



## Investigating The Non-Linear Relationships Of Risk-Taking And Monetary Policy Shocks On The Stock Returns Of Iranian Banks Using The Soft Threshold Model

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### ABSTRACT

The stock returns predictability can be seen as an irrational conclusion of investors, which ultimately helps to determine solutions. This work aims at investigating the non-linear relationships of risk appetite, investors' willingness and monetary policy shocks on stock returns in selected banks of the Tehran Stock Exchange using the mild threshold limit model. For this purpose, the panel threshold approach model (PSTR) was used in terms of the annual data of stock market banks during the period of 1392 to 1401. Based on the estimation results of the nonlinear part. One unit increase in credit risk (CR), liquidity risk (LR), economic policy uncertainty (EPU) and psychological biases (ETM), respectively, in banks' stock return index, 0.05, 0.14, 0.08 and 19.0 units decrease. Also, one unit increase in financial willingness of investors (TR), bank size (Size) and growth of banking facilities (LoanG) leads to an increase of 0.02, 0.05 and 0.01 units of the bank stock return index, respectively.

**Keywords:** stock returns, risk aversion, investors' willingness, monetary policy shocks, panel threshold approach model.

## 1. Introduction

Conditional asset pricing can orient predictability for explaining returns via available data including macroeconomic and financial variables. There are several empirical studies to highlight the nonlinear framework relevance. Batuman et al. (2022) In a study, they examined the effect of the global financial crisis on the company's cash holdings: the Eastern European countries' data.

Using the panel fixed impacts model and GMM estimations, it was indicated that the determinants of firm-level cash holdings are considerably different for the pre- and post-crisis durations.

the current research deals with developing the stock returns model to investigate the non-linear relationships of risk aversion, investors' willingness and monetary policy shocks of listed banks. Examining this study for Iran's economy, despite the fluctuating market and affected by all kinds of risks and fluctuations, can act as a road map for the policy makers of the country, the government, the central bank and the capital market. Although most research dealing with the predictability of stock returns favors the linear framework, there is a growing body of empirical research that highlights the relevance of the nonlinear framework. One of the innovations of the research is the investigation of nonlinear relationships between risk-taking and monetary policy shocks using the soft threshold limit model. Also, other research innovations in the field of implementation or geographic area for the first time in Iranian banks. Efficiency when it is complicated with the operational process and valuable practical results are led.

## 2. Literature Review

The research literature is as follows.

Internal governance (Hoitash, U., & Mkrtyan, A.; 2022), and connections of the outside directors to non-director executives: Boards of directors are responsible for protection of shareholders. Hence, they should monitor the CEOs and ensure that their activities best deal with shareholders interests. This includes proper incentives and access to firm-specific data timely. Though, according to academics and practitioners, boards are not informed sufficiently owing to their reliance on the CEO as the main firm-specific information source.

Dahmna et al. (2021) In a study investigating non-linearity in stock returns considering investor sentiment, risk aversion, and monetary policy shocks. They found that index returns decrease as investors become more risk averse after a positive shock to the volatility index for most markets. For some countries, the index returns are negatively affected by restrictive monetary policy in the lower regime thus increasing the higher regime for more liquid markets.

Fan et al. (2021) studied the effect of oil price uncertainty on corporate leverage in China. It was found that the international crude oil markets' stronger fluctuation highly attracted the attention of scholars. Moreover, the relationship between macroeconomic activities and oil price uncertainty and asset prices has been highly studied. Oil price is an important input factor affecting the financial and operational decisions of enterprises thus future cash flow and production cost.

Ludvigson et al. (2021) investigated Uncertainty and business cycles considering exogenous impulse or endogenous response. They aimed to use small-scale structural VARs with theoretical possibilities. In the present work, we used a new identification approach based on economic assumptions on the shocks behavior. We applied parameterizations and specifications raised by macro uncertainty endogenously against real activity shocks, which contributes to its countercyclical behavior strongly.

Yan et al. (2020) investigated stock price crash risk and Economic policy uncertainty. Based on cross-sectionally analysis, EPU has higher strong effect on stock price crash risk for firms with more sensitive returns to EPU. More specifically, small, young, high volatility stocks, and growth stocks, with higher valuation uncertainty per se have higher sensitivity to EPU and are highly affected by EPU based on crash risk.

Gregoriou et al (20019): In a study, they examined the stock returns and prospect theory: a seven-factor pricing model during the period of 1927-2014. In this study, seven factor asset pricing is proposed, which integrates the insights of expected return theory and prospect theory.

Eva et al. (2018) In a study, they investigated the effects of free float ratio on stock valuation behavior in companies admitted to the Latin American capital market. It has been found that in Colombia and Peru,

floating shares impose a greater effect on the stock market value.

Wilkins, A. S. (2018). "To lag or not to lag? Re-evaluating the use of lagged based variables in regression analysis: Indeed, more lagged independent and LDV variables should be involved in the specification. It is also indicated that inappropriate exclusion of LDVs can result in severe bias in coefficient estimates. Though no panacea, scholars should involve LDVs confidently as part of a strong estimation policy.

Eoghan Nichol, M. D. (2014) Profitability and investment factors for UK asset pricing models: This indicates that the profitability and investment factors for both models measure different features of investment and profitability, in spite of the commonality in terminology utilized by the respective authors.

### 3- Methodology

The general form of the PSTR model is as follows:

$$\begin{aligned}
 (1) \quad R_{i,t} = & \alpha_0 + \beta_1 CR_{i,t} + \beta_2 LR_{i,t} + \beta_3 EPU_{i,t} + \beta_4 ETM_{i,t} \\
 & + \beta_5 TR_{i,t} + \beta_6 Size_{i,t} \\
 & + \beta_7 LoanG_{i,t}(\theta_1 CR_{i,t} + \theta_2 LR_{i,t} \\
 & + \theta_3 EPU_{i,t} + \theta_4 ETM_{i,t} + \theta_5 TR_{i,t} \\
 & + \theta_6 Size_{i,t} \\
 & + \theta_6 LoanG_{i,t})F(S_t, \gamma, c) + u_t
 \end{aligned}$$

where the transition function F is equal to:

$$F(\gamma, s_t, c) = (1 + EPU\{-\gamma(s_t - c)\})^{-1}, \quad \gamma > 0$$

In this study, two indicators of interest rate and monetary base are used for monetary policy.

$$EPU_{i,t} = \frac{\sum_{i=1}^n |r - \bar{r}|}{n}$$

In this study, the method of calculating the action and financial behavior of investors is as follows:

$$Tr_{i,t} = \frac{p_{i,t}(1 + \alpha + \beta) + Div - (p_{i,t-1} + C\alpha)}{p_{i,t-1} + C\alpha}$$

Tobin defines (Q) as the market value of the firm relative to the replacement cost of capital. (Kelikume et al., 2020).

The number of 12 listed banks, including the private banks of New Economy, Parsian Bank, Pasargad Bank, Entrepreneur Bank, Saman Bank, Sina Bank, Capital Bank, Shahr Bank, Day Bank, Saderat Bank, Mellat Bank and Tejarat Bank remained as the screened community. Therefore, our observations reach 120 data (10 years x 12 banks) during the period of 1392 to 1401. In this study, the panel threshold approach (PSTR) is used to estimate the model.

### 4. Results

By using a PSTR model, the function of compiling the stock return model is modeled to investigate the nonlinear relationships of risk aversion, investors' willingness and monetary policy shocks of active listed banks.

Table (1): Model estimation by PSTR model

| Variable | Possibility | t statistic | standard deviation | Coefficient |
|----------|-------------|-------------|--------------------|-------------|
| CONSTANT | 0.0000      | 9.584166    | 0.076055           | 0.728923    |
| CR       | 0.0769      | 1.768823-   | 0.005710           | 0.010101-   |
| LR       | 0.6861      | 0.404392-   | 0.005913           | 0.002391-   |
| EPU      | 0.7681      | 0.294963-   | 0.007672           | 0.002263-   |
| ETM      | 0.0353      | 2.109768-   | 0.011316           | 0.023874-   |
| TR       | 0.0002      | 3.663222    | 0.000317           | 0.001161    |
| Size     | 0.0093      | 2.600783    | 0.002589           | 0.006733    |
| LoanG    | 0.1074      | 1.612259    | 0.009889           | 0.015943    |
| CONSTANT | 0.0000      | 10.48467    | 0.033443           | 0.350640    |
| CR       | 0.0000      | 4.899456-   | 0.012136           | 0.059458-   |
| LR       | 0.0000      | 6.715828-   | 0.021574           | 0.144886-   |
| EPU      | 0.0015      | 3.195642-   | 0.027937           | 0.089278-   |
| ETM      | 0.0201      | 2.324058-   | 0.085146           | 0.197885-   |
| TR       | 0.0274      | 2.205968    | 0.010298           | 0.022717    |
| Size     | 0.0165      | 2.396934    | 0.022425           | 0.053752    |
| LoanG    | 0.0077      | 2.675502    | 0.004822           | 0.012901    |

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| Variable            | Possibility | t statistic | standard deviation | Coefficient |
|---------------------|-------------|-------------|--------------------|-------------|
| (C)threshold limit  | 0.0000      | 3.61322     | 0.039098           | 0.14127     |
| (γ) Slope parameter | 0.000       | 7.33845     | 0.100263           | 0.735776    |

Source: research findings

In the above estimate, the variable is the transfer of economic policy uncertainty, and the estimated threshold value for this variable is equal to 0.14.

In the present study, Durbin-Watson's test is used to check autocorrelation.

There is no correlation between the disturbance components. Another classic standard assumption is

the assumption of homogeneity of variance. The test results indicate the absence of heterogeneity of variance.

The test of the stability of the coefficients between two regimes shows that the coefficients do not change due to the change of the regime.

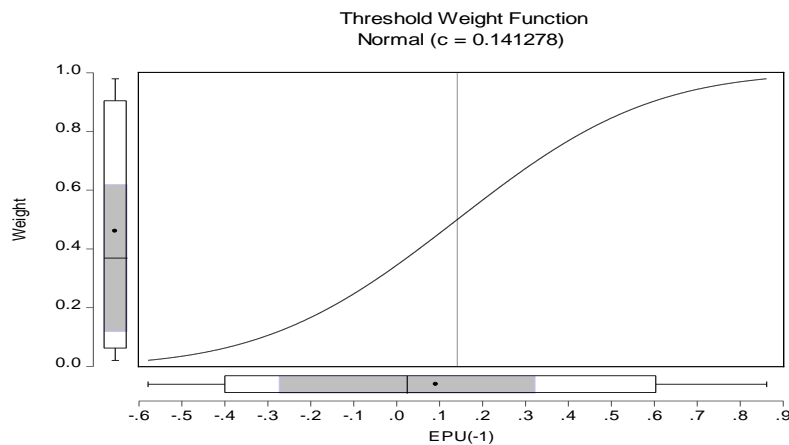


Diagram (1): The relationship between the transfer function and the transfer variable of economic policy uncertainty

Source: research findings

Table (2): Autocorrelation test results

| Description                 | Watson camera | Prob | F statistic |
|-----------------------------|---------------|------|-------------|
| Active stock exchange banks | 239/2         | 47/0 | 325/1       |

Source: research findings

Table (3): Results of variance heterogeneity test

| Description                 | Breusch-Pagan test | Prob  | F statistic |
|-----------------------------|--------------------|-------|-------------|
| Active stock exchange banks | 325/1              | 456/0 | 236/1       |

Source: research findings

Table (4): The results of the stability test of the smooth transition parameter

| Description                 | Prob  | F statistic | Null hypothesis     |
|-----------------------------|-------|-------------|---------------------|
| Active stock exchange banks | 754/0 | 625/0       | $b_1=b_2=b_3=b_4=0$ |
|                             | 552/0 | 741/0       | $b_1=b_2=b_3=0$     |
|                             | 781/0 | 627/0       | $b_1=b_2=0$         |
|                             | 532/0 | 896/0       | $b_1=0$             |

Source: research findings

## 5. Discussion and Conclusions

This research sought to develop a stock return model to investigate the non-linear relationships of risk aversion, investors' willingness and monetary policy shocks of listed banks. The investor is trying to get information about the yield of banks' shares. Any factor that can help investors make better decisions can increase the benefits of investing. From the perspective of financial theories, traditional investors are rational and efficient markets, while despite market anomalies and behavioral financial theories, attention is felt to factors other than fundamental factors in asset pricing. According to the analysis and the obtained results, a unit increase in credit (CR), liquidity (LR), policy uncertainty (EPU) and psychological economic biases (ETM) will decrease in 0.05, 0.14, 0.08, 0 and 0.19 units are the efficiency index of banks. Also, one unit increase in investors' financial capital (TR), bank size (Size) and growth of banking facilities (LoanG) will increase to 0.02, 0.05 and 0.01 units respectively in the bank stock return index. A decrease in the growth of payment statements is usually a problem in the capital market. In their decisions, investors always prefer to invest in bonds with higher liquidity and want to spend risk to accept bonds with high illiquidity. Considering that with the increase of credit risk, the lending of banks decreases, therefore, in order to reduce risk, banks should also pay attention to the attraction of deposits in addition to factors affecting risk.

Based on the results of the hypothesis test, investors and brokers are suggested to buy the shares of banks whose stock increases more than the number of days its stock decreases. The high quality of information and information symmetry causes greater coordination and interaction between managers and investors in relation to investment decisions. On the contrary, the greater the information asymmetry between managers and investors, the more risk-taking investors demand a high expected rate of return. Since the stock market yield is one of the most accurate tools displayed in the economy and has a high sensitivity to economic conditions, it can have a direct effect on the interest rate and people's confidence. Policymakers should always adopt policies that lead to stimulating people to withdraw their stagnant funds from banks and invest them in the stock market, and to provide the basis for the development of this market as much as possible. In the last decade, due to the support of government downsizing policies and the

implementation of private banks in the largest and the creation of private banks, industrial banks have experienced the investment of countries in competitive conditions. It is expected that this change in the competitive conditions of the banking industry and the subsequent policies of reducing interest rates on loans will affect the behavior of banks and, as a result, the mechanism of monetary policy transmission through the lending channel, and all these factors will reduce returns. Shares are influenced by the banking industry. But it should not be among these economic issues that factors such as the high risk of activities and special productions in the country, the weakness of laws in the field of economic activities, the existence of political and economic rents in the provision of management, the power of banks to create money, the weakness of the central bank, Lack of independence, centralization, ineffectiveness of Iran's banking system, rentier economy, extreme fluctuations in exchange rates, extreme fluctuations and high interest rates, mandated interest rates, high inflation and expected inflation that leads to a decrease in economic activities and even a decrease in the real value of banking. Banks are coming.

The high banking risk (credit risk) and the transfer of this bank to other monetary and financial economic sectors, increasing the cost and completing the receiving processes, paying these costs to investment and reducing the ability to provide credit, deviation and impossibility of investment and finally. The problem in the monetary and banking system of the country, the system of reducing the banking efficiency and the lack of optimal allocation of financial resources to the required sectors, the illegality of consumer rights, the pessimism of economic workers towards the monetary and banking system of the country and the increase in the name of the future, the rights of the banks by the influential love and mom of The entry of these resources into healthy economic fields is one of the devastating competitive effects in banks for the country's economic system. All these factors reduce the growth of banks. Also, the uncertainty of economic policies, monetary and financial shocks create recessionary conditions in the country and decrease the yield of banks' shares. In terms of economic structure and based on the principles of economics, an increase in the dollar rate will cause economic growth in society, but if this increase is temporary, economic prosperity cannot be

observed. The increase is floating and managed. With the increase in the price of the dollar, companies producing food and parts face problems, because they get the currency at a high price or buy the required products. Importers increase the price offered to the consumer in proportion as the purchase price of their products has increased. This issue will be detrimental to the consumer and will increase the price of goods. This will increase the use of products and create domestic markets based on product prices. An increase in the currency and a decrease in the weakening of the national currency will lead to an increase in the rate of foreign debt by these companies, and it will increase the total liquidity at the same time. And the increase in their price index, it should also be noted that it can increase with the increase in the probability that the capital will leave the stock market or enter the money market. Therefore, it can be said that the exchange rate increases continuously, it will reduce the liquidity of the stock market. In general, it can be concluded that with the increase of some factors such as; The political conditions and factors of the country, the economic situation of the world and the economy, the country's annual budget, macro, financial and currency policies, pricing, Iran's monetary proposals for industrial products, large and long-term investments, technological developments, P/E ratio (price to profit) capital increase by companies, type of ownership of companies (composition of shareholders), forecast of earnings per share (EPS) and EPS trend stability, company development plans, company management, stock and currency price fluctuations, per share, clarification of financial information and many Agents. Other reasons for creating fluctuations in this market and this factor is the reason for the decrease in efficiency and increase in the stock price index.

### **Conflict of interest**

The authors declare the absence of contradiction.

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