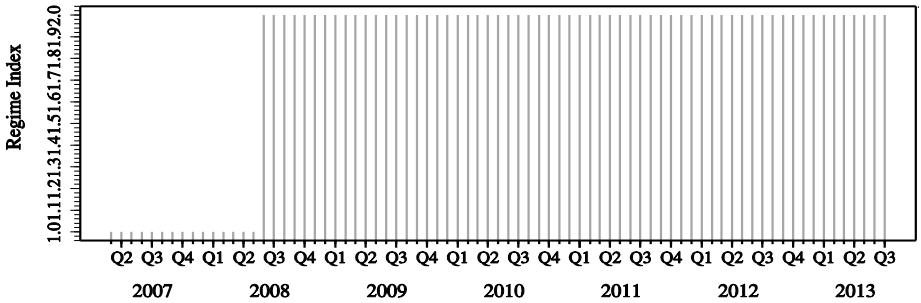
Figure 9. Results of SETAR(3)Model Estimation for the Current Loans Ratio



Source: Authors' calculation

Furthermore, for the ratio of nonperforming loans, if we repeat the same above procedure, the structure of the model estimation will be as in figure 10. It is also reminded that after model estimation of SETAR(2), the threshold for this variable using Hanson test is 9 percent.

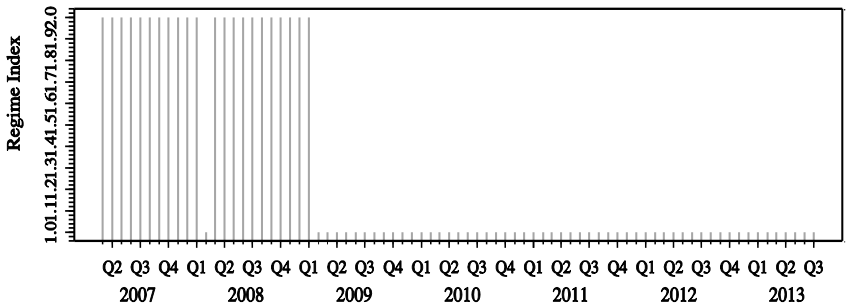
Figure 10. Results of the SETAR (2) Model Estimation for the Model Estimation Ratio



Source: Authors' calculation.

Results from the SETAR(2) model estimation are highlighted for the off-balance sheet items as in figure 11. It is reminded that the threshold of this variable is determined at 41 percent which is significant at 5 percent significance level. Moreover, regarding the exogenous shocks which occurred for the off-balance sheet items of the banks the simultaneous incident of these shocks for the ratio is depicted in the background of the different regime's figure.

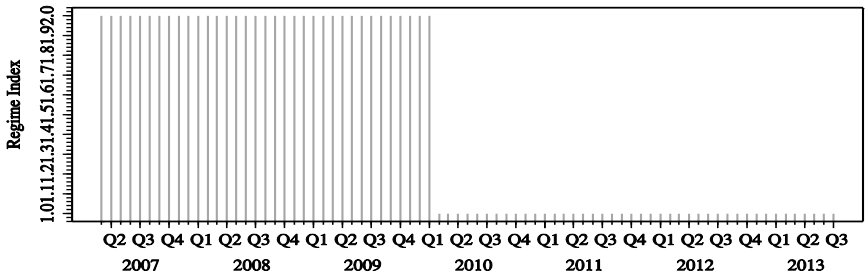
Figure 11. Results of the SETAR(2) Model Estimation for the Off-balance Sheet Items



Source: Authors' calculation

Furthermore, the results of model estimation SETAR(2) for the future profits as indicators of effective interest rate are depicted in figure 12. According to the Hansen test, the threshold of this variable is approximately 14 percent which is also significant at 6 percent level. Results from the model estimation SETAR(2) for the banks' return ratio with 0.9 percent ratio is depicted in figure 12.

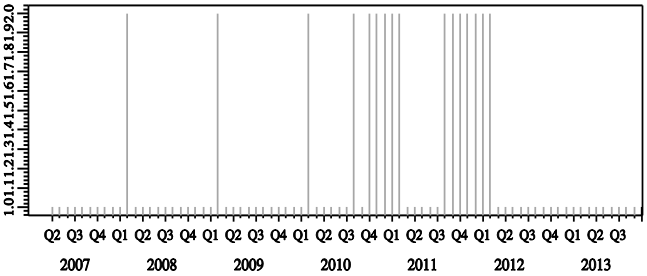
Figure 12. Results of the SETAR(2) Model Estimation for Future Profits Ratio



Source: Authors' calculation.

Figure 13 and 14 respectively indicate the banking network performance regarding the real sector's recession and extension and re-scheduling regulation issuance of the budget act to the banks. Economic recession's occurrence in the figure's background is highlighted for different recent years and denotes the conclusion that in the recession periods of the year 2011-fourth period and 2012-first period, the recession was not impressive or has affected the banking network with delay.

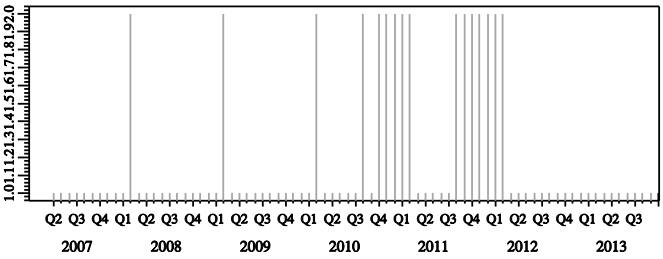
Figure 13. Identifying Different Regimes for the Return Ratio of the Private Sector's Banks and the Real Sector's Performance



Source: Authors' calculation

In spite of the extension and restructuring regulation issuance as in the budget act of the year 2011, issuing this act has also not affected stably increasing the banks' profits in 2012 and 2013; this is because as shown in figure 14, issuing this act in the short term causes changing the regime of banks' return ratio of the year 2011 and in the beginning months of the year 2012 led to an increase and change in the banks' regime.

Figure 14. Identifying Different Regimes of the Private Banks' Return Ratio and the Nonperforming Loans Extension and Restructuring Regulation Performance



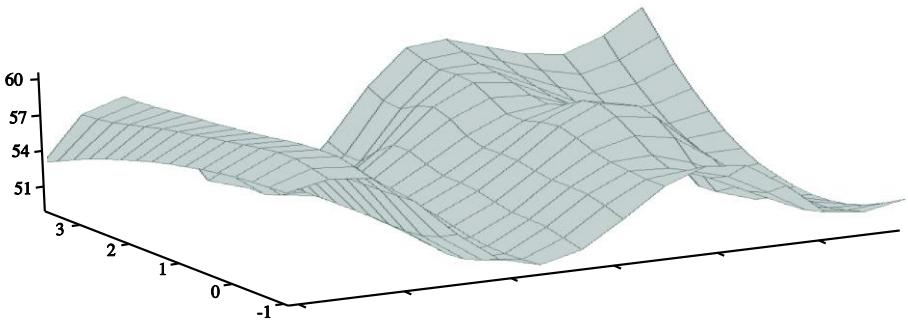
Source: Authors' calculation.

3.3. Multivariate statistical analyses of the banks' consolidated financial statements

As boom and recession datelining in the banking network may not result in tangible and correct-analytical outcomes from the changes incurred in the financial statements without considering the co-movement in the balance sheet items and the links among them, the following section attempts to determine the links in the ratios' probability distribution using the binary classification of the extracted financial ratios in line with the three dimensional figures as well as the balance curves and if possible as a result yielding a more precise recession datelining of the boom and recession of the consolidated financial statements of the banking network would be idealistic.

The three dimensional figure (15), underscores the return on assets movement and the performing loans ratio during the time. The figure confirms that private banks could not increase their assets return unless they augment their loans regarding that the significant part of the banks' income is constituted by the interest earning; moreover, the different periods of time changes in these two ratios are also clarified in the figure.

Figure 15. Three Dimensional Assets Return, Performing Loans and Time

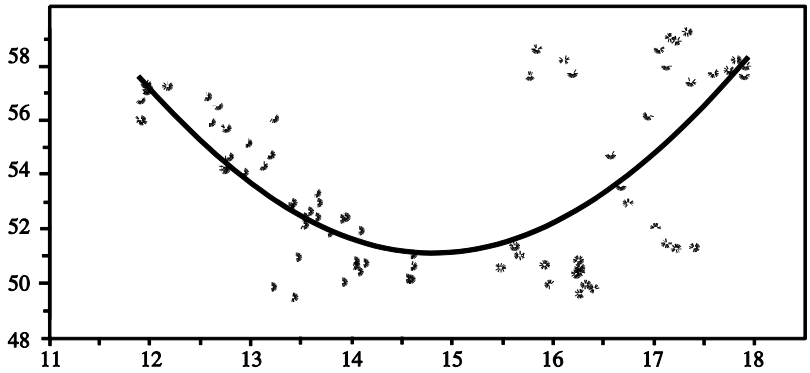


Source: Authors' calculation.

Figure 16 illustrates the scatter plot relationship between the two ratios of performing loans and future interest in which the ratios of the future interests for the banking network have suddenly decreased in a way that the loans ratio is near 54 percent. Generally, two different analyses could be presented for the banking network's behavior; first, when banks' interest rates have dipped

during the study period, they have increased their interest earnings by increasing their loans and as a result, future profits; second, after increasing the interest rates, banks have taken more risks.

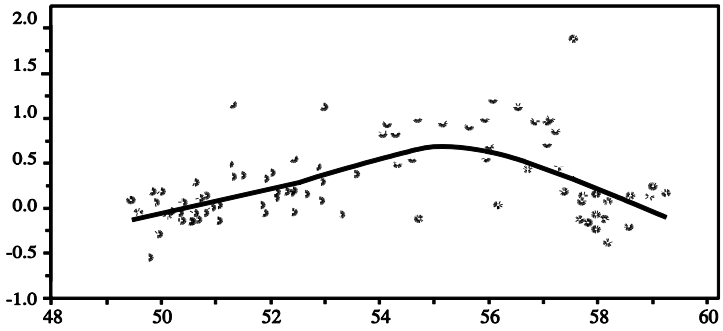
Figure 16. Scatterplot of the Performing Loans to Total Assets Ratio and the Future Profits to Total Assets Ratio



Source: Authors' calculation.

Figure 17 highlights the scatter plot of the performing loans ratio in line with the banking network's assets return. This figure approves that the return on assets ratio as a function of the loans ratio in the banks shows a Quadratic function where its optimal amount is also near 56 percent.

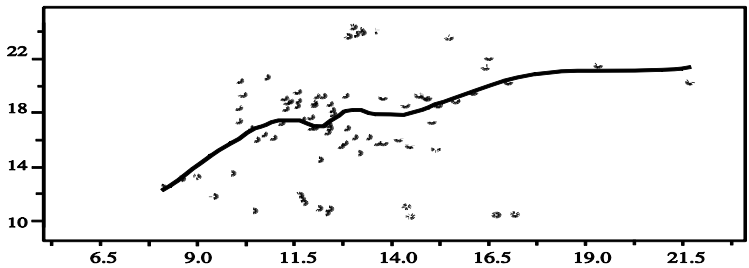
Figure 17. Scatter Plot of the Performing Loans Ratio to Total Assets and Return on Assets



Source: Authors' calculation.

Furthermore, the scatterplot of the nonperforming loans ratio and the non-interest earnings demonstrate that the more the banks' nonperforming loans increase, the more they will take steps forward to noninterest services to compensate their profits.

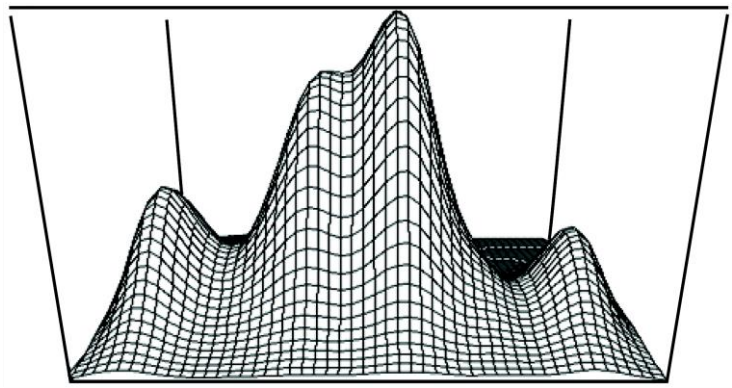
Figure 18. Scatterplot of the Nonperforming Loans (horizontal) to Total Loans and the Ratio of the Noninterest Earnings (vertical)



Source: Authors' calculation.

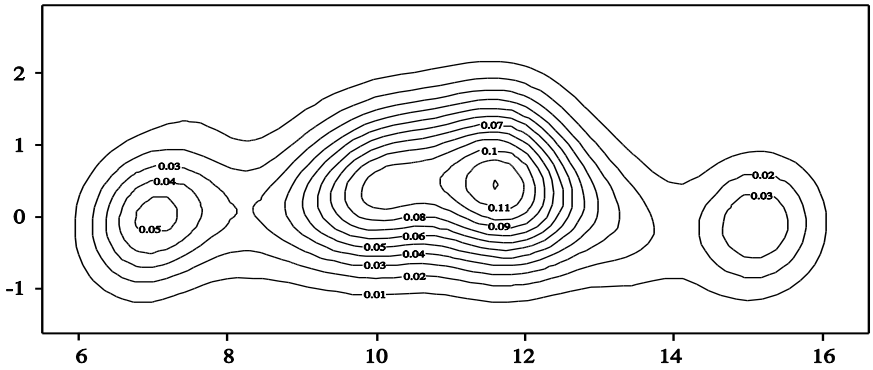
Figure 19 and 20 respectively demonstrate the bivariate kernel density distribution functions as well as the contour line for the two variables of return on assets and the nonperforming loans ratio of the private banks.

Figure 19. Density Distribution Function of the Return to Assets Ratio and the Ratio of the Nonperforming Loans



Source: Authors' calculation.

Figure 20. Contour Line of the Return on Assets Ratio and Ratio of Nonperforming Loans

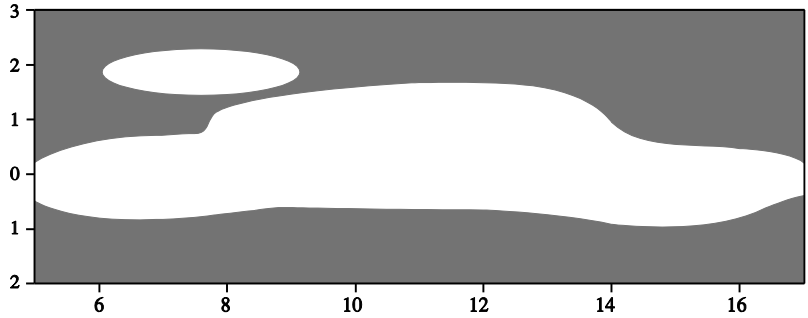


Source: Authors' calculation.

As drawn in the kernel distribution function for the return on assets ratio as well as the private banks' nonperforming loans, the probability of the financial ratio is not exactly clear. In order to clarify the contour line's amount and transfer the three dimensional function to a two dimensional one with more concentration in the different areas, signs have been used. In the contour line, the most inner circle, shows a higher probable event for the lower return rate and nonperforming loans. Both figures 19 and 20 approve different regimes more than three regimes for three dimensional analyses of the two financial ratios.

Figure 21 shows the bivariate distribution function of both return on assets and nonperforming loans ratios. The horizontal axis denotes the nonperforming loans and the vertical axis shows the return on assets ratio. This figure denotes and confirms three different areas for the different intervals from two financial ratios. The significant accumulation of the ratios' intervals for the return ratio is approximately between -0.5 up to 1.5 percent and 9 up to 14 percent for the nonperforming loans ratio.

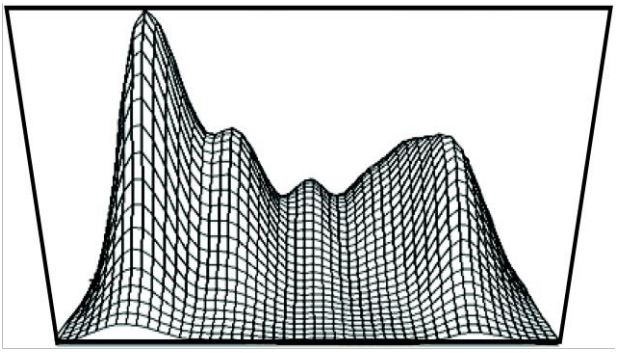
Figure 21. Bivariate Distribution Function of the Return on Assets Ratio and the Ratio of Nonperforming Loans



Source: Authors' calculation.

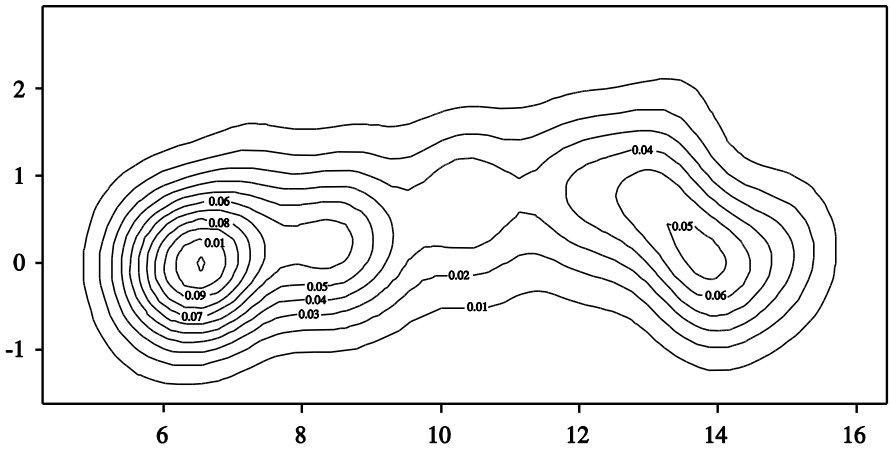
Figures 22 and 23 respectively highlight the kernel distribution function and contour line of the performing loans and return of the private banks. The figure also depicts that, first return on assets of some banks is negative in some months, shows high funding expenditure of the banks. Therefore, banks have to increase their performing loans in order to escape from losses. Moreover, different accumulating parts for these two ratios are depicted in figure 24 which shows two different regimes for some variables simultaneously. Besides, this three dimensional figure approves different regimes in the whole banks' financial statements in an alternative way.

Figure 22. Performing Loans Ratio and the Ratio of Return on Assets in Private Banks



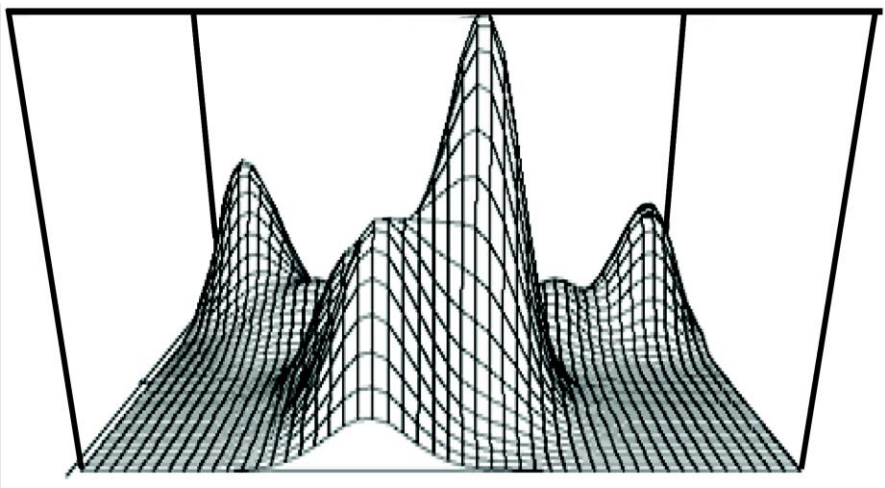
Source: Authors' calculation.

Figure 23. Contour Line of the Performing Loans Ratio and the Ratio of the Return on Assets



Source: Authors' calculation.

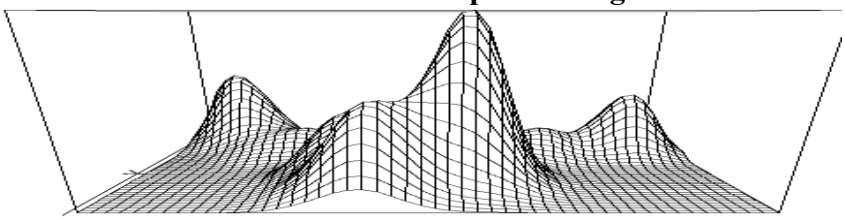
Figure 24. Bivariate Distribution Function of the Return on Assets Ratio and the Performing Loans



Source: Authors' calculation.

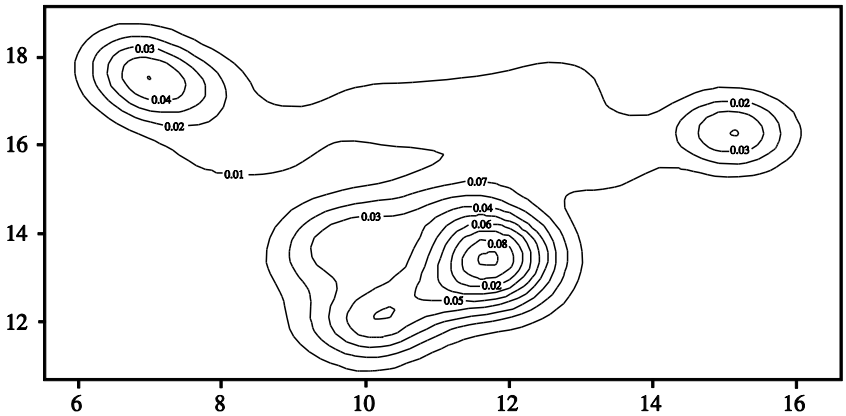
Figures 25 and 26 denote the bivariate density distribution function and contour line for the two financial ratios of the future profits and the nonperforming loans in private banks. These figures are also skewed and approve different regimes in the financial ratios. Furthermore, figure 27 depicts bivariate distribution function of these two ratios that includes three segmented sections for these two ratios which delineate the scatter in interval of 9 to 13 percent for the nonperforming loans ratio and 11-15 percent for the future profits ratio.

Figure 25. Kernel Density Distribution Function of Future Profits and the Ratio of Nonperforming Loans



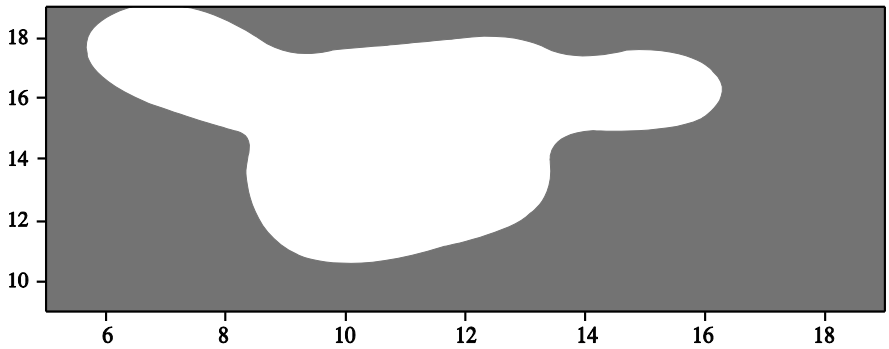
Source: Authors' calculation.

Figure 26. Contour Line of Future Profits and the Ratio of Nonperforming Loans



Source: Authors' calculation.

Figure 27. Bivariate Distribution Function of Future Profits and the Ratio of Nonperforming Loans



Source: Authors' calculation.

4. Conclusions and Policy Recommendations

Results from the financial ratio analyses which are often because of the more logical behavior and clear financial statement of the private banks approve that:

- ✓ The performance of banking network regarding the recession in the real sector and the extension and rescheduling regulation issuance of the budget act to the banks confirm that in the recession periods of the year 2011 fourth period and 2012 first period, the recession has reached the banking network with lag.
- ✓ In spite of the issuance of the extension and re-scheduling of the regulation in the budget act of the year 2011, it has been able to change the return on assets ratio regimes of the banks neither in the year 2011 nor in the beginning months of the year 2012.
- ✓ The structural break in banks' uses, off-balance sheet items, future profits and banks' nonperforming loans are observable.
- ✓ The return on assets ratio as a function of loans ratio in banks is similar to a quadratic function in which its optimal value is also near 56 percent.

Table 3. Summary of the Banking Network Performance with Reference to the Economic Shocks

Regulation and real sector's shock	Year	Season	Performing loans	Nonperforming loans	Off-balance sheet items	Return
	2007	first	boom	boom	boom	
First shock		second	boom	boom	boom	
First shock		third	boom	boom	boom	
First shock		fourth	boom	boom	boom	
First shock	2008	first	boom	boom	boom	boom
First shock		second	boom	boom	boom	
First shock		third			boom	
First shock		fourth			boom	
First shock	2009	first			boom	
First shock		second				boom
		third				
		fourth				
	2010	first				boom
		second				
		third				boom
		fourth				boom
First, Second and third shocks	2011	first	boom			
First, Second and third shocks		second	boom			
First, Second and third shocks		third	boom			boom
First, Second and third shocks		fourth	boom			boom
First, Second and third shocks	2012	first	boom			boom
First, Second and third shocks		second				
First, Second and third shocks		third				
First, Second and third shocks		fourth				
First, Second and third shocks	2013	first				
First, Second and third shocks		second				
First, Second and third shocks		third				
First, Second and third shocks		fourth				

Source: Authors' calculation.

- ✓ The summary of the boom and recession of the banking network's financial statements considering the real sector shocks, the extension and restructuring regulation of the nonperforming loans and sanction problems are characterized in table 3. The recession period for the performing loans of the same period means that the banks have started contracting policy (lower than the 53 percent threshold) in providing loans. Moreover, the recession period for the nonperforming loans is the period where the nonperforming loans are determined higher than the predetermined threshold of 9 percent. According to the table, if the performance variable of the banking network is defined as the ratio of return on assets, this variable happened to be in the recession regime for the alternative periods except for the year 2010 and the ending period of 2011.

Furthermore, results of the statistical bivariate analyses which are implemented by the three dimensional density distribution function, contour line and the bivariate distribution function confirm that the threshold values which are determined in the first period when the values of performing loans, future profits and nonperforming loans are near the values as acquired before and make it certain to simultaneously conclude the regime changes probability in the total behavior of the banking network of the consolidated financial statements' behavior.

It would be reminded that the bivariate and three dimensional depicted figures as an instrument of analyzing different regimes for the total financial statements interactions are also considered. All of the figures are considered to be bivariate and almost two thresholds or minimum three regimes are analytically proved to be relatively separate. The Threshold Autoregressive Models that are estimated in part one for a variable and, if finally confirmed, the estimation of this model must be used for two or more ratios.

Banks would be required to take into account the accurate and tangible issues from the variations in the banking network as well as to consider the co-movement in the balance sheet items and the links among them. Furthermore, boom and recession would be needed for banks to take for granted. Therefore, they have to consider the datelining in order to determine the downturns and upturns of the economic states. Determining the links in the ratios' distribution of probability in the financial fractions could be useful besides the balance curves to yield more precise results of boom and recession datelining by means of consolidated banking statements. Banks are reluctant in increasing their loans because it may go beyond their critical threshold

generating loans which are non-performing and because the loans are not going to be reimbursed if the monitoring is not completely implemented. Henceforth, two events might happen: First, they will have to extend their loans to new loan contracts to consider them as performing. Second, it will lead to identifying fake profits which transparently demonstrate that the yields which are caused are not from the real financial intermediary operations of the banks.

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