Assessing the effect of central bank supervision interaction with audit and internal inspection units of banks on the efficiency of banking supervision

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(Communicated by Sirous Moradi)

Abstract

This study aimed to investigate the supervision of the central bank with the audit and internal inspection units of banks and evaluate its impact on the efficiency of banking supervision. This research is applied in terms of purpose and in terms of descriptive-survey approach. In this study, all senior managers of bank branches in Tehran were considered as a statistical population of 150 people. According to Krejcie and Morgan's table, a society of this size required at least 108 statistical samples. In this study, a simple random sampling method was used to select statistical samples. The main tool used in this study was a researcher-made questionnaire that contained 22 items. In this questionnaire, the answers were designed based on a five-point Likert scale (from strongly disagree to strongly agree). The validity and reliability of this questionnaire were evaluated and confirmed in different ways. After distributing and collecting questionnaires and extracting data, descriptive and inferential analyses through SPSS and LISREL software were on the agenda. In this process, descriptive analyses were performed on the research variables, KMO test, Kolmograph-Smirnov test, confirmatory factor analysis and path analysis. Finally, the results showed that the interaction of the central bank supervision department with the internal audit units of banks has a strong and significant positive effect on the efficiency and effectiveness of banking supervision.

Keywords: central bank supervision, efficiency, effectiveness
2020 MSC: 62D20

1 Introduction

Effective banking supervision is one of the basic preconditions for ensuring the correct functioning of the country's economic system. The main purpose of banking supervision is to maintain the stability of the financial system and increase its confidence by reducing risk for depositors and other creditors. Supervision therefore seeks to ensure that banks and credit institutions operate in a safe and correct manner; They have enough capital and reserves to face their many risks. The Central Bank of the Islamic Republic of Iran, which according to paragraph "b" of Article 11 of the Monetary and Banking Law (approved in July 1972), is responsible for supervising banks and credit institutions since the late seventies and using the latest achievements of centers and associations Professional and specialized,

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chose the "risk-based supervision" approach as the main approach in supervising the country's banks and credit institutions, and in this regard, while restructuring the organizational structure of banking supervision, formulating precautionary regulations and deepening and expanding new banking literature in the country Put it at the top of its agenda. In this regard, the Wing Banking Committee, as one of the authoritative international bodies in the field of banking supervision, drafted a document containing 25 basic principles or in other words 25 principles called the basic principles for effective banking supervision, the first version of which was published in It was published in 1997 and then revised in 2006. Subsequently, in September 2012, following the financial crises of 2007 and 2008, the document was revised by the Wing Committee and upgraded to 29 (29 principles) with the addition of four new principles. In this document, the way of classifying the principles has also changed compared to the previous document. In general, the new version is based on three main issues, which are: 1) using a forward-looking approach to effective supervision of banks, 2) effective supervision based on risk analysis and early intervention of banking supervision, if necessary, and 3) Assessing the risk characteristics of banks according to the amount of risk in their operations and imposing risk by a bank on the financial and banking system. In addition, the new document emphasizes the two issues of corporate governance and transparency and disclosure of information in banks. Also, the mentioned document, which is integrated in the methodological document, includes the minimum standards that have been recommended in order to regulate and exercise prudential supervision over banks and the banking system. In fact, these standards provide guidelines for achieving an acceptable level of banking supervision. The corporate governance regulations in Iran have a special emphasis on the establishment of the internal audit system and the internal audit committee and the audit committee, in which the relationship between managers and independent auditors is formed through the audit committee. It can be further acknowledged that organizations are established to create value or benefits for owners, customers, owners and other stakeholders.

This is the concept of their existential philosophy. Value creation is the result of using resources in the process of production and supply of goods and services. In this process, internal auditors provide information about identifying and evaluating risks and opportunities for the benefit of the organization. During the last three decades, internal auditing has been accompanied by great changes in the world, but in our country due to the state economy and the lack of large and multinational companies and not keeping up with the global economy, these changes have not been followed and still in many companies, Internal audit is at the level of Sandres.

Despite efforts to strengthen internal audit, such as conducting internal audit seminars and publishing internal auditing standards to strengthen and expand internal auditing and establishing a code of professional ethics, giving priority to internal controls in law, redefining integrated internal controls with internal controls. In Iran and the formation of an association consisting of internal auditors and leading managers and other related specialties we need [3]. Interaction between the supervisory department of the central bank with the audit and internal inspection units of banks in various ways such as face-to-face evaluations performed by the supervisor of internal controls of banks, in the presence of supervisors are always in constant contact with internal auditors, holding seminars Training, planning meetings and necessary meetings in the field of effective implementation of controls. Accordingly, the main question of the research is as follows: Is it effective banking supervision? "

2 Theoretical foundations

In the concept of supervision, it can be said that it is not easy to provide a clear definition in this field, because banking supervision covers various areas of complex banking activities in the world today. There are many definitions in the field under discussion, but it can be boldly stated that maintaining the stability and health of financial institutions, following the rules and safeguarding the interests of depositors are the common points of the existing definitions. Due to the complexity of the context of modern financial institutions and the constant need to adapt the legal framework to fundamental change and innovation, legislators often give limited power to regulators to oversee and regulate the activities of financial institutions. The importance of supervision in the context in question lies in the fact that banks and financial institutions are intermediaries between savers and final consumers of financial resources or savings sources in society in general. In other words, through their branches, banks are not only the main holders of private sector deposits and the primary channel of credit and investment in the economy, but also the main regulator of society's payment mechanism. In addition, these activities have a direct impact on the supply of monetary and credit resources of the country, because banks are institutions that have the power to create money through the provision of facilities [6]. Preventing the spread of harmful effects of banks' problems and failures to other sections of society is another issue that highlights the importance of banking supervision. In this regard, in order to achieve monetary policy goals, banks are always controlled through macroeconomic controls such as open market operations, interest rates, credit ceilings, direct controls and re-discounting facilities. In addition, "precautionary regulations" or controls at the microeconomic level, such as "liquidity ratios and current assets" are always used in this regard. Therefore,

supervision monitors the performance of each bank to ensure that its activities are in accordance with the regulations. This leads to the financial health of each bank and ultimately to maintaining a healthy banking network by ensuring the security of deposits and preventing crises. Another issue that underscores the importance of banking supervision at the present time is the development of developing countries into interest rate liberalization and other economic adjustments. The experience of Latin American countries in the last two decades shows that before entering the stage of liberalization of bank rates, there are two important and basic conditions, including economic stability (economic situation suitable for private sector activity) and the existence of effective and strong banking supervision. In general, setting regulations for banks and supervising the implementation of these regulations by the central bank to achieve goals such as: expanding reliable and comprehensive financial services to meet the needs of the economy; Ensuring that banks are efficient, reliable and effective in meeting customer needs and grievances; Ensure that the bank's operations are in line with important banking standards; And ensuring that banks' performance is in line with monetary and credit policies [13].

2.1 The role of supervision in the banking system

Supervision usually takes on meaning after regulation. Therefore, the starting point in evaluation and monitoring is to find criteria that can measure the "effectiveness" and "efficiency" of the regulations. However, there are practical problems in measuring the above cases. Utility can be defined as the ability of regulations to achieve goals, and efficiency can mean achieving goals using the most possible way. The problem with measurement is that, first, the targets are often intangible or qualitative in nature; For example, it is difficult to maintain public confidence in banks or to separate part of the set of rules that may be relevant to achieving a particular goal. In contrast, part of the set of rules may cover the achievement of several goals. For example, the role of capital is not only as a hedge against possible accidents, but also contributes to the growth of the bank and usually builds trust because the capital adequacy ratio indicates that the bank is highly resistant to potential risks and further protects the interests of depositors under this situation. will be. Today, banking supervision is evaluated from three dimensions:

Lending regulations are a control tool for dealing with loan losses. When the banking system faces delinquent receivables, arrangements to deal with it increase. Therefore, there is a positive relationship between these two indicators [7]. Banks that anticipate high capital losses and overdue receivables will try to take more precautions to reduce non-payment of loans. In fact, this indicator warns bank managers about the situation of the banking system in terms of overdue debts. In fact, this index is a criterion for controlling the risk of the banking system [2].

Bank profitability is an indicator to determine the risk-taking behavior of bank managers. Banks with high profitability are less likely to be under pressure to generate revenue and therefore less likely to engage in risky activities. Banks with low efficiency are more likely to face problem loans. Also, managers who perform poorly in cost management are more likely to engage in risky activities and lose more customers than others. Godlewski [5] used the return on assets ratio as an indicator of banking performance and examined its effect on delinquent receivables. The results of his study indicate that the higher the profitability of the banking system, the less delinquent claims it will face. According to the contents of the researches, the following is done:

Fathi et al. [4] in a study on the relationship between central bank independence with the structure of financial supervision and bank health using structural equations. The results of this study showed that the independence of the central bank, financial supervision, the expected return on bank health had a positive relationship. Samandari et al. [11] in a study examined the factors affecting the effectiveness of internal audit of Birjand Agricultural Bank branches. The results showed that the competence of the internal audit unit has a significant effect on the effectiveness of internal audit of the branches of Birjand Agricultural Bank. The size of the internal audit unit has a significant effect on the effectiveness of internal audit in the branches of Agricultural Bank of Birjand.

Shabanian Badi and Firoozi [12] in a study examined the effect of internal audit performance on the performance of accountants in banks in Kashan. The results of this study show that independent auditors rely on the results of the work of internal auditors and this reliance leads to a reduction in time and money budgets in the audit program and practically measure the impact of internal audit performance on the performance of internal auditors of banks. Shows outputs based on variables measured in Kashan city banks.

Sahiti et al. [10] conducted a study entitled Enterprise Risk Management in Kosovo's Banking Sector, assuming that internal audit can play a role as a starting point for detecting fraud and error in companies. The results showed that the existence of internal audit increases the reliability of financial statements and reduces the likelihood of fraud in financial statements. The researchers stated that the vision of the internal auditor is to add value to government organizations through the optimal, rational and effective use of the general government budget.

Muchiri and Jagongo [9] investigated the relationship between internal audit and financial performance in government agencies. Adetiloye et al. [1] investigated the effect of internal control system on fraud prevention in the banking industry. The results showed that internal control alone was effective in preventing fraud, but not all employees were committed to it. On the other hand, it was stated that the central bank's policy has been effective in reducing current expenses and employing educated staff to reduce the occurrence of fraud in the banking system.

3 Methods

The research method is applied in terms of purpose, descriptive-survey approach and causal studies. The statistical population of this study was all senior managers of bank branches in Tehran, and based on the study, their number was determined to be 150 people. According to Krejcie and Morgan table, for a population of 150 people, at least 108 statistical samples were needed. In this study, we tried to select the required samples based on a simple random sampling method. In the present study, in order to evaluate the validity of the instrument, according to the number of experts, the items whose CVR was calculated to be more than 0.62 were approved.

Table 1: Convergent validity

AVE	Variables
0.559085	Interaction between the Central Bank Supervision Department and internal audit units
0.592171	Effectiveness of Banking Supervision
0.508631	Banking supervision efficiency

Table 2: Check the reliability of the questionnaire

Cronbach's alpha coefficient	Variables
0.841678	Interaction between the Central Bank Supervision Department and internal audit units
0.769435	Banking supervision efficiency
0.662904	Effectiveness of Banking Supervision

Table 3: Combined reliability

CR	Variables
0.883415	Interaction between the Central Bank Supervision Department and internal audit units
0.850707	Effectiveness of Banking Supervision
0.798226	Banking supervision efficiency

According to the type of research and the type of variables, descriptive statistics and inferential tests appropriate to the type of data and variables were used to analyze statistical data and study research questions using SPSS and Lisrel statistical software. In the present study, for inferential analysis of data, the following tests were used: Kolmogorov-Smirnov test to determine the distribution of research variables (normal or abnormal distribution of variables). Checking the reliability and validity of variables, confirmatory factor analysis, fitting General model (structural equation method and path analysis).

4 Data analysis

4.1 Confirmatory factor analysis of research variables

KMO index and Bartlett test, KMO index is more than (0.6) and close to one and sig Bartlett test is less than (0.05). The output of these tests is presented in the following tables

According to the table 4, the value of KMO index is equal to 0.909 (more than 0.6), so the number of samples (number of respondents) is sufficient for factor analysis. Also, the sig value of Bartlett test is less than 0.05; Which indicates that factor analysis is appropriate to identify the structure of the factor model and the assumption that the correlation matrix is known is rejected.

Table 4: KMO and Bartlett test for questions

0.909		**KMO test**
942.1378	χ^2	
231	Degree of freedom	**Bartlett test**
0.000	sig	

The stability test of the parameters in different modes (linear and nonlinear segments) can be modeled as follows:

$$y_t = \emptyset(t)'z_t + \theta(t)'z_t G(y, c, s_t) + u_t$$
$$\emptyset(t) = \emptyset + \lambda_\emptyset H_\emptyset(\gamma_\emptyset, c_\emptyset, t^*)$$
$$\theta(t) = \theta + \lambda_\theta H_\theta(\gamma_\theta, c_\theta, t^*)$$
$$u_t \approx iid(o, \sigma^2)$$
$$t^* = \frac{t}{T}$$

For this purpose, a high nonlinear regression approximation is used assuming the stability of the parameters and in the form of the following equation:

$$y_t = \beta_0' z_t + \sum_{j=1}^{3} \beta_j' z_t (t^*)^j + \sum_{j=1}^{3} \beta_{j+3}' z_t (t^*)^j G(\gamma, c, s_t) + u_t^*$$

This can be done for the other three transfer functions in the form of the following equation:

$$H(\gamma, c, t^*) = \left(1 + \exp\left\{-\gamma \prod_{k=1}^{k} (t^* - c_k)\right\}\right)^{-1} - \frac{1}{2}, \quad \gamma > 0$$

$$\text{For} \quad k = 1, 2, 3 \quad \text{and}$$

$$\gamma_\theta = \gamma_\emptyset$$

4.2 Confirmatory factor analysis of communication variable

Figures 1 and 2 show the model of the dimensions of the communication variable in standard and significant states. As it is known, the membership of all the examined factors in this variable is confirmed:
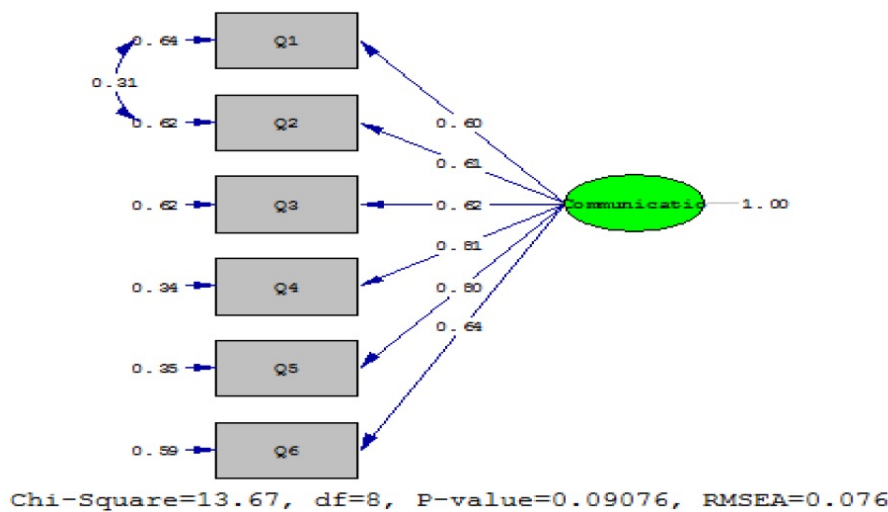

Chi-Square=13.67, df=8, P-value=0.09076, RMSEA=0.076

Figure 1: Model for measuring the dimensions of a communication variable in the standard mode

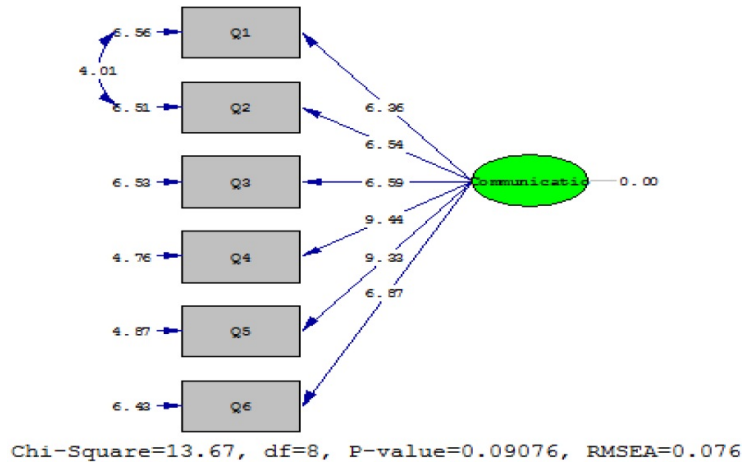Chi-Square=13.67, df=8, P-value=0.09076, RMSEA=0.076

Figure 2: A model for measuring the dimensions of a communication variable in a significant state

4.3 Confirmatory factor analysis of operational variables

Figures 3 and 4 show the model of operational variable dimensions in standard and significant modes. As it is known, the membership of all the examined factors in this variable is confirmed:
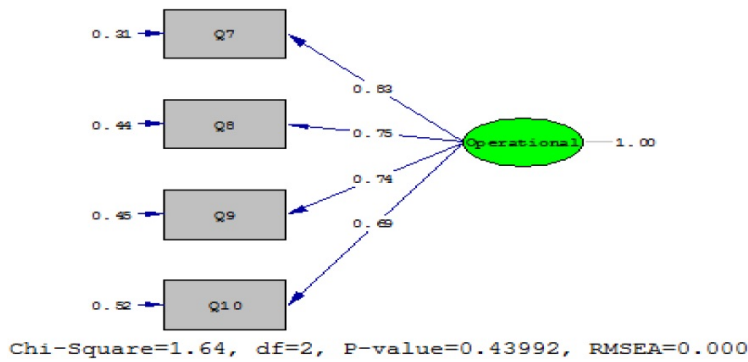

Chi-Square=1.64, df=2, P-value=0.43992, RMSEA=0.000

Figure 3: Model for measuring the dimensions of operational variables in standard mode

Chi-Square=1.64, df=2, P-value=0.43992, RMSEA=0.000
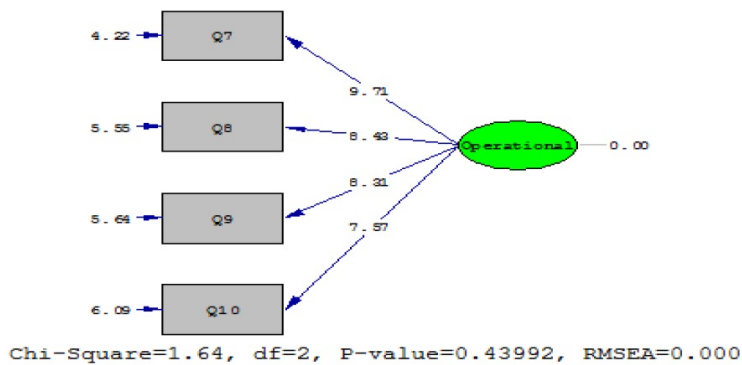
Figure 4: Model for measuring operational dimensions in a significant state

4.4 Confirmatory factor analysis of documentation and reporting/reporting variables

Figures 5 and 6 show the model of the variable dimensions of documentation and reporting / reporting in standard and meaningful modes. As it is known, the membership of all the examined factors in this variable is confirmed:
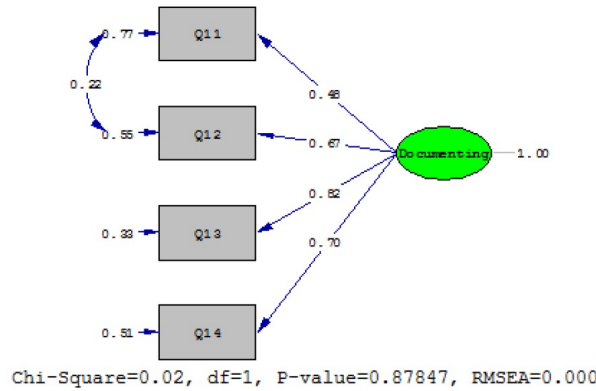
Chi-Square=0.02, df=1, P-value=0.87847, RMSEA=0.000

Figure 5: Model for measuring the dimensions of the variable documentation and reporting / reporting in standard mode

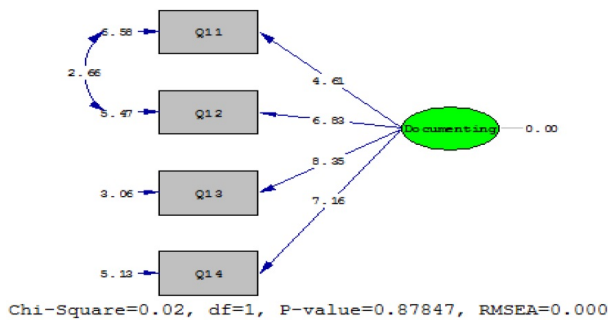Chi-Square=0.02, df=1, P-value=0.87847, RMSEA=0.000

Figure 6: Model for measuring the dimensions of documentation and reporting / reporting in a significant way

4.5 Confirmatory factor analysis of the variable of interaction between the central bank supervision department and internal audit units

Figures 7 and 8 show the model of the variable dimensions of the interaction between the central bank supervision department and internal audit units in standard and significant cases. As it is known, the membership of all the examined factors in this variable is confirmed:

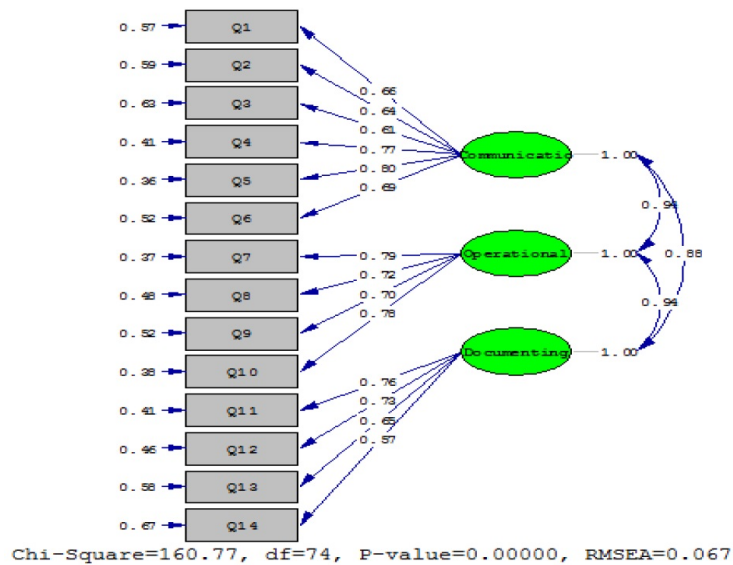Chi-Square=160.77, df=74, P-value=0.00000, RMSEA=0.067

Figure 7: Model for measuring the variable dimensions of the interaction between the central bank supervision department and internal audit units in standard mode

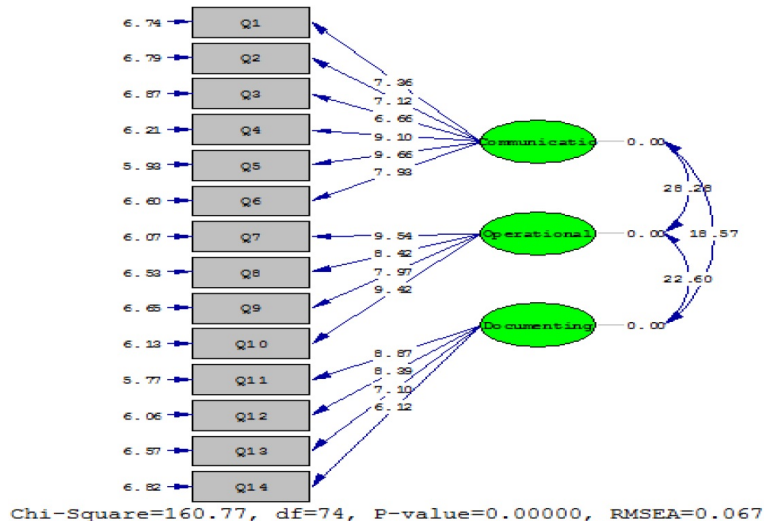Chi-Square=160.77, df=74, P-value=0.00000, RMSEA=0.067

Figure 8: Model for measuring the dimensions of interaction between the central bank supervision department and internal audit units in a significant way

4.6 Confirmatory factor analysis of banking supervision efficiency variables

Figures 9 and 10 show the model of variable dimensions of banking supervision efficiency in standard and significant cases. As it is known, the membership of all the examined factors in this variable is confirmed:
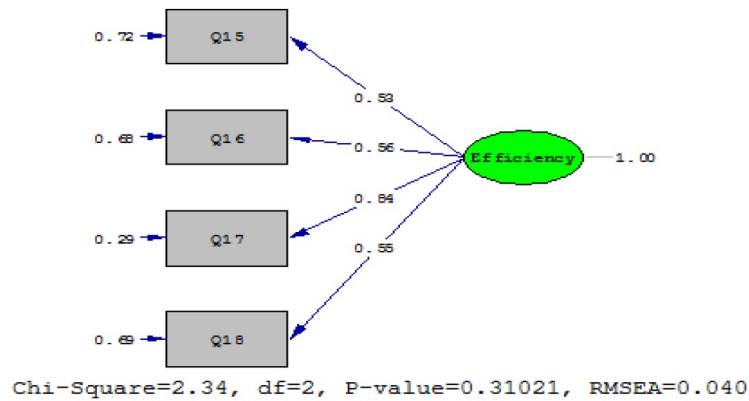

Chi-Square=2.34, df=2, P-value=0.31021, RMSEA=0.040

Figure 9: Model for measuring the variable dimensions of banking supervision efficiency in standard mode

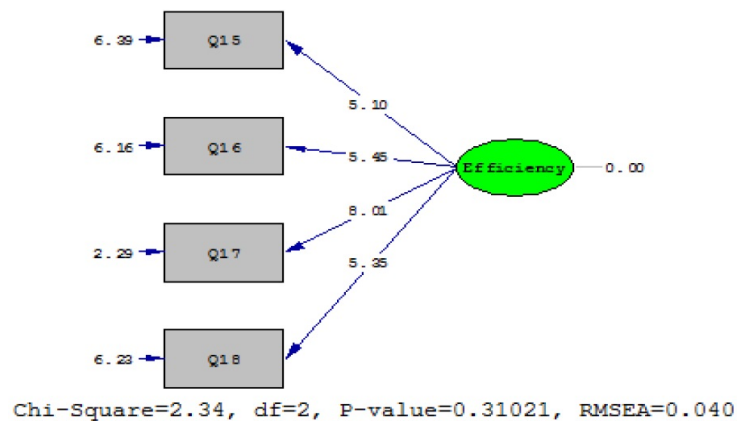Chi-Square=2.34, df=2, P-value=0.31021, RMSEA=0.040

Figure 10: A model for measuring the dimensions of banking supervision efficiency in a significant way

4.7 Confirmatory factor analysis of the variable of the effectiveness of banking supervision

Figures 11 and 12 show the model of variable dimensions of the effectiveness of banking supervision in standard and significant cases. As it is known, the membership of all the examined factors in this variable is confirmed:
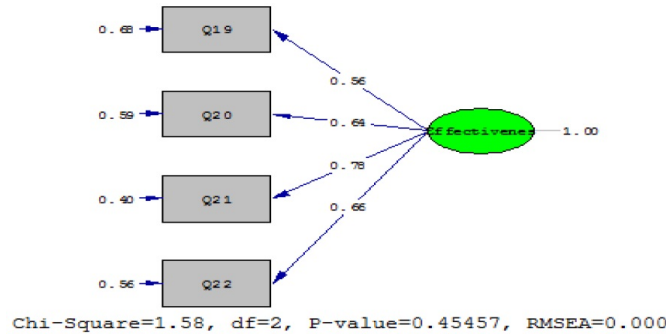
Chi-Square=1.58, df=2, P-value=0.45457, RMSEA=0.000

Figure 11: Model for measuring the variable dimensions of the effectiveness of banking supervision in the standard mode

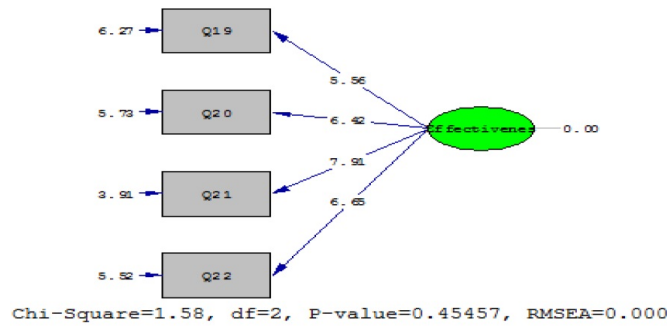Chi-Square=1.58, df=2, P-value=0.45457, RMSEA=0.000

Figure 12: Model for measuring the effectiveness of banking supervision in a significant way

4.8 Testing hypotheses using linear structured relationships

After determining the measurement models to evaluate the conceptual model of the research and also to ensure the existence or non-existence of a causal relationship between the research variables and to examine the appropriateness of the observed data with the conceptual model of the research, the research hypotheses were tested using structural equation modeling. The test results of the hypotheses are reflected in Figures 13 and 14:
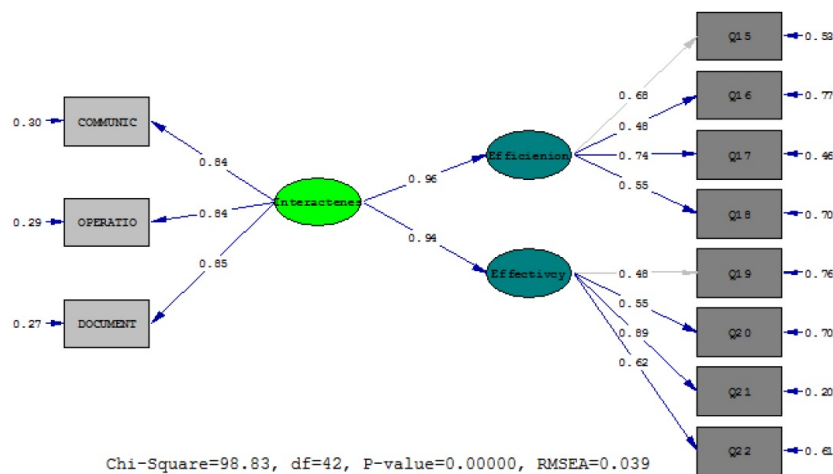
Chi-Square=98.83, df=42, P-value=0.00000, RMSEA=0.039

Figure 13: Fitting the general research model in the standard mode

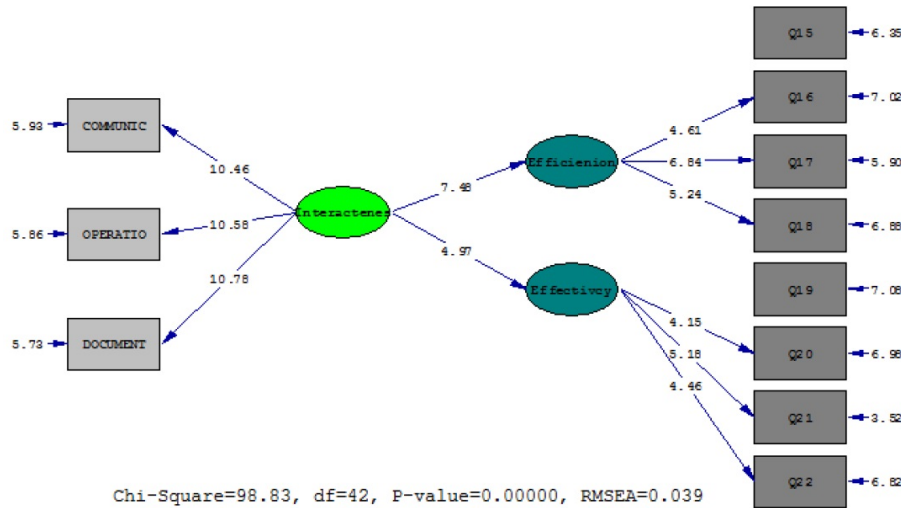Chi-Square=98.83, df=42, P-value=0.00000, RMSEA=0.039

Figure 14: Fitting the general research model in a significant way

Table 5: Values of model fit indices and fit result. The value of the pattern is the optimal value of the fit index

Fit index	Optimal amount	Pattern value
χ^2/df	< 3.00	2.30
GFI (Goodness of Fit Index)	> 0.90	0.94
AGFI (Adjusted Goodness of Fit Index)	> 0.90	0.90
RMR (Root Mean square Residual)	< 0.05	0.042
NFI (Normed Fit Index)	> 0.90	0.99
NNFI (Non-Normed Fit Index)	> 0.90	0.90
IFI (Incremental Fit Index)	> 0.90	0.97
CFI (Comparative Fit Index)	> 0.90	0.92
RMSEA (Root Mean Square Error of Approximation)	< 0.08	0.039

According to Table 5, where the model fit indices are presented, the values of all fit indices indicate the acceptable and appropriate status of the model and data and have an acceptable fit. In this regard, to evaluate the designed model, LISREL software was used, based on which the indicators of χ^2 to the degree of freedom, fit index, fit adjustment index, mean of residual squares, softened fit index, not softened fit index, Incremental fitness index, adaptive fitness index and the very important second root index of estimating the variance of approximation error have been used.

The ratio of χ^2 squared to the degree of freedom is highly dependent on the sample size, and the larger sample increases the quantity of chi-square more than can be attributed to the model being incorrect. Ideally, the ratio of chi-square to degree of freedom is less than 3. According to the value reported for this value in the table above, the results obtained in this section can be considered valid and statistically analyzable. Because the ratio of chi-square to degree of freedom for this model is reported to be 2.35. The GFI and AGFI indices proposed by Jöreskog and Sörbom [8] represent the relative values of variance and covariances that are explained by the model. This criterion is between zero and one variable that the closer to number one, the better the fit of the model with the observed data. The reported GFI and AGFI values for this model are higher than 0.9, which confirm the results of the chi-square test.

The second root index is the mean squared residual index (RMR), ie the difference between the matrix elements observed in the sample group and the matrix elements estimated or predicted assuming that the model is correct, that the closer the index is to zero for the model, the model has a better fit. The value of RMR in this study (0.042) indicates a suitable explanation of covariances. To evaluate how well a model, especially compared to other possible models, performs in terms of explaining the observed data set, from the values of the Softened Fitness Index (NFI), the Non-Softened Fitness Index (NNFI), Incremental Fitness Index (IFI), Adaptive Fitness Index (CFI), has been used, which values above 0.9 of these indicators indicate a very good fit of the designed model compared to other possible models. Finally, to examine how the fit and savings of the respective model are combined, a very powerful second-rooted index of estimation of variance of approximation error (RMSEA) has been used. The value of this index for good models is less than 0.08. A model in which this index is 0.10 or higher has a poor fit. The value of this index in this model is (0.039) which for the model designed in this research, shows the proper fit of the collected data and

their excellent fit.

Table 6 summarizes the significance coefficient and test results of the research hypotheses:

Table 6: Test result of hypotheses

Result	significance	Standard	Hypotheses
Confirmation	7.48	0.96	The interaction between the central bank's supervision department and internal audit units has a significant effect on the efficiency of bank supervision
Confirmation	4.97	0.94	The interaction between the central bank's supervision department and internal audit units has a significant effect on the effectiveness of bank supervision

As it is known, considering that the significance number of both research hypotheses is greater than (+1.96), it can be inferred that these hypotheses are confirmed.

5 Discussion

In the first hypothesis of the research, it was claimed that the interaction between the central bank supervision department and internal audit units has a significant effect on the efficiency of bank supervision. Statistical analysis between the two showed that the significance number of the path between the two variables is equal to (7.48) and because this value was greater than (+1.96), so this hypothesis was confirmed. On the other hand, because the standard coefficient of this causal relationship was positive (+0.96), this direct effect was recognized. This means that if the constructive interaction of the central bank's supervisory department with the banks' internal audit units will have a very strong and positive effect on the supervisory efficiency of the affiliated banks. This result is implicitly with the results of research conducted by Fathi et al. [4], Samandari et al. [11], Shabanian Badi and Firoozi [12], and Muchiri and Jagongo [9] is consistent.

In the second hypothesis of the study, it was claimed that the interaction between the central bank supervision department and internal audit units has a significant effect on the effectiveness of bank supervision. Statistical analysis between the two showed that the significance number of the path between the two variables is equal to (4.97) and because this value was greater than (+1.96), so this hypothesis was confirmed. On the other hand, because the standard coefficient of this causal relationship was positive (+0.94), this direct effect was recognized. This means that if the constructive interaction of the central bank's supervisory department with the banks' internal audit units will have a very strong and positive effect on the effectiveness of supervision in the subsidiary banks. This result is implicitly with the results of research conducted by Fathi et al. [4], Samandari et al. [11], Shabanian Badi and Firoozi [12], and Muchiri and Jagongo [9] is consistent.

6 Executive suggestions

According to the results of the present study, the following suggestions can be provided to senior managers of the Central Bank and banks operating in the country to improve the efficiency and effectiveness of banking supervision.

Sufficient number of assessments should be done in person by the supervisory authority of the Central Bank on the internal controls of the affiliated banks.

The supervisory authorities of the Central Bank should be actively involved in all supervisory matters through direct contact with the internal auditors of the affiliated banks.

Regular meetings are held between the central bank supervisors and the internal auditors of the affiliated banks.

The supervisory authorities of the central bank randomly and occasionally control the internal audit system of the affiliated banks.

Central bank supervisors should have sufficient knowledge of the supposed function and actual operation of the internal audit system of the affiliated banks.

Internal auditors of banks have access to central bank supervisors whenever necessary.

Internal auditors of banks should report any deficiencies to the supervisory authorities of the Central Bank.

Internal auditors of banks and central bank supervisors should, if necessary, use the expert opinions of independent auditors.

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