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The Analysis of the Relationship Between Economic and Financial Variables and Financial Supervision Structure

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Abstract: This study deals with the analysis of the relationship between the economic and financial variables and the supervision structure in 97 countries in 2004-2013. In order to study the changings in the countrie's financial supervision structure Panel ordered Probit Pooled and Panel binary choice analysis are applied. The results of this study and the comparison to the former studies show: group variables such as financial depth, financial return and financial stability don't have an identical group relationship with the supervision structure. Good governance has a direct and positive relationship with the rate of the supervision and concentration in the supervision structure of the countries. Therefore, the increase in the good governance causes increase in concentration of the financial supervision structure. The positive relationship between the good governance and financial supervision structure is the common item of these studies.

Key words: Financial supervision structure, panel ordered and twin peak regression, financial supervision structures, stability, Iran

INTRODUCTION

The necessity to update the supervision methods on market, economic clarification and supervision of the realization of general policies of economic causes the structure of supervision on financial organizations to be constantly analyzed and to be studied. In the course of developing the markets the analysis of the supervision in financial organizations has increased by the participation of the investing companies, banks and insurances in the stock. The interaction method of the bank, the insurance and the stock raises the discussion of overlap and lack of supervision within the scope of the activity (Masciandaro, 2008). The occurrence of problems such as underwriting of new bank in stock, bank stocks price, the activity of investing companies corresponded directly or indirectly to banks and insurances by playing with promissory notes in stocks market, currency, gold and housing has created a wave of financial instability and uncertainty in economy. The occurrence of these problems in recent years is the evidence to this issue. Therefore, the analysis of financial structure of the country has become important in developing conditions of the markets and the money flow speed in parallel markets. The most important organization in the field of supervision is supervision on bank. Banks have an important role in other markets regarding the possibility of investing and providing facilities. In some countries banks merely provide the facilities and in some others they directly engage in commercial and investment activities. Banks freedom in investment and the power of banks in economy has made the issue of supervision very important. Therefore, the comparative study of concentrated and independent supervision systems with the regard to the experiences of other countries is very important. In these studies the differences of political and legal structure of the different countries of the world should be notified. The occurrence of financial crises in different countries has made the revision of financial structure of countries necessary (Cukierman, 2010). Therefore, the optimized structure should be followed by taking advantage of the experiences of other countries and the experiences of the present supervision organizations in banks, insurance and stock. The relationships and the supportive role of each of these three organizations regarding their importance and their share in the economy of countries is also influential in the selection of the proper supervision structure (Bhattacharyya, 2013). The research on the supervision structure of countries and revision in the supervision structure was carried out in recent years after the occurrence of the financial crises and development of the markets. Issues such as independence of supervision organizations, the level of supervision focus, the analysis of the efficacy of the supervision structures, selection of the optimized supervision structure, specialization of the financial supervision, access to the optimized methods of supervision in parallel markets, financial stability in the

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macro-economic level, creation of the possibility of supervision based of meta-executives organizations, the increase of the prevention and the management of economic risks in occurrence of financial crises, the method of supervision newly emerged markets, has been analyzed by quantity, quality and combined methods in recent decade. The structure of prudential supervision and business conduct supervision are required to be analyzed and studies in the analysis of the supervisions structure of the countries. This study analyzes the financial structure that includes prudential supervision and supervision on the implementation of trade that is mentioned in the first part of the research theories. Then review of the literature is presented and by the defining of the variables and presentation of the model with the collected date, the calculation is carried out and the results are analyzed. In comparison to other conducted studies, this study by paying attention to the affecting factors on the financial supervision structure, analyzed the relationship of the variables and the supervision structures (Greene, 2015).

MATERIALS AND METHODS

Research theories: Dependent variables are five groups. The variable of consumer price index is selected from economic development variables' group. Theoretically this variable has a positive relationship with the dependent variable of financial supervision. The second group is the affecting variables on the supervision structure including the quality of governance and the number of the financial crises. Theoretically, the relationship among them and the dependent variables of the financial supervision is positive. The third group of the variables is financial depth index. The increase in the financial depth results in a more and larger activity in the markets, therefore, the relationship with the dependent and direct variable is theoretically positive. The fourth groups are tax efficacy index variables. There is also a positive relationship between these variables and the depended variable of the financial supervision. In other words by increasing these variables the supervision structure becomes more concentrated and more integrated, vice versa. The fifth groups are the variables of the financial stability index. Reduction of financial stability expects increase of supervision and concentration on financial supervision structure. Therefore, the relationship between the variables of financial stability index and the financial supervision structure is negative and reverse. The dependent variable of this study is the financial supervision structure. The studies on 70 countries of the world conducted by a financial committee of 30 countries in the world in 2008 divides the models of financial supervision of these countries into 4 major groups that include the followings:

Institutional model: Institutional model is one of the classic types of supervision on financial supervisor. This is an implied method based on the issue of establishing a financial institution. Basically the legal status of a company (for example, institute as a bank, correspondent or a registered insurance company) determines which observer is responsible to monitor the company's activities regarding the security and correctness of commercial activity. This status also determines the company's domain of the permissible commercial activities.

Functional model: In functional model, the supervision of supervision is determined regarding the business which is practiced by the institution regardless of its legal status. For example in a merely functional method, if a company participates in several businesses that includes, banking, securities and insurance activities, each of these separate field of activity is monitored by a different supervisor. The work supervisor is responsible to monitor the security and accuracy of the institution and its commercial activities. The concern of the functional method is to make sure that the classification of the activities is clear enough so that the supervisor can monitor them.

Integrated model (united supervision system): In integrated model, there is a general supervisor who monitors the security, the accuracy and commercial activities in all of the work sections of financial services. This model has earned a great reputation in last decade. This model is also called the service of financial services. It is remarkable that after the financial crises the financial supervision model in England has officially changed from the service of financial services into a two-level model.

The twin peak model: The two-level is based on the objective supervision and it mentions the separation of supervision roles between two supervisors: the supervisor whose job is supervision the security and the accuracy are responsible for prudential supervision. The supervisor, whose job is supervision the implementation of business activities of the unit is responsible to monitor its business activities. There are also supervision differences between macro and micro activities in this method. Supervision in the micro activity is practiced by the supervision supervisor of the implementation of

business activity. Some consider this model the real supervision as well. This supervision system was taken into account after the financial crisis in 2007.

RESULTS AND DISCUSSION

Empirical studies: Studies carried out in regulatory centers, Global financial institutions and research centers around the world have been centered on 3 concepts:

- Various models of prudential supervision and supervision of trade, Issues about the integrity of supervision, Central Bank's role in supervision and Integrated supervision system (Qualitative issues about a variety of supervisionsystems)
- The relationship between a country's economic and political indicators and the type of its supervisionsystem (qualitative issues about the effect of economic indicators on selection of supervision model with the use of econometric methods and forecasting appropriate models)
- The relationship between the amount of integrity in financial supervision sectors and supervision performance (qualitative issues about evaluating the performance of supervision models)

The above reviews and researches are contradictory in some cases. Massy Andrew in his 2005 studies deals with the central bank's role in supervision the integrity of the financial system and concludes that the amount of regulatory power is subordinate to the power and influence of the central bank. He has investigated 89 countries in these studies.

Based on the studies carried out by Chung and Shan in 2006, countries in which supervision is the responsibility of central bank are less interested in integrated supervision system and countries where the scope of activities of the banks is vast are more interested in integrated supervision system.

Masciandaro in his 2006 studies argues that it is more probable that a country heads toward integrated system of financial supervision in smaller economies and legal framework with Scandinavian and German roots.

Masciandaro, Quintyn and Taylor based on their studies in 2008 over 55 countries argued that, proper governance has a positive effect on responsiveness of supervision system and also democratic systems have more potential in reforming the supervisionsystem.

Otoyca and Diakanzo concluded in their 2012 studies that there is no clear relationship between banking and financial variables and supervision system but there is a significant relationship between inflation, development and supervisionsystem.

Martin Melecky and Podpiera investigated organizational structures of prudential supervision and supervision of financial services of 98 countries with medium and high production in the last decade. This study investigates the stimulus that are likely to create change in supervision structures and declare that countries with proper governance system have a tendency to integrate their supervision system by a prudential supervision, countries which are more financially developed have more tendency to integrate and countries that have experienced financial crises integrate their supervision structures to a greater extent and greater autonomy of central banks could cause less integrity of prudential supervision.

Nitsch (2015) in his study of 98 countries argues that central banks that have independent and transparent performance supervision play a lesser role in supervision.

The introduction of variables and presentation of model: The introduction of variable resources and variable selection criteria, as well as introduction of selected regression model are desired. Information about resources for data collection are mentioned in appendix 1, descriptive statistics related to these variables are mentioned in appendix 2 and correlation matrix of variables are mentioned in appendix 3.

Introduction of variables: Independent variables were selected from five main groups related to the issue and previous studies: the economic development indicators, variables affecting the structure of financial supervision, financial depth indicator variables, financial efficiency index variables, Financial stability indicator variables.

FS dependent variable is the structure of financial supervision system, that financial supervision systems in accordance with structure and the amount of supervision focus are divided into 4 supervision levels:

- Partial supervision (institutional) in which each of the sub-sectors of financial supervision is e
- Entrusted to a separate supervisor
- Partial supervision is integrated with supervision inside or outside the central bank and is responsible for prudential supervision and supervision the implementation of trade
- Integration of supervisionover financial institutions is done in integrated supervision financial reference or bi-level supervision model
- Integration of supervision over financial institutions in central bank

This dependent variable is a four-level ordinal variable which is applied in accordance with the type of regression used in the selected model.

The presentation of the model: The selection of the model is based on the panel data of 97 countries in a time period from 2004-2013 and the dependent variable is a multi-level logistic regression one. The positive or negative relationship of the significance of the variables of the supervision model is expected by the calculation of the significance of the applied variables. The dependent variable in the first stage is considered as an ordinal variable with two determined levels and the ordered Probit Pooled regression is practiced. In the next stage the dependent variable is considered in 2 supervision level by merging level and 2 as the decentralized supervision and merging level 3 and 4 as the centralized supervision and twin peak Logit and Probit regressions are used. Then the significant independent variables in the regression are identified and the relations of the variable are analyzed based on the subscription of significant variables:

$$Fs_{it} = cpi_{it-1}+gdp_{it-1}+qgov_{it-1}+fcr_{it-1}+iag_{it-1}+dbag_{it-1}+ nig_{it-1}+ smcg_{it-1}+bcin_{it-1}+smto_{it-1}+bre_{it-1}+ bra_{it-1}+bnim_{it-1}+bld_{it-1}+bca_{it}+ bcbd_{it-1}+ bcria_{it-1}+bnlg_{it-1}+pnl_{it-1}$$

Calculation: In order to perform the calculation at first Durbin Watson's self-regression statistics test was calculated. The amount of this statistic was close to zero. In order to remove self-regression of the data all of the dependent variables were paused for one step then the calculations were again performed. Since, self-regression wasn't removed, the problem can be solved by adding an independent paused variable to the right side. Regarding the emphasis by William Green in the comprehensive book of econometrics of panel data under the supervision of Beltaji, based on the omission of dummy variables, due to the proceeding identical amount, the only dummy variable in the equation which is the financial crisis variable is omitted and the calculations are carried out.

In the analysis of the results the calculations that are carried out by the econometric software, in order to increase the stability of the results the subscription of the significance of a variable in all of the regression is the criterion of the stability. In Table 1, three, two and one star was respectively presented for one, five and ten percent of the considered error.

The results of the calculation was presented in table one. The consumer price index variable is significant in the ordered Probit regression and it is related to the dependent variable with positive sign. The consumer price index variable is not significant in twin peak regressions of Probit and Logit. Therefore the presence of the relationship does not have the necessary stability.in the group of the financial depth indexes the variables of nonlife insurance premium volume to GDP Stock market capitalization to GDP is not significant in all of the regressions.

Table 1: Star presented considered error

Variables	Ordered probit pooled	Ordered probit	Binary choice panel
L.cpi	0/021***	0/068***	0/19**
	0/0039	0/000085	0/049
L.gdp	-7/2E-06	0/00002	0/00041
	0/52	0/61	0/11
L.qgov	1/60***	2/62***	13/2***
	4/80E-11	0/00057	0/00013
L.fcr	0/07	0/26	-3/15
	0/83	0/62	0/55
L.iag	0/0041	-0/0088	-0/092
	0/54	0/69	0/45
L.dbag	-0/0084**	-0/013	0/079
	0/022	0/24	0/27
L.nig	-0/44***	-0/94*	-5/45**
	0/0045	0/08	0/034
L.smcg	-0/0053***	-0/0090*	-0/11***
	0/00048	0/073	0/00024
L.bcin	0/0039	-0/0057	0/06
	0/48	0/56	0/53
L.smto	0/0068***	0/0052	0/029
	0/00092	0/35	0/36
L.bre	0/0067	0/024	0/052
	0/49	0/14	0/82
L.bra	0/04	-0/0095	0/47
	0/48	0/93	0/8
L.bnim	-0/0047	-0/044	0/64
	0/92	0/57	0/19
L.bld	-0/00018	0/017	-0/62
	0/99	0/79	0/36
L.bca	0/031	-0/095	0/42
	0/44	0/38	0/6
L.bcbd	-0/00043	-0/0012	-0/015
	0/72	0/75	0/41
L.bcria	-0/019	0/086	0/15
	0/58	0/25	0/77
L.bnlg	-0/0075	-0/056	-0/46
	0/74	0/33	0/25
L.pnl	-0/0027	0/0049	0/012
	0/16	0/22	0/67
χ^2 LR	58/143	125/25	100/95
Prob. > χ^2	0	0	0
Pseudo R^2	265/0	28/0	542/0

In the group of the financial efficacy index variable, stock market turnover ratio in two periods divided into the average of the investment, the Bank return on equity (before tax) ratio to the average of the income of the shareholders, the Bank return on assets (before tax) to total assets, the ratio of the bank net interest margin, the difference between the bank lending rate and the deposit rate is not significant in all of the regressions. The variable of the bank cost to income ratio is significant in twin peak regressions of Probit and Logit and it is related with a positive sign to the dependent variable.

The variable of the bank cost to income ratio is not significant in ordered Probit. In the financial stability index variables group, the variables of the ratio of the bank capital to total assets to the total of assets, the ratio of the bank regulatory capital to risk-weighted assets and nonperforming loans to gross loans is not significant in all of the regressions. The mentioned values before the variables of regression coefficients and each variable and the following number is the coefficients of value of the

Table 2: Significant variables in different regressions

Variable group	Two level logit	Two level probit	Ordinal probit	Independent variables
Economic development	-	-	✓	cpi
Governance structure	-	-	✓	qgov
Financial depth	-	-	-	nig
	Economic development	-	-	smcg
Financial efficiency	✓	✓	-	bcin
	-	-	-	smto
	-	-	-	bre
	-	-	-	bra
	-	-	-	bnim
Financial stability	-	-	-	Bca
	-	-	-	Bria
	-	-	-	Bnig

Table 3: Comparative analysis of the former studies results

This study	Martin *et al.* in 2012	Ovidiu *et al.* in 2012	Masciandaro *et al.* (2008)	Chung-Hua Shen in 2006	Eihak and Podpiera in 2006	Donato Masciandaro in 2005	Common independent variable between studies
(+)	*	(-)	*	*	(-)	*	cpi
(+)	(+)		(+)	(+)		(+)	qgov
Insignificant	(-)	*	*	*	*	*	nig
Insignificant	(-)	*	*				Smeg
(+)	(-)	*	*	*	*	*	Bein
Insignificant	(-)	*	*	*	*	*	bnlg
blng							

*Indicates not using this variable in the related study

Table 4: The analysis of the results of the calculations

Variables	References
Consumer price index (consumer price index)	Global Financial Development Database (GFDD) September 2015 Version
Quality of governance (qgov)	The Worldwide Governance Indicators http:..info.world ank.org.governance.wgi.index.
Financial crises (fcr)	Global Financial Development Database (GFDD) September 2015 Version
Nonlife insurance premium volume to GDP (nig)	Global Financial Development Database (GFDD) September 2015 Version
Stock market capitalization to GDP (smcg)	Global Financial Development Database (GFDD) September 2015 Version
Bank cost to income ratio (bcin)	The Worldwide Governance Indicators http:..info.world ank.org.governance.wgi.index.
Stock market turnover ratio (smto)	Global Financial Development Database (GFDD) September 2015 Version
Bank return on assets (before tax) (Bre)	Global Financial Development Database (GFDD) September 2015 Version
Bank return on assets (before tax) (bra)	Global Financial Development Database (GFDD) September 2015 Version
Bank net interest margin (bnim)	Global Financial Development Database (GFDD) September 2015 Version
Bank capital to total assets (bca)	Global Financial Development Database (GFDD) September 2015 Version
Bank regulatory capital to risk-weighted assets (bcria)	
Bank nonperforming loans to gross loans (bnig)	Global Financial Development Database (GFDD) September 2015 Version
Financial supervision structure (fs)	Global Financial Development Database (GFDD) September 2015 Version

possiblity. In Table 2 significant variables in different regressions are marked by a check mark. According to Table 2, the consumers cost variable and the variable of cost ratio to bank income is not significant in the three carried out regressions. Therefore, they lack the necessary stability in the presence of the relationship with the dependent variable. The variable of good governance is significant in all of the regressions and with a positive sign it is related to the dependent variable. Therefore, the presence of the relationship has the necessary stability. Regarding the variable of the financial depth, financial efficiency and financial stability, no identical reactions have emerged that can assume the possibility of the presence of a group relationship with the dependent variable. Accordingly the increase of the good governance index which is obtained out of six other variables has a direct and positive relationship with the increase of the focus of the country's supervision structure.

In order to analyze and compare the results of the former studies, the common variables in the six former studies and the variables of this study are collected in three tables and the results of the significant calculations are compared. Accordingly the variable of the good governance had a positive effect on the mentoring structure focus in the six former studies. The common variables of the former studies lacks an identical and classifiable behavior regarding the relationship with the dependent variable.

CONCLUSION

In the analysis of the results of the calculations about the relationship of the economic variables with the

financial supervision structure of the countries and according to the economic theories it can be concluded that: the good governance can be considered as a political, legal and valuable index that states the features of political structure, the relationships within the judicial and political organization with each other and with the people. This index takes the minimums of the economic development into account. Fighting the corruption and dominance of the law are common and rational items in good governance and as a result in the supervision structure on financial organizations. Therefore the significance of the variable and its theoretical aspect is acceptable. Inflationary conditions prevailing in the economy of Iran in recent years requires a basic revision off the supervision on the financial organization of Iran. This revision is required to be practiced based on the view of Islamic values, governance structure and by relying in the dos and don't of resistive economy.

APPENDIX

Appendix 1

Maximum	Minimum	Standard deviation	Average	The No. of observations	Variables
288/6468	42/81084	18/25428	94/61522	941	cpi
1/986065	-1/686571	/8766145	/3145247	970	qgov
1	0	/3643898	/1573964	845	fcr
5/673	/119	/7816004	1/425291	940	nig
570/1552	/3447142	63/46796	57/70682	828	smcg
218/087	22/81809	19/41607	59/35621	953	bcin
394/317	/042556	58/65101	52/02373	822	smto
88/8202	-59/88722	11/46604	14/01834	952	bre
12/97531	-109/6505	4/264464	1/147811	954	bra
14/63614	/1247633	2/54529	4/135779	953	bnim
24	1/452	3/84301	9/360716	817	bca
36	1/755	3/970786	15/45378	830	bcria
33/684	/1	5/311376	5/211688	821	bnlg

Appendix 2

Repetition (%)	Repetition number	fs
3/4	33	0
67/11	651	1
23/61	229	2
5/88	57	3
100	970	Total

Appendix 3

	cpi	gdp	qgov	nig	smcg	bcin	smto	bre	bra	bnim	bca	bcria	bnlg
cpi	1.0000												
gdp	0.1221	1.0000											
qgov	0.0909	0.8278	1.0000										
nig	0.0692	0.6251	0.6038	1.0000									
smcg	-0.0065	0.3812	0.3593	0.2019	1.0000								
bcin	0.0410	-0.0149	0.0069	-0.0301	-0.1520	1.0000							
smto	-0.0641	0.3690	0.2495	0.1908	0.3182	-0.0446	1.0000						
bre	-0.1271	-0.1226	-0.1003	-0.0657	0.1436	-0.3303	-0.0104	1.0000					
bra	-0.0896	-0.1382	-0.1328	-0.0948	0.0575	-0.5076	0.0045	0.4998	1.0000				
bnim	-0.1344	-0.5065	-0.5410	-0.3459	-0.3121	0.0357	-0.2821	0.2498	0.2805	1.0000			
bca	-0.0478	-0.4315	-0.4782	-0.3553	-0.1985	-0.0267	-0.3189	0.0428	0.2440	0.5934	1.0000		
bcria	-0.0499	-0.1651	-0.2128	-0.1997	-0.0990	-0.0777	-0.2455	0.0114	0.2831	0.4064	0.6883	1.0000	
bnlg	-0.0197	-0.2950	-0.3455	-0.2098	-0.2784	0.1047	-0.2233	-0.2551	-0.2426	0.1043	0.1721	0.0784	1.0000

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