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Determining the relationships between central bank transparency, bank-level characteristics (micro variables) and macroeconomic variables with the capital market reaction (in the context of systemic risk and market return changes) using econometric methods and hierarchical analysis

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Abstract

This research evaluates the impact of central bank transparency on the reaction of the capital market in terms of risk and return. The study identifies systemic risk measures, dimensions of central bank transparency, and economic factors affecting the capital market reaction. It examines the relationship between central bank transparency and the reaction of the money and capital market in Iran and neighboring Islamic countries from 2008 to 2022. The study uses regression methods to investigate the relationship between central bank transparency and risk response. Findings show that increased central bank transparency is associated with reduced systemic risk and specific bank risk, but may also incentivize risky behavior in the banking sector.

Keywords: central bank transparency, capital market reaction, systemic risk, short and long term returns, central bank supervision
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1 Introduction

Until the 1990s, central banks were shrouded in mystery, and their policymakers and trustees believed that this was how it should be. Conventional wisdom in central banking circles was based on the belief that monetary policymakers should say as little as possible and express it confidentially. But the view that monetary policy is, at least to some extent, about managing expectations, is now widely accepted both in academia and central bank policy-making circles. It is not an exaggeration if we call such a view a revolution in thinking about the central bank. The new idea of

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transparency of the central bank has also affected the performance of the central bank. Developments in the real world have given rise to a large new scholarly literature on central bank communication, almost entirely over the past two decades. While part of this new literature has mainly dealt with theoretical issues, most of it is based on empirical evidence and this shows the importance of the subject. The studies conducted on how to create communication of the central bank are focused on the issue that, for example, the written or oral reports of the trustees and policymakers of the central bank influenced the expectations of the capital market and therefore the value, return and accordingly the risk of investing in assets under It affects In certain circumstances, it is even possible that the communication of the central bank has an effect on the direction of the monetary and financial markets and the guidance of market expectations, and in some cases, it is even possible that the mentioned communication becomes the main tool for applying monetary policies through financial transparency [15].

The review of the research literature based on the empirical evidence obtained from the research on the effect of the financial transparency of the central bank on the market reaction in the form of noise and systemic risk (for example: reducing market uncertainty) [20], shows that there are two main fields in the literature. The first group of research focuses on the effects of central bank communications on financial markets and the capital market's reaction to the central bank's financial transparency. The main idea in these studies is that if the central bank's communications successfully guide expectations, the price, return and risk of capital assets in the money and financial markets should react and policy decisions become more predictable. The second category of research tries to relate the difference in communication strategies between central banks or in terms of time to the difference in economic performance. For example, does announcing a numerical inflation target help guide people's long-term inflation expectations [1].

The review of previous research shows that although the collection of research related to the evaluation of the effects of Central Bank Transparency (CBT) is growing, but the findings are mixed and sometimes even contradictory. Demertzis, Hughes Hallett [11] have emphasized that there is a potential difference between the ability to control central banks and their need for financial transparency, and therefore, different researchers have reached different results [11]. Despite the aforementioned conflicts, the studies of Chortareas [7], De Mendonça, and Fiho [10], Demertzis and Hughes Hallett [11], Dincer and Eichengreen [13] and finally Papadamou et al [22] based on the results obtained from their research have shown that increasing the level of transparency of the central bank (CBT) reduces the volatility of the stock market due to the increased ability of the central bank in managing expectations. Van der Cruijsen et al [25] also showed during a similar study that based on the increase in the level of transparency of the central bank (CBT), inflation has been minimized and at the same time there is a favourable level of transparency of the central bank (CBT) [23]. Beyond the desired level, confusion and information overload may worsen the quality of private sector inflation forecasts. In the study of Afshari & Daraei [2], credit is considered as one of the main elements of effective communication of the central bank, and "financial transparency" applied through the effective role of central bank communication on credit has been considered [2]. Aftab & Mehmood [3] show in research that increasing the transparency of the central bank has a stabilizing effect on exchange rate fluctuations and this effect remains even after controlling various internal and external factors [3].

According to these findings, during the current research, a new analysis was conducted to design a model to explain the relationship between central bank transparency and capital market reaction, to explain the potential relationship between central bank transparency (CBT) and market reaction in the form of share-based fluctuations. It is based on systemic risk (SR). Based on this, in the form of identification and refinement of systemic risk measures in the capital market, the financial transparency of the central bank and the factors affecting it, the relationship between them will be explained.

2 Data and methods

This research is in line with the development of literature related to risk and performance in the financial industry based on providing appropriate models in determining the relationship between variables as well as innovation in the field of providing models and developing literature in this field, from the perspective of a theoretical goal and based on providing guidelines for improvement Performance in the financial industry consists of: banks and credit institutions, investment companies, and finally, applied research companies and brokerages. Also, this study is post-event, retrospective or descriptive-analytical based on past experiences.

The statistical community in the calculation of explanatory and dependent variables is made up of companies and institutions active in the financial industry (banks and financial institutions) that were randomly selected. Delphi, in order to identify the components of the proposed model, from the unspecified and unlimited community of experts and experts in the field of finance and banking, which includes professors and policymakers of banking, finance and

money of the country with a doctorate degree in economics, finance or accounting and having scientific and practical experience in were financial or monetary, 25 people were selected by snowball method and surveyed by Delphi method.

Another statistical population of this study is 26 countries that are officially considered as Islamic countries based on the constitution. These countries include Egypt, Iran, Iraq, Jordan, Kuwait, Libya, Maldives, Malaysia, Mauritania, Morocco, Oman, Pakistan, Palestine, Qatar, Saudi Arabia, the Sahrawi Republic, Somalia, Tunisia, Afghanistan, Algeria, Bangladesh, and Bahrain. , Brunei, Comoros, Djibouti, United Arab Emirates and Yemen, and they were studied in the ten years ending on 3/20/2022 due to the limited number of censuses. Capital market variables are valued at the macro level and based on the average value in each country. The required data on the transparency of the central bank is extracted from the global system of Transparency International and other data from the World Bank or the stock exchange systems of these countries.

For the statistical analysis of the data, two types of descriptive and inferential statistical methods have been used. In the regression analysis, the functional data of the years (2017-2022) in a period of 6 years and the panel data method have been used. For this purpose, Limmer's F-test, Chow and Hausman's test for choosing between fixed and random effects, Fisher's test for the accuracy of the research regression model, and Durbin-Watson's test for independence of observations were used. The assumptions of the normality of the distribution of the variables were evaluated by using the Jarkio-Bera statistic, the normality of the distribution of the residuals by comparing the histogram of the distribution of errors, the stability of the variances by using the White test, and the linear independence of the independent variables were evaluated based on Pearson's linear correlation analysis. In addition, since the data related to the variable was defined in an absolute form and based on Rial value, to provide the ability to compare the values of the times or to combine the data related to different years, the function of adjusting the data to The logarithmic method or, if possible, adjustment based on the general price index has been used. Durbin-Watson's test was also used to evaluate the independence of the residuals.

3 Research model

The model for explaining the relationship between the transparency of the central bank and the reaction of the capital market in this research is defined based on related and similar literature, especially the proposed model of Rai, Rogers and Susanna [5] and Andrieş et al [4].

The present study is the first research that is based on a combination of three approaches: 1) Analysis of the Knowledge Domain, 2) a Multi-criteria decision-making approach (MADM) and 3) Econometric Methodology. In this model, the aim is to identify and refine systemic risk indicators (SR), the level of financial transparency of the central bank and factors affecting systemic risk (SR) as a capital market reaction by analyzing the field of knowledge and a multi-criteria approach and finally explaining the relationships between the mentioned It is done through econometrics in Iran's capital market. A summary of the definition and measurement of the variables is presented in Table No. 1.

The main explanatory variable studied in this research is the central bank's financial transparency (TI), which is based on the proposed model of Dincer and Eichengreen [12] and based on the real information announced by the central banks based on the performance data of more than 100 central banks. It is calculated for the period under review. This index is measured based on 15 components related to five dimensions of transparency and following the method developed by Geraats [14]. These dimensions are: 1) political transparency, 2) economic transparency, 3) procedural transparency, 4) political transparency and 5) operational transparency. Each dimension has one point and a total of 15 points, and if the central bank does not show any degree of transparency, its value is at least zero and in case of high transparency, the maximum is 15.

The relationship between the financial transparency of the central bank and the market reaction (systemic risk) will be estimated based on the compound linear relationship as described in relationship number 1 and defined as follows and based on the least squares and panel data analysis model:

Relation number 1:

$$\text{Risk}_{ij,t} = \beta_0 + \beta_1 \text{CentralBankTransparency}_{j,t-1} + \beta_2 \text{Bankcontrols}_{ij,t-1} + \beta_3 \text{Macrocontrol}_{sj,t-1} + \delta_1 + \varphi_t + \varepsilon_{ij,t}$$

In this regard, the dependent variable $\text{Risk}_{ij,t}$ is defined based on the systemic risk of bank i from country j in year t, and in the second step, the dependent variable is defined based on the individual risk of bank i from country j in year t. The independent variable is $\text{CentralBankTransparency}_{j,t-1}$, the transparency of the central bank and as a delay structure and the main factor of capital return is related to the country's central bank in year $t-1$.

$\text{Bankcontrols}_{ij,t-1}$ is the delay structures of control variables at the micro level and for each bank, which indicate the difference in risk profile and business strategies among banks and includes variables such as:

Table 1: Summary of definition and measurement of variables

Row	Variable description	code	Measuring scale
1	Change in the conditional value of risk	ΔCoVaR	The share of the 1st bank in systemic risk, as the difference in the value at risk, the difference in the market value of the sum of assets subject to the failure of a particular bank (first percentile) and the median market value estimated using the quantal regression method, where the total market value. The assets of the system are evaluated based on the market value of the assets of each of the banks and in a set of market indices that value the exposure of financial institutions based on common factors, which include: the level of the financial index of return, the difference between the ten-year spread and a Monthly government bonds, changes in bond rates, changes in quarterly returns of bank and market stock rates, and the fluctuation of market returns expressed annually.
2	Value at risk	VaR	The maximum possible loss is considered as a percentage of the total market value of the assets that the bank can register for a certain confidence level (99%) and is estimated using the quantile regression method. In this estimate, the market value of the total assets of Bank i is estimated based on a set of market indicators in a sample of financial institutions. The common factors are: the level of the financial index of return, the difference between ten-year and one-month government bond spreads, changes in bond rates, changes in the three-month returns of bank and market stock rates, and the fluctuation of market returns. Finally, this amount is expressed annually.
3	Systemic risk	SRISK	I'am Bank's loss in the year depends on the helplessness of the whole system, which is defined on the basis of 1% of the worst results of the capital market.
4	bank size	Size	The natural logarithm of the total assets of each bank at the end of the period
5	Proprietary ratio	OWNR	The book value of equity to the total assets of each bank at the end of the period
6	Facility rate	FACR	Sum of facilities to sum of assets at the end of the period
7	Deposit absorption rate	DEPR	Total deposits to total assets at the end of the period
8	Average return on assets	ROAA	Net profit on average assets at the beginning and end of the period
9	Independence of the central bank	CBII	Total points for: 1) appointment, dismissal and term of office of the head of the central bank, 2) resolving conflicts between the executive branch and the central bank, 3) the centrality of the central bank and 4) the limitation of granting facilities to the government.
10	Central bank supervision	CBSI	Privilege depends on: 1- The central bank does not participate in the supervision. 2- Banking supervision is divided between the central bank and another authority. 3- Only banking supervision is at the disposal of the central bank. 4- Unit supervision over banking and insurance departments within the central bank. 5 - Single supervision of banking departments and securities markets within the central bank. 6 - Single supervision over the entire financial sector within the central bank.
11	Quality index of legality	RQI	Regulatory quality captures the government's ability to formulate and implement sound policies and regulations that allow private sector development.
12	Relative wealth	CBA	Sum of central bank assets to gross domestic product
13	Economic growth per capita	GDPR	Percentage change of GDP per person in the country
14	Competitiveness	LCI	The percentage of the central bank's market share from the financial industry based on total revenues

1) the logarithm of total assets as a measure of bank size; 2) ownership ratio or the ratio of equity to total assets as a standard for measuring capital adequacy; 3) facility rate to total assets as a measure of the ratio of customer deposits to total liabilities and as a measure for the budget structure and 4) average return on assets, as a measure of profitability in performance evaluation.

In addition, the delay structures of control variables at the macro level, namely $\text{Macrocontrol}_{sj,t-1}$ have also been used. These variables have been selected to control the heterogeneity in different banking systems and the macroeconomic environment and include things such as: 1) the ratio of central bank assets to GDP, 2) per capita GDP growth, 3) the annual inflation index and 4) the Lerner index. It has been used as a measure of internal competition. In addition, in this regard, country fixed effects (δ_i) and year fixed effects (φ_t) and finally ($\varepsilon_{ij,t}$) have been defined as estimation errors.

During the current research, in order to involve the central bank's supervisory role, three supervisory indicators including 1) the independence of the central bank, 2) the supervisory role of the central bank, and 3) the rule of law quality index have been used [4] and their average as an index. Legitimacy or *Regulatoryindex* is considered based on the differentiation pattern in the relationship between variables. In such a way that the difference between the value of this index for each country and its mean in the entire studied sample has been calculated. Based on this, the effect of financial transparency, legality, bank-level characteristics and macro-level characteristics on the capital

market reaction (systemic risk) is defined in the form of relationship number 2:

Relation number 2:

$$\begin{aligned}\text{Risk}_{ij,t} =&\beta_0 + \beta_1 \text{CentralBankTransparency}_{j,t-1} + \beta_2 \text{CentralBankTransparency}_{j,t-1} \star \text{Regulatoryindex}_{j,t-1} + \\ &\beta_3 \text{Regulatoryindex}_{j,t-1} + \beta_4 \text{Bankcontrols}_{ij,t-1} + \beta_5 \text{Macrocontrol}_{sj,t-1} + \delta_1 + \varphi_t + \varepsilon_{ij,t}\end{aligned}$$

The central bank independence index is the updated version of the proposed model of Cukierman et al [9], which was revised by Bodea and Hicks [6]. This criterion includes four dimensions related to 1) the appointment, removal and tenure of the head of the central bank 2) resolving disputes between the executive branch and the central bank, 3) the objectives of the central bank and 4) laws limiting the granting of facilities to the government, and higher values It is associated with greater independence of the central bank.

The supervisory role of the central bank is defined in the form of the supervision index and through the roles that central banks have in supervising financial institutions, and it was invented by Masciandaro et al [19]. This index gets the minimum score in countries where no supervisory responsibility is assigned to the central bank, and otherwise it has the maximum score.

In determining the relationship between financial transparency and capital market reaction, univariate tests have been used at first. Univariate tests first determine whether there are improvements in forecast accuracy, reductions in surprise announcements, and reductions in the standard deviation of economists' forecasts following changes in central bank policies to increase transparency. In this regard, the accuracy of forecasts (ACCUR) for each change in the monetary policy rate (MPR) is defined and measured as follows: Accuracy of Forecasts (ACCUR): Number of accurate forecasts to total forecasts per change in MPR and year average.

It is expected that the change in forecast accuracy before and after the improvement of banking transparency will increase if the transparency is effective. SURP surprise announcement is measured as the absolute difference between the actual and average forecast for each MPR change. Any deviation from zero is treated as a surprise. If transparency leads to more accurate predictions, the percentage of surprise announcements should be lower in the post-period. If clarification efforts are effective, standard deviations should also decrease in the latter period.

In addition, multivariate tests are followed in order to determine the informational content of the announcements and the effect of transparency. Since central bank supervisors do not have access to the same information as the central bank, some markets are expected to react on the announcement date. If investors' macroeconomic outlook aligns with that of central banks, the market's expected interest rates will adjust ahead of the announcement. For this purpose, an event study is used to record the expected interest rate changes in the market before, during and after the announcement date. Market reactions too far from the announcement may be influenced by other events, while those too close to the announcement may miss changes that occurred before the event. For this study, an interval of two weeks or ten working days is selected before and after the announcement of the MPR change. This number is evaluated based on the frequency of MPR changes in the spatial extent and time frame of the research. In this regard, the multivariate regression relationship with the panel data analysis approach and fixed effect has been used as described in relationship number 3 and as follows.

Relation number 3:

$$\begin{aligned}R_{t,t+n} =&\beta_0 + \beta_1 \Delta MPR + \beta_2 MPR \star SURP + \beta_3 MPR \star STD + \beta_4 POST + \beta_5 POST \star SURP + \beta_6 POST \\ &\star STD + \beta_7 NUM + \beta_8 QUAL + \beta_9 \Delta FX_s + \beta_{10} \Delta PBDEBT + \beta_{11} BOP + \beta_{12} GDP_s + \varepsilon_i\end{aligned}$$

In this relationship, the dependent variable $R_{t,t+n}$ is the reaction of the capital market in the form of stock returns before and after the announcement of a special transparency policy by the central bank based on the changes in the stock prices of the studied companies on day $t = 0$, while which is $n = -10, -5, -1, 1, 5$ and 10 days, based on the contagion theory of money and capital markets in the country, it is assumed that changes in stock returns in the capital market can be a reaction to changes in money markets. Specifically, the log change in stock return rates over the following periods (-10 to -1), (-5 to -1), (-1 to 0), (0 to 1), (1 to 5) and (1 to 10) are estimated. This combination covers four weeks or 20 working days from the date of announcement. The immediate impact on market rates of return is expected to be observed for the interval (-1 to 0), MPR on day 0 minus MPR on day -1.

Based on the proposed model, ΔMPR is the primary independent variable that determines the information content of the monetary policy announcement from the perspective of transparency. Two additional variables include $SURP$ for announcements that are a surprise and STD for announcements that are not unanimously predicted by economists, in other words, there is a split vote.

In addition, *POST* is a dummy variable for the period after the announcement of monetary policy in line with transparency and determines the effect of transparency. Since the dependent variable is examined before, on the day and after the announcement, explanations about the expected signs of the coefficients for all intervals are provided.

4 Results

Based on the studies of the research literature and according to the survey of the examined experts and the Delphi method, the identified components of the proposed model are summarized as described in Table No. 2:

Table 2: Refined components of the proposed model based on the use of fuzzy Delphi survey of experts

Row	Variable Description	Dimensions	Measurement method
1	Transparency of the central bank	Political transparency	Having formal goals
2			Objective and quantitative goal setting
3			Having institutional arrangements and systems
4		Economic transparency	Periodic publication of monetary, financial and economic data
5			Using models for policy making
6			Publication of economic forecasts
7		Procedural transparency	Developing and communicating a clear strategy
8			Publication of meeting minutes and documents
9			Publication of documents and decision-making documents
10		policy transparency	Quick notification
11			Explanation of policies
12			Adherence to policies
13		Operational transparency	Control of errors and deviation from goals
14			Reflecting functional disorders
15			Evaluating policy outcomes
16	Risk	Change in the conditional value of risk exposed value	Money and capital market performance data
17			Money and capital market performance data
18		Systemic risk	Money and capital market performance data
19	Financial wisdom component	Company value to capital	Money and capital market performance data
20		Asset size	Money and capital market performance data
21		Liquidity of assets	Money and capital market performance data
22	The component of economic wisdom	Market return index	Money and capital market performance data
23		Index of the value of transactions in the stock exchange	Money and capital market performance data
24	macroeconomic component	Financial instability	Money and capital market performance data
25		Investment growth	Money and capital market performance data
26		Financial development	Money and capital market performance data
27		GDP growth	Money and capital market performance data
28		Price index growth	Money and capital market performance data
29		Monetary base	Money and capital market performance data
30		Real interest rate	Money and capital market performance data

To investigate the relationship between the transparency of the central bank in the context of changes in monetary policies, the transparency of the central bank and the reaction of the money and capital market, first, the findings and the univariate test have been described, and then the multivariate test of the relationships between the variables has been investigated. In this regard, the data of Islamic countries (26 countries) in the period from 2008 to 2022 were used for 15 years and divided into two sub-periods. In this regard, based on the univariate test, the averages of the two dependent samples (earlier period and later period) and the significance of their differences in these two periods have been compared and tested. Table No. 3 shows the test of paired comparisons between the previous and the last periods. In this table, the numbers marked with *, **, and ***; have been determined that it was significant at the level of 10, 5 and 1 percent, respectively:

Table No. 3 shows the results of the univariate test of three variables, the accuracy of the economists' forecasts, the number of surprise announcements and the error (standard deviation) of the forecasts. The analysis of the findings shows that: the average annual accuracy (ACCUR) in the entire studied period was 71.62% for Iran, 61.0% in neighboring countries and 46.09% in other Islamic countries. The accuracy of forecasting in Iran and other Islamic countries has improved in the recent period compared to before so that in Iran it has increased from 63.96 to 78.33 percent in the recent period. The paired dependent samples test for the difference in prediction accuracy in Iran and other neighbouring countries has been statistically significant at the 10% level. While the level of forecasting accuracy

Table 3: Pairwise test comparing prediction accuracy, surprising predictions and prediction error

Time	Iran			Neighboring Countries			Other Islamic countries		
	ACCUR	SURP	STD	ACCUR	SURP	STD	ACCUR	SURP	STD
2008	74.53	33.33	097.0	67.66	100	087.0	22.14	100	00.8
2009	57.67	22.22	109.0	26.72	22.22	079.0	00.0	100	080.0
2010	08.78	25	075.0	11.86	0	063.0	49.51	50	000.0
2011	67.91	0	037	79.61	40	064.0	68.76	25	097.0
2012	99.54	50	105.0	95.71	20	136.0	12.29	100	085.0
2013	49.53	40	162.0	19.50	14.57	170.0	25.46	5.37	130.0
2014	21.48	67.66	080.0	89.75	29.14	081.0	00.0	100	164.0
2015	31.74	25	065.0	23.59	40	094.0	18.72	29.14	000.0
2016	77.57	57.28	054.0	79.15	100	090.0	33.37	67.66	074.0
2017	4.76	67.16	070.0	22.36	50	100.0	27.62	33.33	090.0
2018	85.58	40	078.0	04.85	0	073.0	19.71	20	073.0
2019	66.91	0	064.0	26.58	50	115.0	59.39	75	084.0
2020	9.73	100	065.0	48.59	60	122.0	98.68	25	108.0
2021	54.85	5.12	041.0	39.62	50	088.0	70.56	44.44	069.0
2022	17.95	0	055.0	17.52	0	120.0	36.73	0	100.0
Average									
Total Time	62.71	66.30	077.0	00.61	83.38	097.0	09.46	75.52	083.0
2008-2015	96.63	89.33	095.0	27.69	24.36	097.0	97.29	21.73	079.0
2015-2022	33.78	84.27	062.0	73.52	43.41	097.0	20.60	84.34	086.0
The meaning of t	P = 0.075⋆	P = 0.673	P = 0.061⋆	P = 0.100	P = 0.780	P = 0.987	P = 0.015⋆⋆	P = 0.034⋆⋆	P = 0.790

in neighboring countries has decreased from 69.27% to 52.73% in the recent period, the Student's t-test shows that this difference is statistically insignificant.

Other Islamic countries have had the highest increase in forecasting accuracy, from 29.97% to 60.20% in the recent period, and this difference is statistically significant. The lowest accurate estimates were in 2009 and 2014 for other Islamic countries and equal to zero percent, because they had only one monetary policy change (MPR) in both years. In general, it can be concluded that the clarification efforts by the central banks of Iran and other Islamic countries have significantly improved the forecast accuracy during the years 2015 onwards (late period), while the forecast accuracy in neighbouring countries has remained unchanged.

It is expected that the percentage of surprise announcements (SURP) will decrease as the accuracy of predictions increases. During the period under review (2008-2022), the average surprise notifications (SURP) was 33.66% in Iran, 38.83% in neighbouring countries and 52.75% for other Islamic countries. Comparing the situation before and after the period shows that surprise announcements (SURP) in Iran decreased from 33.89 to 27.84%, but there was no statistically significant difference. Among neighbouring countries, surprise notifications (SURP) have increased and this difference is not statistically significant. While in other Islamic countries, this number has decreased and is statistically significant. The average prediction error (STD) during the entire period from 2008 to 2022 was 0.077% for Iran, 0.097% in neighbouring countries, and 0.083% in other Islamic countries. In addition, the comparison of the prediction error in the previous and subsequent periods shows that the average prediction error (STD) in Iran has decreased from 0.095% to 0.062% and is statistically significant. In neighbouring countries, the average prediction error (STD) has not changed much compared to before, but it has increased in other Islamic countries and this difference is statistically insignificant. In general, the univariate tests show that the central bank's clarification efforts have improved the forecasts of monetary policy measures in Iran and other Islamic countries, but there has been no significant change in neighbouring countries. The improvement made can lead to better performance in forecasting accuracy in the mentioned countries. In the following, the impact of this clarification on the reaction of the money and capital market has been examined.

Because central banks have more information than the private sector, there will always be some monetary policy news and macroeconomic news in any announcement. The statistical tests in this part of the analysis of the findings determine whether the two news components are low or high based on the reaction of the money and capital market to interest rates before, during and after the central bank announcements. Tables 4, 5 and 6 respectively show the results of the tests of the effect of central bank transparency on the reaction of the capital market in Iran, neighbouring countries and other Islamic countries.

Table 4 in relation to the reaction of the capital market to the transparency of the Central Bank of Iran shows that the coefficient of change of monetary policies (ΔMPR) is positive for one-day returns and also positive for the interval (-10 to -1). The adjustment of return rates in the capital market related to before the news announcement shows that

Table 4: The effect of central bank transparency on the reaction of Iran's money and capital market

Market reaction	variable description	Symbol	10- 1-	5- 1-	1- - 0	0 - 1	1 - 5	1 - 10
One day Return	Intercept	Intercept Elevation	-0.047-	0.040-	0.054	-0.329	-0.076	-0.055
	ΔMPR	Change in monetary policy	*0.207	0.203	***0.688	0.134	0.079	0.065
	ΔMPR*SURP	Interaction of surprise announcement and monetary policy change	***0.215	***0.224	***0.326-	**0.549	**0.137	*0.106
	ΔMPR*STD	Interaction of forecast error and monetary policy change	-0.008	-0.010	0.008	-0.008	0.001	0.002
	POST	Late period	*0.038	*0.038	**-0.051	0.041	0.015	0.012
	POST*SURP	Post-course interaction and surprise announcement	0.002	0.002	***0.021-	0.021	***0.016	***0.017
	POST*STD	The interaction of hindsight and prediction error	-0.019	-0.032	0.052	-0.109	-0.043	-0.035
	NUM	Economists and capital market analysts	0.007	0.005	0.001-	0.070	0.010	0.006
	QUAL	Qualified economists and analysts	0.003	0.001	0.030-	0.045	0.039	0.034
	FX	exchange rate	*0.119	*0.131	-0.106	-0.035	0.007	-0.013
	PBDEBT	Public debt	-0.054	-0.031	0.326	0.016	-0.176	-0.228
	BOP	Balance of payments	0.000	0.000	-0.001	0.001	0.000	0.000
	LGDP	The natural logarithm of GDP	0.085	0.069	0.029	-0.153	*-0.098	*-0.096
	Fixed effects	Fixed effects	Year	Year	Year	Year	Year	Year
	N	Number of items	82	82	82	82	82	82
	Adj. R2	Adjusted coefficient of determination	0.1691	0.2107	0.858	0.0054	0.1654	0.1481
Annual Return	Intercept	Intercept Elevation	0.127	-0.038	0.026	0.107	0.079	0.027
	ΔMPR	Change in monetary policy	-0.035	-0.092	0.220	-0.048	-0.112	-0.136
	ΔMPR*SURP	Interaction of surprise announcement and monetary policy change	*0.216	-0.051	0.061	***0.257	0.083	**0.289
	ΔMPR*STD	Interaction of forecast error and monetary policy change	**0.019	***0.019	0.004-	0.001	*0.013	***0.027
	POST	Late period	0.046	0.003	*0.042	0.002	*-0.046	-0.009
	POST*SURP	Post-course interaction and surprise announcement	*-0.016	-0.006	-0.001	0.007	***0.017	***0.025
	POST*STD	The interaction of hindsight and prediction error	0.127	0.054	0.008	0.064	-0.079	0.064
	NUM	Economists and capital market analysts	-0.036	0.007	-0.020	-0.018	-0.007	-0.006
	QUAL	Qualified economists and analysts	-0.052	-0.008	0.030	-0.04-	-0.027	-0.019
	FX	exchange rate	-0.138	-0.060	0.039	0.014	-0.031	-0.064
	PBDEBT	Public debt	-0.186	0.111	-0.262	0.137	0.120	0.173
	BOP	Balance of payments	0.000	0.000	0.001	0.000	0.001	0.000
	LGDP	The natural logarithm of GDP	-0.084	-0.101	0.097	-0.024	**-0.192	0.101
	Fixed effects	Fixed effects	Year	Year	Year	Year	Year	Year
	N	Number of items	67	67	67	67	67	67
	Adj. R2	Adjusted coefficient of determination	0.1966	0.2278	0.0066	0.0323	0.3853	0.3381
Long term Returns	Intercept	Intercept Elevation	0.040	0.259	***0.295	-0.106	0.160	0.258
	ΔMPR	Change in monetary policy	0.286	-0.132	0.058	-0.136	-0.266	-0.384
	ΔMPR*SURP	Interaction of surprise announcement and monetary policy change	0.170	0.022	0.059-	0.000	0.076	0.063
	ΔMPR*STD	Interaction of forecast error and monetary policy change	0.010	0.006	0.007-	***0.016	**0.021	**0.025

	POST	Late period	0.025	-0.007	0.001	-0.004	-0.013	-0.016
	POST*SURP	Post-course interaction and surprise announcement	***-0.032	0.002	-0.006	0.002	0.008	0.007
	POST*STD	The interaction of hindsight and prediction error	**0.219 -	0.012	0.053	-0.025	-0.008	0.007
	NUM	Economists and capital market analysts	-0.012	-0.058	***0.067	0.028	-0.038	-0.061
	QUAL	Qualified economists and analysts	0.000	-0.060	*-0.040	-0.001	-0.016	-0.028
	FX	exchange rate	-0.212	*-0.148	-0.007	*0.112	0.061	-0.007
	PBDEBT	Public debt	**-1.031	-0.120	**-0.303	0.139	0.257	0.336
	BOP	Balance of payments	0.000	0.001	**0.001	0.000	**0.002	0.002
	LGDP	The natural logarithm of GDP	-0.241	-0.117	-0.035	-0.062	-0.204	*-0.248
	Fixed effects	Fixed effects	Year	Year	Year	Year	Year	Year
	N	Number of items	67	67	67	67	67	67
	Adj. R^2	Adjusted coefficient of determination	0.0925	0.0011	0.3207	0.0753	0.1731	0.2128

the monetary policy rate changes are predicted and reduce the impact of the monetary policy news component. The coefficient of monetary policy announcement date, (-1 to 0), is positive based on 69 cases.

For surprise announcements, the interactive coefficient of monetary policy change and surprise announcements (ΔMPR*SURP) is positive before the announcement and negative on the announcement date, indicating a low monetary policy news component. ΔMPR*SURP is positive after the announcement indicating the presence of macroeconomic news in the central bank announcement. Surprise announcements differ from non-surprise announcements in that there is a high macro news component in central bank announcements and ΔMPR*STD is significant for all time intervals.

POST coefficients are positive before the announcement and negative on the announcement date, which further reduces the impact of the monetary policy component in the announcements. The coefficients after the announcement are insignificant, which shows that there is still no macroeconomic news in the announcement. POST*SURP is negative (-1 to 0) on the announcement date, indicating less monetary policy news than before. Uncertainty after the announcement with positive coefficients for time intervals (1 to 5) and (1 to 10) still prevails, which shows that the component of macroeconomic news in the announcement is more in the period after surprise announcements. In addition, the forecast error (POST*STD) remains insignificant and insignificant in the later period.

The coefficients of monetary policy change (ΔMPR) for one-year rates are all insignificant. The results for surprise announcements are different, showing a positive ΔMPR*SURP in the interval (-10 to -1) and an insignificant coefficient on the announcement day (-0 to 1) of low money. The results are similar for announcements with higher prediction error (ΔMPR*STD). The POST coefficient is positive on the announcement date and negative in the interval (1 to 5), which indicates the increase of uncertainty after the announcement in the later period. POST*SURP is negative for (-10 to -1) and positive in the intervals (1 to 5) and (1 to 10), while POST*STD is insignificant for all intervals.

The coefficients of ΔMPR and ΔMPR*SURP are insignificant for long-term market rates of return for all intervals. However, ΔMPR*STD is positive for all post-announcement intervals, indicating that macroeconomic news and central bank transparency are related to capital market reaction. POST is not significant for all intervals, but POST*SURP is positive before the announcement, indicating rate adjustments before the central bank's policy announcement. POST*STD is negative for the interval (-10 to -1) and insignificant on the announcement date.

The control variables for all three time periods show small significant coefficients and are generally consistent with expectations. The number of economists and money and capital market analysts, including qualified economists and financial analysts, has a large impact by dampening market reactions at the announcement date of long-term rates. FX and BOP coefficients show positive coefficients for one-day, one-year and long-term maturities while GDP and PDEBT show negative coefficients.

In general, the results of one-day rates show that the announcements of the central bank in Iran and the transparency interpretation of the central bank contain low monetary policy news and little macroeconomic news. Transparency further reduced the amount of monetary policy news in announcements, which is consistent with univariate

tests that show improvement in forecast accuracy and reduction in forecast error and surprise announcements of low monetary policy news and high macroeconomic news. The transparency of the central bank has reduced monetary policy news and increased the component of macroeconomic news in post-period announcements.

Table 5: The effect of central bank transparency on the reaction of money and capital markets of neighboring countries

Market reaction	Variable description	Symbol	10- 1-	5- 1-	1- - 0	0 - 1	1 - 5	1 - 10
One day Return	Intercept	Intercept Elevation	*0.606	-0.279	0.039	**-0.209	**0.208	*0.387
	ΔMPR	Change in monetary policy	***0.507	-0.008	***-0.788	***-0.094	***0.098	***0.321
	ΔMPR*SURP	Interaction of surprise announcement and monetary policy change	***0.283	**-0.108	***0.301	***-0.064	*0.037	-0.077
	ΔMPR*STD	Interaction of forecast error and monetary policy change	***-0.014	0.003	-0.003	***0.003	***-0.003	***-0.007
	POST	Late period	0.041	-0.062	0.050	*-0.040	0.002	0.046
	POST*SURP	Post-course interaction and surprise announcement	-0.007	-0.007	0.007	0.000	0.001	0.005
	POST*STD	The interaction of hindsight and prediction error	-0.121	0.092	0.046	0.034	**0.196	0.278
	NUM	Economists and capital market analysts	-0.140	*0.089	-0.017	**0.054	***-0.062	*-0.112
	QUAL	Qualified economists and analysts	**0.369-	0.088	0.019-	***0.119	-0.059	*-0.169
	FX	exchange rate	0.253	-0.081	0.211	-0.053	0.021	0.130
	PBDEBT	Public debt	-0.017	0.001	0.079	0.055	0.007	-0.021
	BOP	Balance of payments	0.001	0.003	0.003-	0.001	0.001-	-0.006
	LGDP	The natural logarithm of GDP	0.085-	0.040	0.402	0.132	**0.242-	-0.314
	Fixed effects	Fixed effects	year	year	year	year	year	year
	N	Number of items	46	46	46	46	46	46
	Adj. R2	Adjusted coefficient of determination	0.7772	0.103	0.9736	0.3241	0.5420	0.6554
Annual Return	Intercept	Intercept Elevation	-0.293	-0.011	0.503	0.633	0.589	0.200
	ΔMPR	Change in monetary policy	-0.084	-0.127	-0.215	***0.395	***0.436	0.110
	ΔMPR*SURP	Interaction of surprise announcement and monetary policy change	0.125	0.026	***0.450	***-0.376	*-0.264	-0.057
	ΔMPR*STD	Interaction of forecast error and monetary policy change	0.002	0.003	-0.009	0.004	-0.005	-0.002
	POST	Late period	-0.026	-0.086	0.162	0.044	0.004	-0.057
	POST*SURP	Post-course interaction and surprise announcement	-0.012	-0.004	-0.006	-0.012	-0.017	-0.013
	POST*STD	The interaction of hindsight and prediction error	0.289	0.339	-0.511	0.426	0.304	0.096
	NUM	Economists and capital market analysts	0.093	0.028	-0.119	-0.186	-0.172	-0.067
	QUAL	Qualified economists and analysts	0.008	-0.087	-0.330	-0.249	-0.201	0.095
	FX	exchange rate	0.161	-0.564	0.491	0.595	1.068	1.085
	PBDEBT	Public debt	0.125	0.093	0.135	*-0.377	-0.378	-0.162
	BOP	Balance of payments	0.005-	0.007	-0.007	-0.008	-0.003	0.004
	LGDP	The natural logarithm of GDP	***1.675	0.574	**1.996	-0.875	-0.893	*-1.608
	Fixed effects	Fixed effects	year	year	year	year	year	year
	N	Number of items	44	44	44	44	44	44
	Adj. R2	Adjusted coefficient of determination	0.7884	0.3925	0.0346	0.2847	0.1718	0.0481
Long term Returns	Intercept	Intercept Elevation	0.258	*0.384	-0.003	0.031	-0.115	-0.094
	ΔMPR	Change in monetary policy	0.045	0.036	0.005	0.024	-0.085	**-0.183
	ΔMPR*SURP	Interaction of surprise announcement and monetary policy change	0.003	0.017	0.008	-0.003	0.003	0.048
	ΔMPR*STD	Interaction of forecast error and monetary policy change	-0.001-	-0.001	-0.001	***-0.002	-0.003	-0.002
	POST	Late period	**0.160	**0.084	0.006	0.024	0.089	*0.134
	POST*SURP	Post-course interaction and surprise announcement	-0.021	-0.011	-0.002	-0.006	0.008	-0.009
	POST*STD	The interaction of hindsight and prediction error	**-0.712	**-0.317	-0.091	***0.164	0.148	0.080

	NUM	Economists and capital market analysts	-0.066	*-0.098	0.004	-0.005	0.049	0.049
	QUAL	Qualified economists and analysts	-0.166	-0.132	-0.015	0.033	-0.029	-0.033
	FX	exchange rate	0.070	0.004	0.208	0.074	0.284	*0.689
	PBDEBT	Public debt	-0.189	**-0.194	-0.002	*-0.063	0.081	-0.110
	BOP	Balance of payments	-0.004	-0.001	-0.001	0.000	0.006	0.009
	LGDP	The natural logarithm of GDP	0.226	-0.062	0.120	-0.036	0.408	0.489
	Fixed effects	Fixed effects	Year	Year	Year	Year	Year	Year
	N	Number of items	44	44	44	44	44	44
	Adj. R^2	Adjusted coefficient of determination	0.0414	0.0104	0.0231	0.6173	0.2027	0.1589

Table 5 shows the results of the capital market's reaction to changes in monetary policies (MPR) in neighboring countries. The effect of monetary policy change (ΔMPR) on positive one-day rates and the positive coefficient before the announcement of central bank monetary policies indicate adjustments consistent with a low monetary policy news component. Positive MPR*SURPΔ coefficients at (-10 to -1) and (-5 to -1) indicate pre-announcement adjustments and a low monetary policy news component for surprise announcements. Positive signals during and after the release of macroeconomic news announcements embedded in the surprise announcement support. Similarly, the post-announcement ΔMPR*STD is positive, indicating a high macroeconomic news component. The POST variable is negative the day after the announcement (0 to 1) and is insignificant for other intervals. POST*SURP and POST*STD are also insignificant, indicating little change in the postperiod.

In general, central bank announcements show a low monetary policy news component and a high macroeconomic news component in one-day rate announcements in order to clarify central bank policies. One-year return rates show a high macroeconomic news component in central bank announcements, including for surprise announcements, suggesting that clarification efforts had no effect in the subsequent period. Similarly, ten-year rates have a high macroeconomic news component, including for announcements with wide variation in forecasts. The central bank's transparency has been effective to some extent in reducing the monetary policy news component for one-day rates of return and the short-term reaction of money and capital markets in neighboring countries.

In order to investigate the capital market's reaction to the central bank's transparency, it has been discussed in the form of systemic risk. In this regard, the performance data of Iran and other Islamic countries have been used in the 15-year period from 2008 to 2022 (without dividing the review period into two smaller sections(. The results of the regression estimation in order to determine the relationship between the financial transparency of the central bank and the market reaction (systemic risk) are shown in Table 6. The results presented regarding the analysis of the effects of central bank transparency on the individual risk of banks are presented in column (1) and show a negative effect that is statistically significant at 10 percent. A one percent increase in the standard deviation of the transparency index has caused a 28 percent decrease in the banks' value-at-risk index, which indicates the beneficial effect of the transparency of the central bank based on the disclosure of information on financial policies or other macro variables on banks' risk-taking. In this estimate, the symbols: "*", "**" and "***" are significant at the 10, 5 and 1 percent level, respectively:

On the contrary, for banks' contribution to systemic risk, the coefficient of central bank transparency (TI) is positive for both measures of systemic risk (columns 2 and 3). This means that greater transparency of the central bank and, in other words, the disclosure of more information by central banks to the public leads to an increase in the systemic participation of banks. A one percent shock in the standard deviation of the transparency index is associated with an increase of about 19 percent in the ΔCoVaR index (that is, the loss of the market value of the total assets of the system subject to banks being in crisis). The average effect of an increase of one standard deviation in the Central Bank Transparency Index (TI) has been added to the losses of the banks' market shares by about 68%. In columns 4 to 6 of additional control variables, the Lerner index has been added, which indicates the competition in the banking industry, and the comparison of the results shows that the research findings have not changed significantly. In general, the findings of the research, are the negative effects of central bank transparency on capital market risk response (reduction of risk level); The Kurdish approach has emphasized the prudential approach (individual banking supervision) and the macro-precautionary approach (banking system). In other words, the more transparent the central bank is, the more information banks have and thus can improve their expectations and decisions to reduce individual risk-taking during extreme events. The results can be considered in line with the studies of van der Cruijsen and Demertzis [24] and Crowe and Meade [8] and while the findings obtained from these studies showed that improving the effectiveness of the monetary policy transmission mechanism More transparent central banks were found to lead to more accurate expectations and better decisions at the individual bank level. On the other hand, the beneficial effects

Table 6: The effect of central bank transparency on risk in the money and capital market (market reaction)

Type	Variable Description	Symbol	Types of risk metrics					
			1) VaR	2) ΔCoVaR	3) SRISK	4) VaR	5) ΔCoVaR	6) SRISK
Risk	Central bank transparency	TI	*-0.433	***0.060	***0.005	**-0.527	**0.054	***0.006
			(0.219)	(0.021)	(0.002)	(0.230)	(0.027)	(0.002)
Effective factors (control) at the bank level:	bank size	Size	*-2.498	0.106	*0.014	*-2.407	0.111	**0.014
			(1.435)	(0.125)	(0.005)	(1.348)	(0.126)	(0.005)
	Proprietary ratio	OWNR	*-0.303	*0.016	0.000	*-0.303	*0.016	0.000
			(0.158)	(0.008)	(0.001)	(0.146)	(0.008)	(0.001)
	Facility rate	FACR	0.001	-0.001	0.000	0.002	-0.001	0.000
			(0.034)	(0.003)	(0.000)	(0.033)	(0.003)	(0.000)
	Deposit absorption rate	DEPR	-4.013	-0.403	-0.010	-3.470	-0.372	-0.012
			(2.692)	(0.298)	(0.018)	(2.607)	(0.305)	(0.017)
	Average return on assets	ROAA	-0.105	-0.008	-0.000	-0.139	-0.010	0.000
			(0.163)	(0.013)	(0.001)	(0.157)	(0.013)	(0.001)
Effective factors (controlling) at the macro level:	Relative property	CBA	*-0.824	0.026	0.000	-0.690	0.034	-0.000
			(0.416)	(0.024)	(0.002)	(0.446)	(0.24)	(0.002)
	Economic growth per capita	GDPR	*-0.130	**0.016	-0.000	*-0.119	*-0.015	-0.000
			(0.068)	(0.008)	(0.000)	(0.064)	(0.008)	(0.000)
	inflation	Inf	***-0.238	***-0.036	-0.001	***-0.312	*-0.040	-0.001
			(0.075)	(0.013)	(0.001)	(0.100)	(0.015)	(0.001)
	Lerner index (competitiveness)	LI				**15.319	0.883	-0.055
						(7.316)	(0.782)	(0.068)
Other cases:	Intercept	β_0	***35.436	***-0.190	***-0.138	***30.984	*-0.067	***-0.122
			(12.232)	(1.006)	(0.042)	(11.057)	(1.030)	(0.044)
	Year fixed effects		Yes	Yes	Yes	Yes	Yes	Yes
	Bank fixed effects		Yes	Yes	Yes	Yes	Yes	Yes
	Clustering level		Bank	Bank	Bank	Bank	Bank	Bank
	Coefficient of determination		0.466	0.332	0.405	0.488	0.339	0.409

of central bank transparency for the purposes of internal management of financial institutions can be attributed to the reduction of financial market volatility in the case of countries where more information is disclosed by the central bank to the public (central bank transparency is greater) (De Mendonça, Fiho [10]; Dincer and Eichengreen, [12] or leads to a decrease in the volatility of the money market Neuenkirch [21]; Kia [17].

The Regulatory Quality Index is provided by the World Bank (Global Governance Indicators Database) and provides insights into the government's ability to formulate and implement sound regulatory policies that promote the development of the private sector. The range of this index varies from -2.5 to 2.5, with higher values indicating a stronger legislative framework. To correct heteroscedasticity and serial correlation, bank-level cluster standard errors were used, and to check the explanatory power of the estimated relationship, two additional methods were used: 1) two-stage least squares instrumental variable (2SLS) and hierarchical linear modelling (HML). has been taken advantage of.

From a macro-prudential point of view, the results conflict with the research that found a positive relationship between central bank transparency and financial stability (for example, Klomp and De Haan, 2009 [18]). A possible explanation for the detrimental effect of central bank transparency on contagion spillovers can be explained by banks' motivation to engage in risky activities. Parallel to the increase in the level of transparency of the central bank due to more information disclosed by the central bank, financial institutions through herd behaviour may increase the individual contribution to the risk of the entire banking system. For example, researchers such as Van der Cruijsen, et al. [25] and Horváth and Vaško [16], based on the analysis of empirical evidence obtained from their research, have shown that an optimal level of transparency There is a central bank and beyond that, more information tends to create a misleading behaviour among investors.

The results may be affected by reverse causality, as central banks may become more transparent after banks participate in systemic risk increases. In this research, to address potential endogeneity issues between systemic risk and central bank transparency, the analysis of instrumental variables has been investigated using the two-stage least squares method. The tools that have been used to evaluate the effectiveness of the central bank's supervisory role are: the rule of law, accountability and the ratio of facilities to GDP. The rule of law index shows property rights and freedom from corruption across countries. Higher values of this index reflect strong laws that support property rights, an independent judicial system with low levels of corruption, and the ability of individuals and businesses to enforce contracts.

Table 7: The supervisory role and the effect of transparency of the central bank on risk in the money and capital market (market reaction)

Type	Variable Description	Symbol	Part A) 2-step regression			Part B) Hierarchical analysis		
			1) VaR	2) ΔCoVaR	3) SRISK	4) VaR	5) ΔCoVaR	6) SRISK
Risk	Central bank transparency	TI	-0.016 (1.068)	**0.266 (0.126)	**0.021 (0.010)	**-0.112- (0.169)	***0.088 (0.026)	***0.005 (0.002)
Effective factors (control) at the bank level:	bank size	Size	***- 3.175 (1.052)	0.126 (0.084)	*0.011 (0.006)	***-0.908 (0.314)	**0.143 (0.056)	0.002 (0.002)
	Proprietary ratio	OWNR	-0.235 (0.154)	*-0.018 (0.010)	-0.001 (0.001)	***-0.232 (0.067)	*-0.014 (0.008)	-0.000 (0.000)
	Facility rate	FACR	0.016 (0.028)	0.002 (0.003)	0.001 (0.000)	0.005 (0.023)	-0.002 (0.003)	0.000 (0.000)
	Deposit absorption rate	DEPR	-2.846 (3.112)	-0.341 (0.315)	-0.036 (0.026)	**-4.105 (1.754)	*-0.382 (0.218)	0.001 (0.012)
	Average return on assets	ROAA	-0.323 (0.313)	0.035 (0.024)	**0.004 (0.002)	*-0.198- (0.115)	-0.006 (0.014)	-0.000 (0.001)
Effective factors (controlling) at the macro level:	Relative property	CBA	**-0.888 (0.428)	0.033 (0.031)	0.000 (0.002)	*-0.487 (0.273)	0.022 (0.034)	0.002 (0.002)
	Economic growth per capita	GDPR	0.150 (0.135)	-0.016 (0.017)	-0.001 (0.001)	**-0.146 (0.063)	*-0.014 (0.007)	-0.000 (0.001)
	inflation	Inf	0.111 (0.138)	-0.022 (0.017)	*-0.003 (0.002)	**-0.179 (0.084)	***-0.038 (0.010)	-0.001 (0.001)
Other parameters	Year fixed effects		Yes	Yes	Yes	Yes	Yes	Yes
	Bank fixed effects		Yes	Yes	Yes	Yes	Yes	Yes
	Clustering level		Bank	Bank	Bank	Bank	Bank	Bank
	Coefficient of determination		0.585	0.113	0.439	0.466	0.332	0.405
Regression parameters	Clibergen-Pope Walderk F. Test		***10.046	***10.046	3.367			
	Hansen J		2.742	1.740	2.338			
	The significant level of the Hansen G. statistic		0.241	0.419	0.311			
Hierarchical parameters	Country level variance					0.000 (0.000)	0.066 (0.439	0.008 (0.006)
	Bank level variance					2.664 (0.390)	0.711 (0.094)	0.011 (0.002)
	Residual variance					1.589 (0.092)	0.013 (0.001)	0.180 (0.010)
	Chi-statistics of two LR tests					***120.72	***374.14	***55.23

5 Discussion and Conclusion

In total, the obtained results indicate a positive and significant effect of the central bank's transparency on the share of financial institutions in systemic risk. The analysis of the findings showed that greater transparency of the central bank significantly reduces the specific risk of banks. Also, a more transparent and independent central bank has beneficial effects on accumulated risks in the banking sector and may help banks reduce their individual risk and systemic spillovers. Companies that have better risk management have been able to have better financial performance in utilizing the company's assets, ensuring the benefits and returns of the company's shareholders and increasing the wealth of the shareholders compared to other companies. Also, compared to other companies, investment companies have benefited better from risk management in creating adjusted returns, creating returns for shareholders and increasing the adjusted value of the company. The level of effectiveness of the model based on the evaluation checklist was probably due to the reliance on more direct dimensions in risk management evaluation and its impact on the adjusted return on assets, capital and the adjusted value of the company. Based on the results, the harmful effect of a more transparent central bank on systemic risk can be mitigated in the context of a strong regulatory environment. In contrast, transparent central banks that adopt a strong regulatory framework increase banks' individual risk as well as their systemic contribution.

In terms of policy implications, it can be argued that a more transparent central bank is beneficial to the banking sector from a micro-prudential perspective but may create incentives for financial institutions to engage in risky activities and, through herd behaviour, individual participation in risk. It has increased the entire banking system, in which case the implementation of strong mechanisms to play the central bank's supervisory role in the dimensions of independence, accountability and legality quality can reduce such consequences. Based on this, it is recommended to the policymakers, top management and supervisory bodies, especially in the financial industry, which is of special importance in the country's economy and has a high risk for providing and allocating direct and indirect capital, comprehensive risk management systems. Design and implement the company. In this field, legal institutions have

provided legal requirements, and regulatory bodies and policymakers have established incentive mechanisms based on the effectiveness of the risk management system in these companies. The weak performance of insurance companies and then banks in comparison with investment companies also requires the attention of policymakers, legal institutions and regulatory bodies in the field of adopting better measures in order to establish stronger risk management systems in these sectors. Is. Also, it is recommended that legal institutions, regulatory bodies and policymakers in the financial industry establish a comprehensive risk management system based on a survey evaluation model based on COSO standards and other international standards and evaluate the performance of senior managers based on quality. , improve the establishment and efficiency of these systems.

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