

The Effect of Regulatory Policy on Efficiency under Prudential Framework among Listed Iranian Banks

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This study examines the effect of regulatory policy on efficiency under prudential framework among banks listed in the Iranian Securities and Exchange Organization over the period 2003 to 2015. Arellano-Bond estimation method has been patronized to investigate the effect of regulatory policies on efficiency. Results indicate that regulatory policy indicator indexing reserve requirement on investment deposits has had a positive relationship with the efficiency ratio, Sum of Assets Circulation Ratio (SACR), although it is not meaningful. On the other hand, the legal reserve ratio is positively and meaningfully affecting efficiency in financial institutions. Leverage ratio is negatively and meaningfully affecting the efficiency ratio (SACR) which highlights the point that as the financial institutions heighten their leverage ratio, it will lead to lower sum of asset circulation ratio as the best indicator of efficiency under activity proportions. Higher risk will lead to higher Financial Cost to Net Profit ratio (FCNP) interpreted as lower efficiency in financial institutes. Furthermore, regulatory policy denoted by the legal reserves ratio with one lag interval negatively-significantly influences the financial cost ratio.

Keywords: Regulatory Policy, Efficiency, Degree of Leverage Ratio, Prudential Framework

JEL Classification: C81, E43, E65, G21, G23

1 Introduction

The areas of apprehensions which involve the financial systems include the current activities that the institutions are running, what they must do as well as the factors which determine the banks' efficient enactment. Screening and

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This article is organized, extracted and written from the thesis titled as "Analyzing the Impact of Regulatory Policies on Efficiency, Earning per Share and its Volatilities in Listed Banks at the Iranian Securities and Exchange Organization under Prudential Supervision Framework (Basel Committee Accord)" for receiving the PH.D degree at Monetary and Banking Research Institute, Central Bank of Islamic Republic of Iran.

monitoring lenders' and borrowers' financial status, financial intermediation delineates the fact that institutions would intrinsically be able to decrease and remove most of the problems caused by imperfect information between the main two parties. Activities such as risk evaluations and management as well as signing contracts in line with contractual enactment monitoring and debt problems in banks could regularly be implemented from the information received from the banking and financial transactions (Bhattacharya and Thakor, 1993).

Banks' production fundamentals originate from their ability to promote informational asymmetries among borrowers and lenders along with their power for risk management. Prudential and efficient financial services are well due to these possibilities as integral components of bank output and triggers for managerial inducements. A proper example in this perspective includes the relatively high level of debt in a financial institution's resource and capital structure which has direct relationship with risk taking measures and bank appetite for producing more efficient financial services by exposing their entities to an increased risk of insolvency.

Higher pressure will be imposed on financial institutions through demandable feature of the debt when it is not fully insured leading to increasing liquidity risk. There will be more willingness to make a more appropriate surveillance on the borrowers in banks since a particular feature of their capital structure has a key role in making financial institutions more different in kind from other forms of lending agencies in productions and services (Calomiris and Kahn, 1991; Flannery, 1994). Efficiency in bank activities would directly correspond to the property rights, legal affairs and most importantly regulatory policies in the financial environments where they work. Variations in other determinants such as Market conditions, accounting practices and policy making issues in this framework can lead to differences in efficiency of financial institutions across the financial system.

Considering the internal disciplines such as organizational form, ownership and capital structure in line with board members as well as external ones including regulatory policies, capital market discipline such as takeovers, and cost of fund, stakeholder ability to sell stock, labor market competition, equity and debt holders and product market competition induce or decrease efficiency in the financial systems. The financial view on the policy making affairs and their influences on the enactment of the financial legal entities could academically be observed in studies by Barth et al. (2004) who targeted bank stability and development from specific regulatory and supervisory practices in which capital stringencies, official regulatory and supervisory

power, together with enactment were insignificantly associated with each other.

Two wide approaches are emphasized in the literature about measuring financial intermediary efficiency: nonstructural and structural. The nonstructural approach applies a variety of financial ratios and compares the enactment among banks connecting the financial intermediation efficiency with the investment strategies and other relevant factors. Besides, it follows to clarify how enactment ratios are associated with the variables and efficiency ratios and quality of governance in financial institutions. The investigations regarding these issues are inspired by informal and formal theories and it would be highlighted that no general theory of performance provides an amalgamating structure for such studies.

On the other hand, the structural approach is choice-theoretic and is based on a theoretical model of the banking firm and optimization concept. If one divides the literature about financial intermediary efficiency into two categories of traditional and new literature, the traditional one includes the microeconomic theory of production to banking firms and the new literature views banks as financial intermediaries that produce financial services and diversify risk in which it combines the theory of financial intermediation with the microeconomics of bank production which helps the selection of output and input in the banks' production structure.

The possibility that scale- and scope-related improvements in diversification could lower the cost of borrowed funds is ruled out by the standard application of efficiency analysis to banking which does not allow bank production decisions to affect bank risk and inspires the bank to change their risk exposure (Mester, 1992). What constitutes banks' choices would be about their capital structure and the amount of risk they might take when they model financial production and make strategic decisions about asset quality and capital structure influencing their risk premium in its output and input prices.

Regulatory policies as factors, which depicted significant relationship, consisted of disclosure resulted from correct information, monitoring empowered by private sector as key beneficiaries and corporate control exposed from incentives for private representative agents. The fact as it is highlighted in finance-oriented articles strengthen that financial institutions which contribute to more robust regulatory regimes are proved to experience lower risk and stronger credit environment.

Rahavard Novin Co. version 3 of Securities and Exchange Organization database has been applied to exemplify the nexus between the regulatory

policies and efficiency in the financial institutions. The framework which has been marginally spread in this paper is to construct indices to requirements regarding the prudential regulations along with restrictions on financial entities' activities via Barth et al., (2001a; 2006; 2008) which has been the first study in describing the relationship between the regulatory policies and efficiency in financial institutions' enactment.

In this paper, the efficiency indices are attributed as they are described by determinants including and highlighting reserve requirement for different kinds of deposits, legal reserve in line with the leverage degree and their cross effects and the sections are segmented as facts and figures besides the related literature and antecedent studies in section 2 and 3 respectively in addition to section 4 that illuminates research methodology. The model and estimation approach is presented to reach the empirical results in section 5. Ultimately, the concluding annotations will notably be presented in section 6.

2 Facts and Figures

Legal reserve is derived as 5 percent of the net profit based on the article 140 in the trade law amendment. Entities that have calculated and recorded the legal reserve above 5 percent for one year are not allowed to change it below the calculated and recorded percentage. This kind of reserve is held in a separate account so that it will not exit the asset cycle of the entity. The reserve must increase up to 10 percent of the capital in the entity and above that is arbitrary.

If the ratio of legal reserve on total deposits is derived, it can be used to compare the proportion of legal reserve on deposits through the study period. According to figure 1, Sum of Assets Circulation Ratio (SACR) as a proxy of efficiency changes flat from 2003 to 2005 analogous to the proportion of legal reserve on deposits. SACR continues to grow up to 2014 whereas the proportion of legal reserve on the deposits dips in two periods of 2005 and 2010.

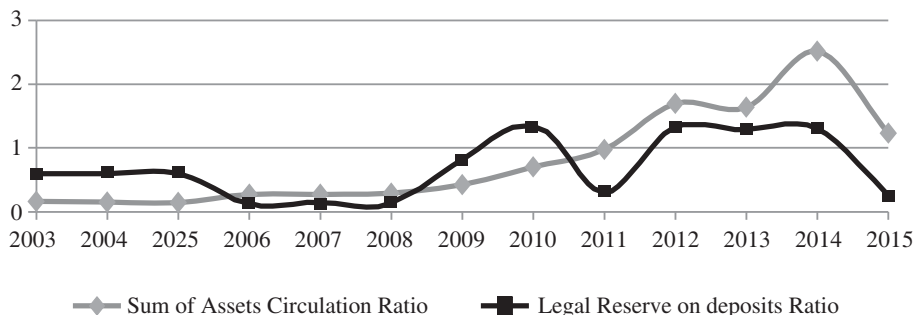


Figure 1. Sum of asset circulation ratio vs. legal reserve on deposits ratio. Source: Rahavard Novin Co. version 3, Securities and Exchange Organization.

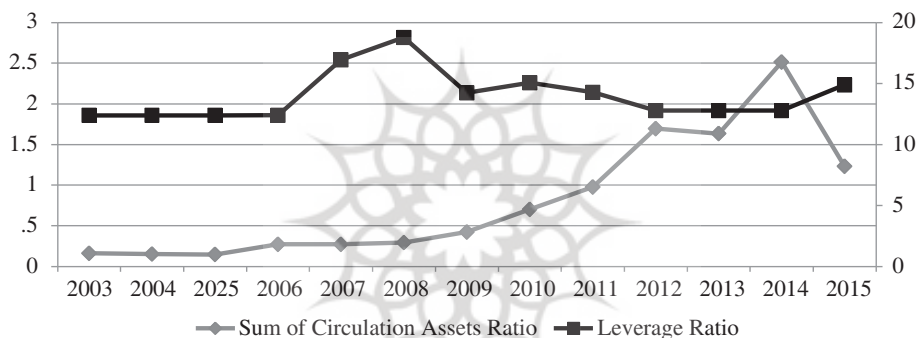


Figure 2. Sum of assets circulation ratio vs. leverage ratio. Source: Rahavard Novin Co. version 3, Securities and Exchange Organization.

The left axis in figure 2 shows the Sum of Assets Circulation Ratio (SACR) as a proxy of efficiency which is rising in the course of the study period and the leverage ratio on the right axis that is fluctuating between 12 and 18. As it can be seen in the figure, higher leverage is accompanied by higher SACR only during 2006 to 2008 which can denote a simultaneous movement in the three years period.

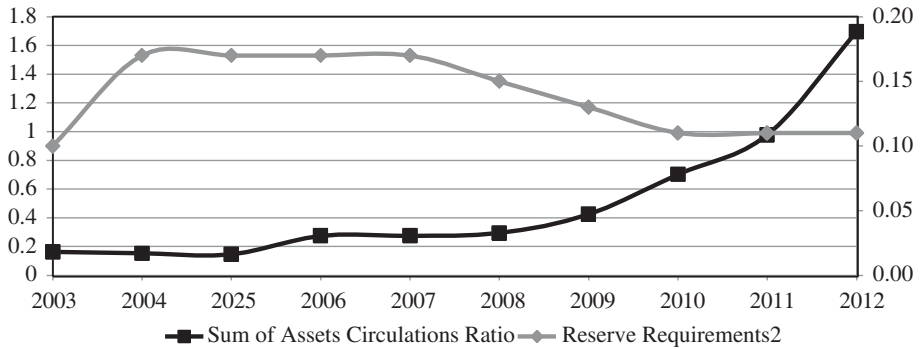


Figure 3. Sum of assets circulation ratio vs. Reserve requirement. *Source:* Rahavard Novin Co. version 3, Securities and Exchange Organization and Central Bank of Iran.

According to figure 3, reserve requirement on investment deposit as the regulatory policy implemented by the central bank on the right axis has had a mild decreasing trend during the study period opposite to the increasing trend of SACR on the left axis. The variation in the reserve requirement on investment deposit is very slow in Iran but as it can be observed from its trend, it could be a probable trigger for the increasing trend of efficiency in the member banks in the market.

3 Literature Review and Antecedent Studies

According to the concept of “input oriented measure”, a production unit’s efficiency was first introduced by Farrell (1957) in which a technical efficiency measure is defined by one minus the maximum proportional reduction in all inputs that still allows continuous production of given outputs (Kablan, 2007). Technical efficiency is linked to the possibility of avoiding wasting by producing as much outputs as the use of input allows it (output oriented measure), or by using as less input as the production objective plans it (input oriented measure). This efficiency is measured by comparing observed and optimal values of production, costs, revenue, profit or all that the production system can follow as objective and which is under appropriate quantities and price constraints.

According to Kablan (2007), the literature proposes two approaches: the mathematical programming approach and the econometric one. The mathematical approach known under the name of DEA method (Data Envelopment Analysis) consists of estimating the frontier by using non parametric mathematical linear programming. It offers an analysis based on

the relative evaluation of the efficiency in an input/output multiple situation, by taking into account each bank and measuring its relative efficiency to an envelopment surface made up with the best banks.

The mathematical method was usually used by making the assumption of constant return to scale (CRS). Recently, the assumption of variable return to scale (VRS) was used in specifications because this hypothesis is more relevant with the environment of imperfect competition in which banks operate (Kablan, 2007). This assumption is therefore made by Grigorian and Manole (2002), to evaluate the efficiency of transition countries' banks from Eastern Europe, following the technological changes which occurred in the banking industry and the banking system reforms after financial liberalization. Leithner and Lovell (1998) are also interested in the impact of financial liberalization on Thai banks' efficiency. They lead an analysis based on the one hand, on profit objective of the Thai banks and on the other hand, on the economic growth objective of the Bank of Thailand. Their results show that under appropriate conditions, financial liberalization can lead to growth, whatever the analytical objective is. Moreover, the size and the nature (domestic or foreign) of banks affect the productivity, growth and productivity change measures (Kablan, 2007).

Financial institutions' productivity in Nordic European Countries (Finland, Sweden and Norway) increase financial integration and bank internationalization due to Europe integration which comes out from their study that the Swedish banks are the best ones to face financial European integration and bank internationalization (Berg, Forsund, Hjalmarsson, Suominen, 1993). Econometric approach is also used by other studies which consist of an econometric estimate of the best practice frontier by its specification in a Cobb-Douglas, CES or trans-logarithmic (cost or production) function. The econometric method can be deterministic. In this case, every deviation from the frontier is attributed to inefficiency. It can also be stochastic; it is then possible to separate random errors from the production unit inefficiency (Kablan, 2007).

The stochastic frontier method has two principal advantages compared to DEA method. First, it allows separating random error from the production unit inefficiency and takes into account the existence of exogenous shocks. At this purpose, the error term is divided into two components: an inefficiency component and a random one (which is composed of the error measurement and the exogenous shocks). Second, the stochastic frontier analysis is less sensitive to absurd values (Kablan, 2007).

A distance function with a trans logarithmic form found that on average US banks were inefficient after mergers and consolidations of the US banking system in the 1990s (Grosskopf, Hayes and Yaisawarng, 1993). A comparison of international banks applying the stochastic frontier analysis (SFA) and the Distribution Free Approach (DFA) by Allen and Rai (1996) shows that the inefficiency level displayed by global banks is smaller than that of separate activities banks and the determinants of efficiency were investigated in a second step. However, they do not take into account environmental variables in the explanation of efficiency. Comparing French and Spanish banks, these banks were analyzed in the cost frontier countries environmental specificities (Lozano-Vivas and Dietsch, 2000). The average residuals of the cost function estimated with panel data to construct a measure of cost X-efficiency is utilized in this approach (Kablan, 2007).

Berger and Humphrey (1992) argue that financial institutions' efficiency must be interpreted as the input-output aspect where input is summarized by the deposits and output is regarded as loans in asset side of the financial statement and state that the fundamental difficulty arises in the treatment of demand deposits. When deposits are treated as bank input, the logic must be that a count of the volume of deposits serves as a proxy for un-priced services produced by the bank and provided to depositors as the compensation for the use of their funds. By obtaining an imperfect proxy for the unobserved portion of bank output, the researcher understates efficiency by a major part of the bank's cost of funds (though not necessarily understating total bank costs) and distorts cost of fund comparisons between banks that use purchased funds, compared with those that obtain funds from traditional deposits. No approach satisfactorily deals with demand deposits in the absence of such data, and no approach gets around the basic data deficiency.

One method, applicable in regulated and unregulated financial environments alike, is to assume that the full value of the bundle is equal for all types of accounts that banks equalize at the margin of the cost of funds. The heterogeneity of bank loans has not been addressed satisfactorily in empirical estimates. Irrespective of their approach to banking output, banking production function studies frequently consider whether bank output activity is best specified by the count of the numbers of loans (or deposits) of different types, or by their respective monetary volumes.

European Central Bank (2010) analyzed the impact of efficiency on bank risk and considered whether bank capital has an effect on this relationship. A model for the inter-temporal relationships among efficiency, capital and risk for a large sample of commercial banks operating in the European Union has

been provided and it was found that reductions in cost and revenue efficiencies increase banks' future risks thus supporting the bad management and efficiency version of the moral hazard hypotheses.

In contrast, bank efficiency improvements contribute to shore up bank capital levels. Findings also suggest that banks lagging behind in their efficiency levels might expect higher risk and subdued capital positions in the near future. Bankruptcies in the financial sector are costly, not only for banks' equity and debt holders but often for taxpayers. As a result, the study of the determinants of banks' risk and of the effectiveness of forcing banks to hold a certain amount of capital has a long history. An early line of US research on risk taking incentives examined the effects of capital regulations (Peltzman, 1970; Mayne, 1972). Early researches in this framework had an objective to investigate the effectiveness of financial regulation and take into account incentives for excessive risk originated by the flat-rate deposit insurance scheme.

Basel accord was introduced in 1988 to illuminate on the international bank capital standards (Basel I) mainly focused on the effectiveness of bank capital regulations after which the continuation of the capital adequacy effects on banks' risk appeared. Ediz et al., (1991) found that bank capital regulation had an effect on the increasing capital ratios and proved that riskier assets in the US and UK absorbed the exposures from bank portfolios and off-balance sheet items. Demsetz et al. (1996) and Salas and Saurina (2003) found that banks with lower capital tend to operate higher levels of credit risk as well as moral hazards.

Hughes and Mester (1998; 2009) argued the requirement to take into account bank efficiency as a major contribution to discuss when investigating the relationship between capital and risk. Both capital and risk are probably to be specified by the level of bank efficiency. Efficient banks with higher quality management may be allowed by the supervisory authorities to have a greater flexibility according to their capital leverage or overall risk portfolio whereas a less efficient bank with low capital may be willing to take on higher risks to compensate for lost returns owing to moral hazard remarks.

Williams (2004) applied Granger causality techniques to evaluate the inter-temporal relationships among problem loans, cost efficiency, and financial capital. The sample includes European savings banks over the period 1990-1998 and finds that poorly managed banks tend to make poor quality loans. Altunbas et al. (2007) have utilized a static simultaneous equation framework to analyze the relationship between capital, loan provisions and cost efficiency

for a sample of European banks over 1992-2000. However, they do not find a positive relationship between inefficiency and bank risk-taking (ECB, 2010).

4 Research Methodology

The Arellano-Bond estimation method has been used to analyze the impact of regulatory policy instruments consisting of reserve requirements on investment deposits, legal reserve and leverage ratio in line with financial ratios and volatility of earnings as the risk measure on the efficiency among banks which allows scrutinizing the determinants of the dependent variable across time.

The following equation has been applied to clarify the relationship between variables by which the efficiency model is applied to demonstrate the impact of regulatory policies on the financial institutions' efficiency in the Iranian Securities and Exchange Organization under prudential regulation framework:

$$\begin{aligned} \ln Y_{it} = & \alpha_0 + \ln \sum_{i=1}^n \beta_{it} y_{it-n} + \ln \sum_{i=1}^n \gamma_{it} FR_{it} + \ln \sum_{i=1}^n \theta_{it} FR_{it-n} + \\ & \ln \sum_{i=1}^n \varphi_{it} M_{it} + \ln \sum_{i=1}^n \omega_{it} M_{it-n} + \varepsilon_{it} \end{aligned} \quad (1)$$

where Y_{it} represents efficiency in the financial institutions which is represented by two fractions as the sum of assets circulation ratio (SACR) and proportion of financial cost to net profit (FCNP). FR is abbreviated as the financial ratios from Rahavard Novin Co. version 3, Securities and Exchange Organization crude data set and the required ratios are calculated using this information set along with M variables which stand for the macroeconomic indicators such as the GDP.

Other variables used in this paper include $Voleps_2$ showing the volatility of the earning per share in the twenty financial institutions in the Iranian Securities and Exchange Organization, $Legres^1$ as the first proxy for

¹ Bank capital components relative to the debt components are certain elements of bank's financial statements which depict the leverage they could undertake in order to continue banking operations. The Iranian commercial code in Securities and Exchange Organization as well as Central bank of I.R.I who regulate the member banks at the stock market delineates the fact that higher leverage (ratio of debts components to capital) will be hazardous for the banks. Banks might prefer to preserve lower level of capital components to debts to earn higher return. Legal reserves defined as minimum amount of money that financial institutions such as banks, building societies, credit unions, and insurance companies are required by law to keep as security. The reserves must be kept in the form prescribed by law and cannot be used to pay depositors. According to the amended Iranian commercial code article 140, the regulator monitors the member banks and financial institutions at the stock market to preserve at least

regulatory policy is measured as the ratio of legal reserve to total deposits. Inv2 is the second measure of the regulatory policy estimated as the ratio of reserve requirement regulated by the central bank to safeguard the financial institutions against unwilling events. ROA highlights the Return on Assets ratio as the gain indicator. Liq undermines the ratio of liquidity on total assets and VariA demonstrates the ratio of revenue on total assets.

Furthermore, Quick ratio (QUIC) shows the ability of the institutions to fulfill their short term commitments using high liquid assets and is derived by the ratio of current assets and stock on current debts. DEQR is the leverage ratio calculated as the fraction of total deposits to Equity. The variables are used as logarithm in the empirical estimation to make a parallel view on the theoretical literature perspectives.

5 Model Estimation

Having used Hendry (1985) approach in estimating the model, the variables are shortlisted according to the highest insignificance level as well as the possibility of estimating the regressions using the Arellano-Bond estimation method because including some variables whether they are relevant to the model or not causes an error in estimations and therefore the model cannot be calculated. The following Hypothesis is formulated based on the literature and variables of study: *There is a positive and significant relationship between the regulatory policies and financial institutions' efficiency.*

According to table 1, the relationship between risk measure (logvoleps) and the efficiency ratio (logSACR) is positive which confirms the fact that higher risk in the Iranian Securities and Exchange Organization for financial institutes will lead to a rise in efficiency since it increases the proportion of revenue over the total assets. Leverage ratio denoted by logDEQR is negatively and meaningfully affecting the efficiency ratio (logSACR) which highlights the point that as the financial institutions heighten their leverage ratio, it will lead to lower sum of asset circulation ratio as the best indicator of efficiency under activity proportions.

five percent of the annual net profit in its capital structure for the next year in order to guarantee that banks' debtors will be paid off. Though it would be more common that researchers utilize the total capital structure as the direct variable in the literature, the ratio of legal reserve to total deposits is selected as a proxy of the relationship between the capital components and the efficiency of a bank. Legal reserve to deposit ratio is an appropriate proxy since it is regulated by the Securities and Exchange Organization and it is selected as a regulatory index in this regard. The higher the ratio is, the higher assurance the bank will have for its insolvency coverage.

Table 1
Arellano-Bond Estimation Results for SACR¹

Group Variable: category					
Time Variable: duration					
Wald Chi2(14)=44.67					
Prob>chi2=0.0000					
Dependent variable:	Coef.	Std.Err.	z	p> z	
LogSACR					
LogSACR(-1)	1.50**	0.66	2.27	0.023	
LogSACR(-2)	-0.063	0.30	-0.21	0.836	
Logvoleps	6.04**	2.05	2.94	0.003	
LogROA	9.28***	2.70	3.43	0.001	
LogLIQ	2.70***	0.80	3.38	0.001	
LogVARIA	1.42***	0.42	3.36	0.001	
Loginv2	11.75	25.07	0.47	0.63	
Loglegres	0.47**	0.22	2.13	0.03	
LogGDPoi	-0.08	2.06	-0.04	0.96	
LogGDPoi(-1)	0.18	2.69	0.07	0.94	
Logquic	-58.57***	15.90	-3.68	0.000	
Loginv1(-1)	-0.66	34.27	-0.02	0.98	
LogDEQR	-1.89	1.28	-1.47	0.14	
LogDEQR(-1)	-1.52	1.07	-1.43	0.15	
-cons	30.70	39.90	0.77	0.44	

Note: The significant parameters are indicated as such with***, **, * indicate significance at 1%, 5% and 10% levels. *Source:* authors' calculations.

In other words, degree of leverage ratio as one of the key prudential indicators proves to be negative. Return on asset (ROA) and liquidity ratios (LIQ) as well as variable assets ratio (variable assets on total assets ratio) is positively and significantly influencing the efficiency ratio (logSACR) in banks which are listed in the Securities and Exchange Organization in Iran. Another key prudential and regulatory policy indicator (inv) denoting reserve requirement on investment deposits has had a positive relationship with the efficiency ratio (logSACR) although it is not meaningful though the legal reserve ratio is positively and meaningfully affecting the efficiency in financial institutions.

Based on the first efficiency index of sum of assets circulation ratio as in table 1, the revenue per asset of institutions with higher rotations in assets in one period augments the efficiency in the next period because they will know how to be efficient and replicate this approach by generating a higher revenue

¹ The estimation has been implemented for the dependent variable SACR as the first proxy of Efficiency.

to assets ratio. When banks take higher risks, this results in higher return in long run and it will raise the efficiency ratio by registering acceptable enactment for the financial industry in the stock market.

In other words, entities like banks take higher risk exposures for higher profits. Table 1 also emphasizes the fact that unlike the recent years when banks preferred to hold more fixed assets, variable assets are more effective on their efficiency because it increases the sum of assets circulations and efficiency in the end. According to the results the central bank takes hold of sophisticated responsibility which indicates that relations between the regulatory policies and efficiency is un-meaningfully unassociated and more effective policy instruments have to be acknowledged and developed for further effectiveness. Banks can increase the rate of legal reserves in the capital section of their balance sheet annually for this will improve enactment in banks for future periods.

The only difference between table 2 and table 1 is the multiplication of two reserve requirements on one and two year investment deposits which has negatively but insignificantly influenced efficiency. In other words, the key difference point which varies table 2 from table 1 is using the reserve requirement policy for both investment deposits at the same time and checking their cross effect on banks' efficiency.

Unfortunately, different regulatory policy instruments on investment deposits are neutralizing each other though it would decrease the sum of assets circulation ratio insignificantly. If banks have higher ability to settle their short term commitments, they will record higher efficiency because of the circumstance that they take hold of higher liquid assets proportionate with other current assets. Furthermore, the regulatory policy variable highlights the point that central banks regulatory implementations have not been effective on their enactment.

Table 2 also portrays more different coefficients in which the efficiency ratio ($\log\text{SACR}$) is respectively positively-significantly and negatively-significantly relevant to the last two years amount of this variable at 5 percent confidence interval which highlights the point that higher sum of assets circulation ratio over the last two years in this various model estimation lead to higher amount of the dependent variable at current period in sum. Degree of leverage ratio is still negative and irrelevant according to the statistics with the same impact of legal reserve ratio on the sum of assets circulation ratio.

Table 2

Arellano-Bond Estimation Results for SACR with Cross Effects

Group Variable: category					
Time Variable: duration					
Wald Chi2(14)=44.67					
Prob>chi2=0.0000					
Dependent variable:	Coef.	Std.Err.	z	p> z	
LogSACR					
LogSACR(-1)	1.66**	0.71	2.32	0.020	
LogSACR(-2)	-0.17	0.34	-0.51	0.608	
Logvoleps	6.62***	2.25	2.94	0.003	
LogROA	9.85***	2.91	3.38	0.001	
LogLIQ	2.69***	0.84	3.21	0.001	
LogVARIA	1.49***	0.45	3.32	0.001	
Loginv2	1.55	1.66	0.94	0.348	
Loglegres	0.71**	0.36	1.98	0.048	
LogGDPoi	-4.58	5.54	-0.83	0.409	
LogGDPoi(-1)	-3.94	5.47	-0.72	0.472	
Logquic	-62.5***	17.26	-3.62	0.000	
Loginv1(-1)	-73.35	90.14	-0.81	0.416	
LogDEQR	-1.98	1.35	-1.47	0.142	
LogDEQR(-1)	-1.92	1.20	-1.59	0.112	
Loginv12	-29.34	33.37	-0.88	0.379	
-cons	-82.08	134.94	-0.61	0.543	

Note: The significant parameters are indicated as such with ***, **, * indicate significance at 1%, 5% and 10% levels. *Source:* authors' calculations

According to table 3, a different efficiency ratio (logarithm of financial cost to net profit ratio) known as the cost efficiency indicator (FCNP) is utilized as the dependent variable which is econometrically analyzed to investigate its determinants based on the financial ratios in the Iranian Securities and Exchange Organization.

The two lag periods one and two are respectively associated both negatively-meaningfully and positively-significantly with the dependent variable by denoting that higher cost efficiency ratio (FCNP) in first period causes a lower impact on the dependent variable whereas the second lag has a positive association on the current period.

Table 3

Arellano-Bond Estimation Results for FCNP with Cross Effect and Nonlinearity¹

Dependent variable:	Coef.	Std.Err.	z	p> z
LogFCNP				
LogFCNP(-1)	-0.82***	0.154	-5.30	0.000
LogFCNP(-2)	2.39***	0.42	5.61	0.000
LogVARIA	0.12**	0.05	2.04	0.041
LogVARIA(-1)	-0.45***	0.12	-3.58	0.000
Logvoleps	0.53***	0.19	2.8	0.005
Loglegres(-1)	-4.12***	0.92	-4.46	0.000
LogDEQR(-1)	-1.05**	0.47	-2.23	0.026
Loginv12	13.49*	7.61	1.77	0.076
Loginv2power2	-10.97*	5.61	-1.95	0.051
-cons	-1.93	8.65	-0.22	0.823

Note: The significant parameters are indicated as such with***, **, * indicate significance at 1%, 5% and 10% levels. *Source:* authors' calculations

Furthermore, variable assets ratio as well as its first lag has a respectively positive and negative influence on the financial cost indicator (logarithm of financial cost to net profit ratio (FCNP)). Higher risk will lead to higher financial cost ratio (FCNP) interpreted as lower efficiency in financial institutes. In other words, according to this estimation, banks will face lower efficiency their financial cost ratio as a result of higher risk according to this estimation. Furthermore, regulatory policy denoted by the legal reserves ratio with one lag interval negatively-significantly influences the financial cost ratio which means that it has had positively influenced efficiency.

Furthermore, degree of leverage ratio is positive and meaningful and it denotes the point that banks increase their efficiency by taking higher risks and accepting higher deposits. Higher nonlinear reserve requirements on investment deposit rate causes lower financial cost ratio which means higher efficiency that highlights the fact that there is a maximum or minimum amount reserve requirements on investment deposit rate which can be extracted through linear programming approach.

¹ The estimation has been implemented for the dependent variable FCNP as the second proxy of Efficiency.

6 Conclusions

Prudential regulatory policies are modified by the regulators so that they could have recovering impact on the enactment of financial institutions. Stock market officials as well as the central bank are regulating the financial institutions in order to improve efficiency and return on one hand and monitor and control volatility in the market for these entities on the other. This entails benefits both for the regulators and financial institutions owing to the point that investors could check the enactment ratios e.g., degree of leverage ratio, reserve requirements on investment deposits, legal reserves ratio, cost efficiency ratio, sum of assets circulation ratios, etc. to compare institutions and industries with each other in the stock market.

In other words, regulatory policies from the officials could be directly linked to the decisions made by the beneficiaries in the market. With respect to this paradigm, this paper tends to analyze the impacts of regulatory policies on efficiency as an enactment characteristic to underline the efficacy of the prudential regulation policies and instrument's on cost efficiency and asset circulation ratios.

Rahavard Novin Co. version 3, the Iranian Securities and Exchange Organization database has been applied to exemplify the linkage between the regulatory policies and efficiency of the financial institutions from 2003 to 2015 among banks listed in Iranian Securities and Exchange Organization. Applying original and standardized and defined regulatory indices in addition to financial ratios from the stock market and efficiency proxies,

Arellano-Bond estimation method has been practiced to characterize the impact of regulatory policies on the efficiency of financial institutions. Although insignificant, economic growth as a boom indicator will amend the investors' perspective in transferring their resources to the stock market to purchase shares of the firms and financial institutions. Positive perspective seems to increase an encouraging atmosphere for the shareholders to both potentially and dynamically receive higher earnings in the market.

Based on the first efficiency index of sum of assets circulation ratio, institutions with higher rotations in assets explaining the revenue per asset of these entities in one period augment the efficiency in the next period because they will know how to be efficient and replicate this approach by generating higher revenue to assets ratio.

When banks take higher risks, it results in higher return in long run and it will raise the efficiency ratio by registering acceptable enactment for the financial industry in the stock market. In other words, entities like banks take higher risk exposures for higher profits. Table 1 also emphasizes the fact that

unlike the recent years when banks preferred to hold more fixed assets, variable assets are more effective on their efficiency because it increases the sum of assets circulations and efficiency in the end.

According to the results, the central bank takes hold of sophisticated responsibility which indicates that relations between the regulatory policies and efficiency is un-meaningfully unassociated and more effective policy instruments have to be acknowledged and developed for further effectiveness. Banks can increase the rate of legal reserves in the capital section of their balance sheet annually to improve their enactment in banks for future periods. Different regulatory policy instruments on investment deposits are neutralizing each other though it would decrease the sum of assets circulation ratio insignificantly.

If banks have higher ability to settle their short term commitments, they will record higher efficiency because of the circumstance that they take hold of higher liquid assets proportionate with other current assets. Furthermore, the regulatory policy variable highlights the point that central banks regulatory implementations have not been effective on their enactment. According to this estimation, banks will face lower efficiency based on their financial cost ratio as a result of higher risks according to this estimation. Furthermore, regulatory policy denoted by the legal reserves ratio with one lag interval negatively-significantly influences the financial cost ratio which means that it has positively influenced efficiency.

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