Iranian Economic Review, 2025, 29(2), 557-579
DOI: 10.22059/ier.2025.356323.1007667

RESEARCH PAPER

The Reaction of the Financial Conditions Index to the Macroeconomic Variables Shocks

Atefe Alahverdi[a], Saeed Daei-Karimzadeh[a,*], Sara Ghobadi[a]
a. Department of Economics, Isfahan (Khorasgan) Branch, Islamic Azad University, Isfahan, Iran.
* Corresponding Author, E-mail: saeedkarimzade@yahoo.com

Article History: Received 05 March 2023, Revised 18 June 2023, Accepted 25 July 2023, Published 30 June 2025
Publisher: University of Tehran Press.

Abstract
The financial and real sectors are intrinsically related and the financial sector is affected by the systematic risks of the real sector. So, this study was done to investigate the reaction of the financial conditions index to the macroeconomic variables shocks in Iran with the time-varying parameter factor-augmented vector autoregressive model (TVP-FAVAR) and using quarterly data from 1991 to 2019. The results show that the macroeconomic variables shocks are an important factor in explaining the behavioral changes of the financial conditions index. In other words, the financial conditions index has shown different reactions to the macroeconomic variables shocks over time, and the intensity and extent of this reaction have not been the same for each of the macroeconomic variables. Therefore, policymakers should adopt appropriate policies according to the effects of macro variables on the economy so that they can ultimately improve the financial conditions of the country.
Keywords: Financial Conditions Index, Macroeconomic, Reaction, Shock, TVP-FAVAR Model.
JEL Classification: C22, E44, G18.

1. Introduction
Recent developments in the global economy have helped to re-evaluate and expand on some well-known economic concepts. Arguably, one of the most prominent changes in economic thinking is the importance of the relationship between the real and financial sectors (Plasil et al., 2016). If there is no logical relationship between the financial market and other sectors of the economy, there is a possibility of disturbances in the mechanism of the economy. For example, many emerging Asian economies have experienced deep financial crises after continuous booms in bank credit. The housing bubble burst, and the subsequent financial crisis

also led to the worst economic crisis since the Great Depression in 2008-2009. The severe impact of this crisis on many of the world's economies has led economists to seek tools to understand the financial sector better.

One of these instruments is the financial conditions index (FCI). This index primarily acts as a channel through which monetary policy affects the real economy (Mblu and Soobyah, 2019). Financial variables' importance in the transmission of monetary policy is the first impetus for constructing FCI. FCI based on monetary policy transmission is usually composed of financial variables such as interest rate, exchange rate, stock price, and housing price (Angelopoulou, 2014). After the financial crisis, some researchers also used lending to indicate credit conditions (Swiston, 2008). Changes in interest rates alone may not take into account all the interactions between the financial system and the real economy; As a result, tracking a set of financial variables seems necessary. Credit aggregates, loan amounts, risks, fluctuations, and returns can convey more information about the financial conditions and affect actual activities by influencing consumption and investment.

Any instability in the macroeconomic environment causes economic activists to be uncertain about future developments, and as a result, economic activists cannot draw a clear vision of the future, which affects their decisions and may even lead to deviations in decision-making. Today, the central banks of the world use the financial conditions index to measure the future state of the economy. It seems necessary to analyze the reaction of the financial conditions index to the shocks of macroeconomic variables.

In this paper, we aim to construct Iran's FCI and then evaluate the effects of macroeconomic variable shocks on the FCI from 1991 to 2019 in Iran. We use time-varying parameter factor-augmented vector autoregressive (TVP-FAVAR) to construct and evaluate the FCI's response to the macroeconomic variables' shocks. The created FCI can adapt to different modes of the Iranian economy. Random errors can increase the quality of the FCI and allow its fluctuations to increase over time.

The rest of the paper is structured as follows. Section 2 review of theoretical literature is done; Section 3 is dedicated to the research method and model specification; Empirical results and conclusions are presented in Sections 4 and 5, respectively.

2. Literature Review

2.1 Financial Conditions Index

FCI has been developed based on the Monetary Conditions Index (MCI). MCI is the weighted average of changes in the short-term interest rate and an exchange rate that the Bank of Canada first introduced in the 1990s. Providing information on the stance of economic and monetary policy was one of the goals of MCI. However, as modern finance grows in complexity and size, there is increasing attention on how financial indicators such as asset prices affect the economy. The inability to describe financial markets indicated that MCI was inappropriate as an intermediate goal. Eventually, more indicators were added to the MCI, and the FCI emerged as a broader measure of economic activity. Goodhart and Hofmann (2001) and Mayes and Viren (2001) were the first to develop an FCI by adding variables such as housing prices and stock prices to the MCI.

Hatzius et al. (2010) define an FCI as a compound index that provides financial information about the future situation of an economy. In the studies of Goodhart and Hofmann (2001) and Wacker et al. (2014), FCI is considered an expansion of MCI. FCI is more comprehensive than MCI and is developed using more variables.

FCI based on monetary policy transmission mechanisms usually consists of financial variables such as interest rate, exchange rate, stock price, and housing price. In this study, the variables that construct the FCI have been determined based on the monetary policy transmission mechanisms. Therefore, the relation between financial conditions and macro variables is discussed below.

2.2 Financial Conditions and the Macroeconomy

Financial conditions are important because they affect future real activity in ways that are not fully captured by short-term interest rates. Their macroeconomic relevance rests on two pillars. First, ”monetary policy works by affecting financial conditions” (Adrian and Liang, 2016). Thus, financial conditions determine macroeconomic outcomes of monetary policy decisions. Second, financial conditions are thought to play an independent role in driving business cycle fluctuations by determining financial stability and thereby posing risks to real activity. Because financial conditions and funding costs in the economy are very closely related, a discussion of the various monetary policy transmission mechanisms helps understand the macroeconomic relevance of FCI. Boivin et al. (2010) distinguish between two broad categories of transmission channels. The first category comprises’traditional’ or New Keynesian channels in which financial

markets are perfect or frictionless. The main emphasis is put on the direct effects of short-term policy rates and how expectations regarding the future trajectory determine the shape of the yield curve and, therefore, investment, trade, and consumption. In a frictionless environment, financial conditions still matter because they contain information on long-term interest rates and asset prices, which determine the cost of capital and demand for physical capital (Herculano, 2022).

Financial conditions also play an important role by influencing the transmission of monetary policy decisions through a second category of 'non-traditional' channels that allow for market imperfection in credit supply. Financial frictions, to which borrowers and lenders are subject, give rise to an external finance premium that is well captured by FCI. Such frictions include asymmetric information, agency costs, financial firm's risk models, institutional investor strict return targets, and limited liability (Adrian and Liang, 2016).

Non-traditional transmission channels include balance sheet channels - whereby a decline in borrower's net worth and collateral, results in tighter credit supply due to moral hazard (Bernanke and Gertler, 1986; Kiyotaki and Moore, 1997) and bank-based channels - which recognize the importance of asset prices as determinants of the strength of banks balance sheets (bank capital channel) and the market power of banks as providers of funding in an economy (bank lending channel). Recent and ongoing research investigates the existence of a risk-taking channel of monetary policy. Adrian and Shin (2010) suggest that monetary policy changes the risk-taking capacity of financial intermediaries due to moral hazard problems that change the quantity and composition of credit supply. The risk-taking channel refers to the effects working through the risk appetite of financial intermediaries, which are reflected by FCI. Theory offers unclear predictions on the effect of monetary policy on bank risk-taking. Altunbas et al. (2010), Adrian and Liang (2016) review the various mechanisms and conclude that the impact of short-term interest rates on risk-taking is ultimately an empirical question due to several underlying mechanisms that offset each other. On one hand, traditional portfolio allocation models predict that a higher interest rate incentivises financial institutions to rebalance their portfolios toward safe assets. Therefore, a higher hurdle rate on investment will divert funding from risky projects. In contrast, an increase in interest rates may lead to greater risk-taking due to risk-shifting in lending. The increase in the amount banks have to pay on deposits will aggravate agency problems associated with limited liability, especially for banks with less 'skin in the game' (i.e., higher leverage) (Herculano, 2022).

Low interest rates can increase risk taking by increasing bank leverage (Dell'Ariccia et al., 2017), reducing the cost of holding collateral or required reserves (Stein, 2012), incentivizing 'search for yield' behavior (Rajan, 2006), increasing liquidity and relaxing lending standards (Acharya and Naqvi, 2012), by loosening bank capital constraints (Adrian and Shin, 2010) or by altering aggregate uncertainty and risk aversion and thereby shifting global financial conditions (Miranda et al., 2015). Taken together, the literature suggests that financial conditions are an important aspect of monetary policy transmission. However, the question of how financial conditions should be taken into consideration by monetary authorities is controversial. Adrian and Liang (2016) highlight the inter-temporal trade-off between improving financial conditions at a cost of future financial vulnerabilities.

Beyond their role as determinants of the transmission of monetary policy, financial conditions are found to have an independent role as drivers of business cycle fluctuations. He and Krishnamurthy (2012), Adrian and Boyarchenko (2012), and Brunnermeier and Sannikov (2014) study the consequences of the inclusion of a financial sector in a dynamic general equilibrium economy, where production relies on credit supply from a financial intermediary. Results suggest that vulnerability of the financial sector decreases the supply of credit, potentially causing headwinds to GDP growth. Christiano et al. (2014) augment a dynamic general equilibrium model to include a financial accelerator mechanism. Changes to the volatility of cross-sectional idiosyncratic uncertainty, which measure the severity of agency problems, which the author labels 'risk shocks,' are found to explain a relevant portion of business cycle fluctuations. The idea that financial shocks are independent sources of business cycle fluctuations is also highlighted by Gilchrist and Zakrajsek (2012), Jermann and Quadrini (2012), and Liu et al. (2013).

2.3 Empirical Studies

The FCI is built with different methods for various purposes in many countries, such as forecasting macroeconomic variables, linking with monetary policy, and also as a warning system. For example, Mayes and Viren (2001) constructed FCI by the reduced aggregate demand equation model, arguing that FCI plays a role in formulating the monetary policy of European countries. Montagnoli and Napolitano (2005) used the Kalman filter algorithm and allowed the weights to change over time to construct the FCI of the US and the Euro area. Swiston (2008) used the VAR impulse response function to calculate the United States' FCI and

showed that FCI could be used as a predictor of US economic growth. Hatzius et al. (2010) built FCI with principal components analysis (PCA) and examined its relationship to economic activity. Gomez (2011) used the PCA for constructing Colombia's FCI and suggested that FCI can be used as an effective tool to regulate macro prudence and financial stability. Angelopoulou (2013) constructed FCI by the PCA for European countries and evaluated the impact of monetary policy on the FCI. Taghizadeh and Zamaniyan (2015) calculated the FCI and MCI for Iran by using the PCA method. The results show that the FCI, like the MCI, reflects the changes in inflation and GDP. Deng et al. (2016) constructed China's financial conditions with the TVP-VAR model, showing that the FCI significantly affects inflation and economic fluctuations. Mohseni et al. (2018) extracted the FCI for Iran and used the PCA method. The results show that the FCI has caused a decrease in the growth rate of GDP and private sector investment, while this index has had a positive effect on the real exchange rate and has increased the unemployment rate since the fourth period. Li and Yuanchun (2019) used the TVP-VAR model to build the FCI for China and showed that the FCI with time-varying weights can reflect China's financial situation. Ganchev and Paskaleva (2020) build FCI by PCA for 11 European economies and show that the FCI is a reliable measure of financial shocks sensitive to exogenous shocks and leads to changes in Economic activities. Morana (2021) introduced a new macro-financial conditions index for the euro area, constructed a composite index by principal components analysis, and argued that financial crises could have significant and continuous negative effects on the medium to long-term GDP growth. Kazdal et al. (2022) constructed Turkey's FCI using high-frequency data and examined the link between the FCI and economic activity. Armen et al. (2022) used the TVP-VAR model to build the FCI for Iran. The results show that the FCI has high predictability. Huang et al.(2022) investigated the effects of financial conditions and macroeconomic uncertainty shocks on output growth in the United States using a structural VAR. The results show that output growth decreases disproportionately in response to both shocks.

So, when it comes to shocks of macro variables and the FCI, there is a gap in the literature, and a study has not been done that examines the FCI's response to the macroeconomic variables' shocks. Therefore, the subject of the present study is new.

3. Research Method and Model Specification

3.1 Research Data

In this study,we have been used quarterly data from 1991 to 2019 to analyze the effects of macroeconomic variables shocks on Iran's FCI and research variables are divided into two categories; 1- The variables of inflation rate, unemployment rate, economic growth rate, budget deficit growth rate, Gini coefficient have been used as macro variables; 2- The variables that make up the financial conditions index to extract the index and also estimate the latent factor are: Net foreign assets of the banking system, debts of banks to the central bank, Net public sector debt to the banking system, Net debt of the non-governmental sector to the banking system, Total facilities of the banking system to different economic sectors, Ratio of non-current receivables to total facilities, Real interest rates on banking facilities in various economic sectors, Real interest rate on one-year investment deposits, Real exchange rate changes, Housing price index of all urban areas, Price of gold coins, Stock price index and financial index[1]. The FCI variables were used as growth rates in the TVP-FAVAR model.

Data related to variables of Gini coefficient, inflation rate, and unemployment rate have been extracted from Iran's Statistics Center; data related to the variables of the budget deficit, gross domestic product, and FCI variables have been extracted from Iran's Central Bank.

It should be noted that to extract seasonal data from existing annual data, the Denton method has been used, which is one of the appropriate methods to convert annual data of variables into seasonal data.

3.2 Modeling of Research Variables

Suppose y_t for $t = 1, ...,$ is a S×1 vector of macroeconomic variables in the model, which in the present study includes the Gini coefficient, unemployment rate, budget deficit growth rate, GDP growth rate, and inflation rate (Changes in the Consumer Price Index). f_t is the latent factor in the model. x_t is also a vector of $n \times 1$ variables (used in constructing the FCI) to estimate the non-observable variables in the model. In the empirical model used in this research, x_t and y_t are equal to:

$$x_t = (x_{1t}, x_{2t}, x_{3t}, x_{4t}, x_{5t}, x_{6t}, x_{7t}, x_{8t}, x_{9t}, x_{10t}, x_{11t}, x_{12t}, x_{13t}) \quad (1)$$

[1]. Financial index is the weighted average of the stock price ratios of companies operating in the financial sector (investment companies, multidisciplinary industrial companies, banks and credit institutions, etc.) With a weight equal to the value of their shares at the base time.

$$y_t = (\pi_t, u_t, g_t, gn_t, db_t) \quad (2)$$

In relation (1), (x_1) is equal to the net foreign assets of the banking system, (x_2) debts of banks to the central bank, (x_3) Net public sector debt to the banking system, (x_4) Net debt of the non-governmental sector to the banking system, (x_5) Total facilities of the banking system to different economic sectors, (x_6) Ratio of non-current receivables to total facilities, (x_7) Real interest rates on banking facilities in various economic sectors, (x_8) Real interest rate on one-year investment deposits, (x_9) Housing price index of all urban areas, (x_{10}) Price of gold coins, (x_{11}) Real exchange rate changes, (x_{12}) Stock price index and (x_{13}) financial index.

In relation (2), π_t is equal to the inflation rate, u_t is the unemployment rate, g_t is the GDP growth rate, gn_t is the Gini coefficient and db_t is equal to the government budget deficit growth rate. So, the TVP-FAVAR model is presented as :

$$\begin{aligned} x_t &= \lambda_t^y y_t + \lambda_t^f f_t + u_t \\ \begin{bmatrix} y_t \\ f_t \end{bmatrix} &= c_t + \beta_{t,1} \begin{bmatrix} y_{t-1} \\ f_{t-1} \end{bmatrix} + \cdots + \beta_{t,p} \begin{bmatrix} y_{t-p} \\ f_{t-p} \end{bmatrix} + \varepsilon_t \end{aligned} \quad (3)$$

$$\begin{aligned} \lambda_t &= \lambda_{t-1} + v_t \\ \beta_t &= \beta_{t-1} + \eta_t \end{aligned} \quad (4)$$

where λ_t^y are regression coefficients, λ_t^f are factor loadings, f_t is the latent factor, c_t is a vector of intercepts, ($\beta_{t,1}, \dots, \beta_{t,p}$) are VAR coefficients and u_t and ε_t are zero-mean Gaussian disturbances with time-varying covariances V_t and Q_t, respectively (Koop and Korobilis, 2014).

In this model λ_t^f, λ_t^y, and ($\beta_{t,1}, \dots, \beta_{t,p}$) are extracted based on a random walk, and all errors in the equations are not correlated with each other over time. Estimating the TVP-FAVAR model is computationally hard, so the Exponentially Weighted Moving Average (EWMA) and Kalman filter methods are used to reduce the computational load.

Therefore, we adapt ideas from Doz et al. (2011) and the state-space literature and develop a dual, conditionally linear filtering/smoothing algorithm, which allows us to estimate the unobserved state f_t and the parameters θ_t=(λ_t, β_t) in a fraction of a second.

4. Empirical Results

4.1 Estimates of Financial Conditions Index in TVP-FAVAR Model

In the present study, the financial conditions index (FCI) is extracted from TVP-FAVAR.

Figure 1 shows the FCI in the form of the time-varying parameter factor-augmented vector autoregressive and dynamic model averaging TVP_FAVAR (DMA), assuming the coefficients of the model variables and the set of variables selected to construct the FCI are varied from 1991 to 2019. The FCI obtained in the mentioned model indicates that many instabilities have accompanied the financial conditions of the country's economy; This has periodically weakened the efficiency of the country's economy by creating disequilibrium in the economy's financial system. As shown in Figure 1, the FCI has been declining from the third quarter of 1992 to the end of 1995 and has gone an upward trend from the end of 1995 to the third season of 1999 and has continued downward trend of FCI from the end of 1999 to the end of 2011 and there has been a growing trend from the end of 2011 to the third quarter of 2017. Still, since the fall of 2017, the country's FCI situation has changed again and has started a downward trend. It seems that the imposition of severe economic sanctions has faced the country's financial conditions with a difficult situation.

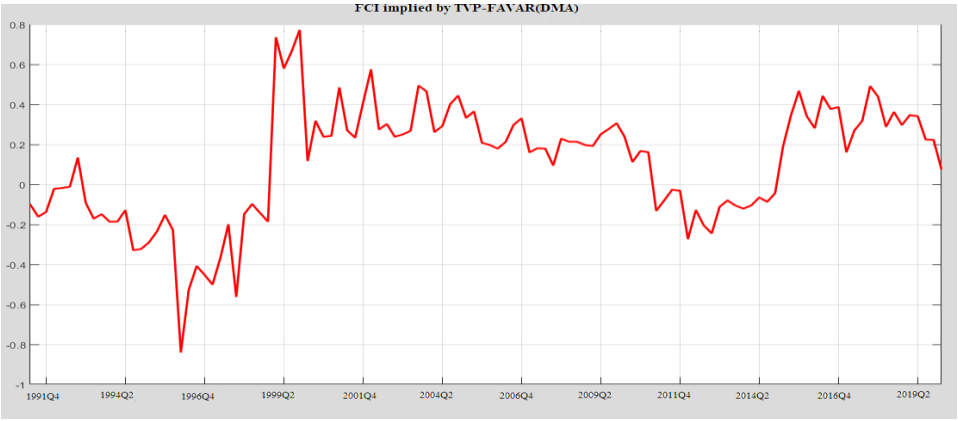

Figure 1. FCI Assuming the Coefficients of the Variables and the Variable Set are Varied Over Time

Source: Research finding.

4.2 Estimation of Latent Variables FCI in the (TVP_FAVAR) Model

Estimating latent variables in models is associated with limitations, and to overcome these limitations, there are various methods: the dynamic factor model, the principal component analysis (PCA) method, and ideas from Doz et al. (2011).

The difference between the above methods is in the assumptions that are considered for the estimation of latent variables. The premise of dynamic factor models (DFMs) is that the common dynamics of a large number of time series variables stem from a relatively small number of unobserved (or latent) factors, which in turn evolve. In the PCA approach, more variables are combined, and each variable is considered as a vector, each of which represents a facet of the latent factor. Then a vector is created, which is the result of all these vectors, and this vector is the latent factor. Doz et al. (2011) use a fast two-step estimation algorithm, which vastly reduces the computational burden and greatly simplifies the estimation of the FCI.

In this study, we follow Koop and Korobilis (2013) and ideas from Doz et al (2011) to estimate the latent variables of the model. The latent variables of the model have been estimated according to the variables selected to construct FCI in the form of a time-varying parameter factor-augmented vector autoregressive (TVP-FAVAR), which allows coefficients and loadings to change in each period. The results of which are shown in Figure 2.

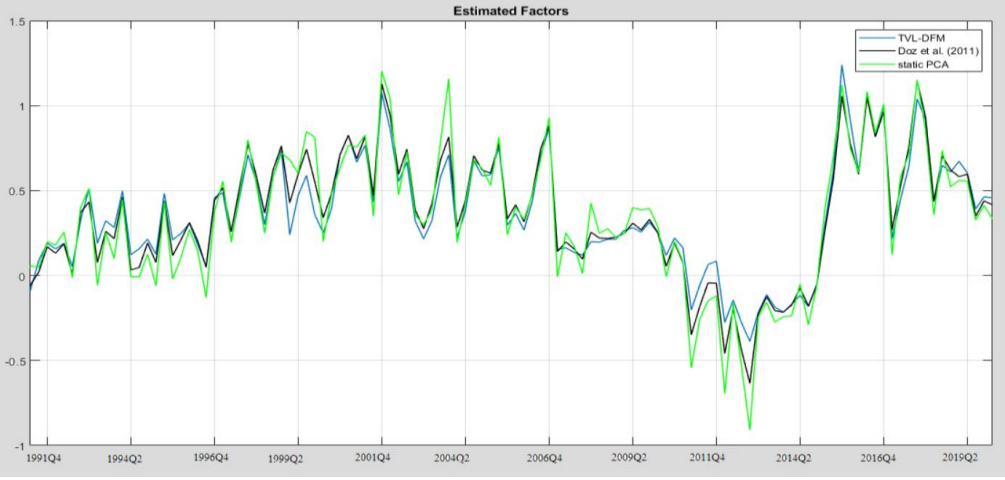

Figure 2. Latent variables FCI
Source: Research finding.

3.4 Evaluation of the Effects of Macroeconomic Variables Shock on FCI in the TVP-FAVAR Model

The present section uses two lags of model variables. The results of impulse response analysis of variables unemployment rate, economic growth rate, inflation rate, budget deficit, and Gini coefficient on the financial conditions index variable are investigated with TVP-FAVAR. In the three-dimensional graphs of this

section, the Z-axis is examined in terms of variables; the Y-axis is the period that occurs after the shock, and the X-axis shows the years of the research.

Therefore, we analyze the effects of the FCI variable on the unemployment rate, economic growth rate, inflation rate, Gini coefficient, and budget deficit shocks.

4.3.1 The Effect of Unemployment Rate Shock on FCI Variable

Table 1 shows the coefficients of the effects of unemployment rate shocks on the variables of the present study. As shown in Table 1, a comparison of the coefficients of model variables indicates that the maximum amount of the coefficients belonged to the first lag of the unemployment rate variable, with a value of 0.778, and the highest mean coefficients of model variables were also related to the first lag of the unemployment rate variable with a value of 0.537.

Table 1. Coefficients of the Effects of Unemployment Rate Shock

coefficients(beta): Endogenous: U	Max	Min	Standard deviation	Mean
FCI(-1)	0.059	-0.043	0.026	0.001
FCI(-2)	0.067	-0.041	0.027	0.012
INF(-1)	0.425	-0.486	0.233	-0.049
INF(-2)	0.418	-0.505	0.212	-0.001
GDB(-1)	0.070	-0.114	0.046	-0.017
GDB(-2)	0.070	-0.106	0.047	0.000
GDP(-1)	0.501	-0.480	0.255	0.032
GDP(-2)	0.448	-0.586	0.281	0.033
GINI(-1)	0.069	-0.832	0.230	-0.308
GINI(-2)	0.249	-0.410	0.179	-0.092
RU(-1)	0.778	0.328	0.116	0.0537
RU(-2)	0.170	-0.301	0.117	-0.045
Constant	0.040	-0.039	0.021	-0.000

Source: Research finding.

Figure 3 shows the response of the FCI variable to an unemployment rate shock. According to the figure, the effects of the unemployment rate shock on the FCI appear after one period. The FCI variable in the whole period under study (1991-2018) in the first three impact periods showed a negative response to the

unemployment rate shock. However, during the years 1991-2005, the negative impact of the unemployment rate shock disappeared after almost 3 periods. From the fourth period, the response of the FCI was positive to the unemployment rate shock, and these positive effects have been lasting. From the second half of 2001s to the late 2011s, the negative effects of the unemployment rate had a more lasting effect, and these negative effects disappeared after almost 13 periods. The most negative response of the FCI to the unemployment rate shock occurred in the second half of the 1991s, and the most positive response of the FCI to the unemployment rate shock also occurred during the years 1994-2001.

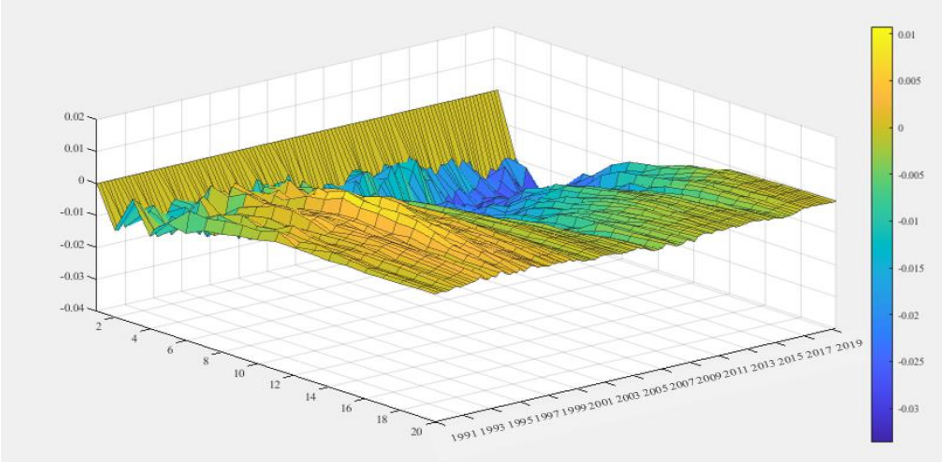

Figure 3. The Response of the FCI Variable to Unemployment Rate Shock
Source: Research finding.

4.3.2 The Effect of Inflation Rate Shock on FCI Variable

Table 2 shows the coefficients of the effects of inflation rate shocks on the variables of the present study. As shown in Table 2, a comparison of the coefficients of model variables indicates that the maximum amount of the coefficients belonged to the first lag of the inflation rate variable with a value of 0.669, and the highest mean coefficients of model variables were also related to the first lag of the inflation rate variable, with a value of 0.325.

Table 2. Coefficients of the Effects of the Inflation Rate Shock

coefficients(beta): Endogenous:π	Max	Min	Standard deviation	Mean
FCI(-1)	0.056	-0.007	0.016	0.018
FCI(-2)	0.020	-0.046	0.017	-0.013

INF(-1)	0.669	0.009	0.141	0.325
INF(-2)	0.285	-0.155	0.126	0.054
GDB(-1)	0.111	-0.027	0.040	0.049
GDB(-2)	0.086	-0.075	0.042	0.029
GDP(-1)	0.112	-0.056	0.039	-0.003
GDP(-2)	0.072	-0.059	0.034	0.002
GINI(-1)	0.205	-0.360	0.145	-0.056
GINI(-2)	0.332	-0.446	0.184	-0.067
RU(-1)	0.235	-0.167	0.106	0.052
RU(-2)	0.327	-0.076	0.099	0.068
Constant	0.058	-0.135	0.052	-0.027

Source: Research finding.

Figure 4 shows the response of the FCI variable to an inflation rate shock. The results show that the effects of the inflation rate shock after one period affect the FCI variable, and the response of the FCI variable to the shock was negative at the beginning of the impact period. This negative response has continued for five periods, and the FCI from the sixth period showed a positive response to the inflation shock. These positive effects continued for seven periods. After that, the effects of the above shock have converged to zero.

The inflation rate shock worsened the country's financial conditions at the beginning of the impact period.

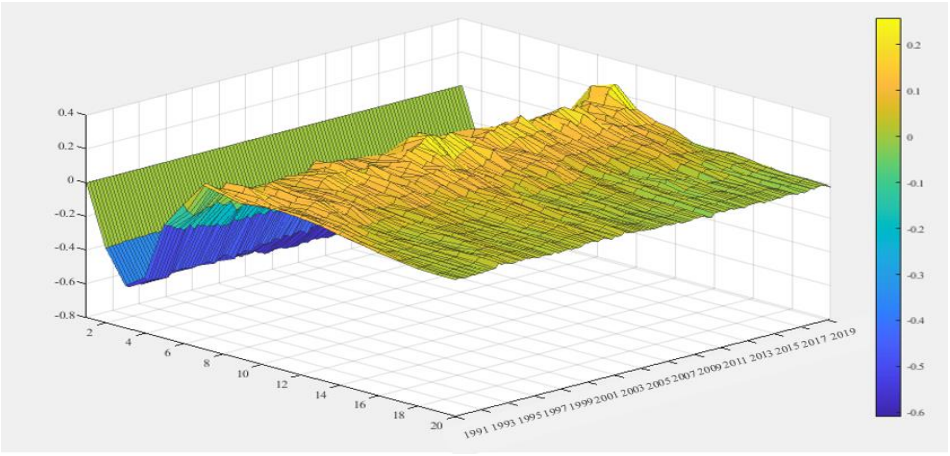

Figure 4. The Response of the FCI Variable to Inflation Rate Shock
Source: Research finding.

4.3.3 The Effect of the Economic Growth Rate Shock on the FCI Variable

Table 3 shows the coefficients of the effects of economic growth rate shocks on the variables of the present study. As shown in Table 3, the comparison of the coefficients of model variables indicates that the maximum amount of the coefficients belonged to the first lag of the economic growth rate variable with a value of 0.432, and the highest mean coefficients of model variables were related to the first lag of the economic growth rate variable with a value of 0.238.

Table 3. Coefficients of the Effects of the Economic Growth Rate Shock

coefficients(beta): Endogenous:G	Max	Min	Standard deviation	Mean
FCI(-1)	0.024	-0.036	0.017	-0.012
FCI(-2)	0.034	-0.037	0.020	0.006
INF(-1)	0.222	-0.326	0.124	0.005
INF(-2)	0.171	-0.296	0.119	-0.049
GDB(-1)	0.040	-0.082	0.032	0.007
GDB(-2)	0.052	-0.058	0.026	0.001
GDP(-1)	0.432	-0.011	0.121	0.238
GDP(-2)	0.290	-0.195	0.131	0.085
GINI(-1)	0.131	-0.134	0.076	-0.009
GINI(-2)	0.125	-0.137	0.073	-0.021
RU(-1)	0.083	-0.117	0.051	-0.021
RU(-2)	0.076	-0.116	0.049	-0.016
Constant	0.033	-0.040	0.180	-0.007

Source: Research finding.

Figure 5 shows the response of the FCI variable to the economic growth rate shock; The results show that the effects of economic growth rate shock appear after one period, and the response of the FCI to the economic growth rate shock has been negative in the entire period under review (1991-2018) up to the first three periods. The effects of the economic growth rate shock have affected the FCI with a delay of one period. After three periods of the negative impact of the economic growth rate shock, the response of the FCI to the above shock was positive in the fourth period. The most positive response to the FCI and, in other words, the most positive effect of the economic growth rate shock on the FCI occurred from 2005 to 2017. However, the positive effects of the economic growth rate have not been

lasting and have disappeared after one period. The most negative response of the FCI to the above shock occurred in the period 8-10 due to the impact of the economic growth rate in 2019.

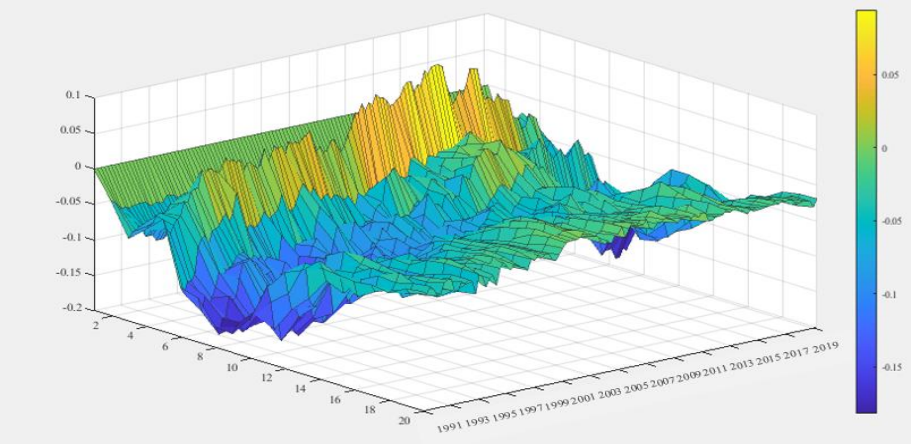

Figure 5. The Response of the FCI Variable to the Economic Growth Rate
Source: Research finding.

4.3.4 The Effect of Gini Coefficient Shock on FCI Variable

Table 4 shows the coefficients of the effects of the Gini coefficient shock on the variables of the present study. As shown in Table 4, the maximum amount of the coefficient of the first lag of the financial conditions index variable in response to the shock of the Gini coefficient variable is equal to 0.028, which is the lowest amount compared to the first lag of other variables used in this model. The maximum number of coefficients in the first lag belongs to the Gini coefficient and GDP variables.

Table 4. Coefficients of the Effects of the Gini Coefficient Shock

coefficients(beta): Endogenous: GN	Max	Min	Standard deviation	Mean
FCI(-1)	0.028	-0.046	0.019	-0.010
FCI(-2)	0.068	-0.005	0.017	0.031
INF(-1)	0.247	-0.314	0.139	-0.037
INF(-2)	0.552	0.071	0.122	0.340
GDB(-1)	0.076	-0.068	0.033	-0.001
GDB(-2)	0.097	-0.098	0.043	-0.007
GDP(-1)	0.316	-0.280	0.159	-0.017
GDP(-2)	0.065	-0.699	0.190	-0.325

GINI(-1)	0.311	-0.113	0.107	0.075
GINI(-2)	0.007	-0.396	0.117	-0.208
RU(-1)	0.140	-0.144	0.067	-0.008
RU(-2)	0.183	-0.033	0.060	0.083
Constant	0.074	0.005	0.017	0.028

Source: Research finding.

Figure 6 shows the response of the FCI variable to the Gini coefficient shock. The results of the effects of the Gini coefficient shock on the FCI indicate that the effects of the above shock in the entire period under review (1991-2018) are shown after one period, and the response of the FCI during 1991-2011 to the Gini coefficient shock in the first period of impact was positive. The reduction of income inequality has positively affected the FCI in the first period. However, the response of the FCI to the Gini coefficient shock was negative in the second and third periods, and this negative response disappeared in the 1991s after two periods. The highest positive response of the FCI to the Gini coefficient shock occurred in the fifth period. The positive effects of the Gini coefficient shock have been lasting since the 1991s. Also, the most negative response of the FCI to the Gini coefficient shock occurred in 2011s and during the years 2014-2019, and increasing the income inequality gap has had a negative impact on the FCI.

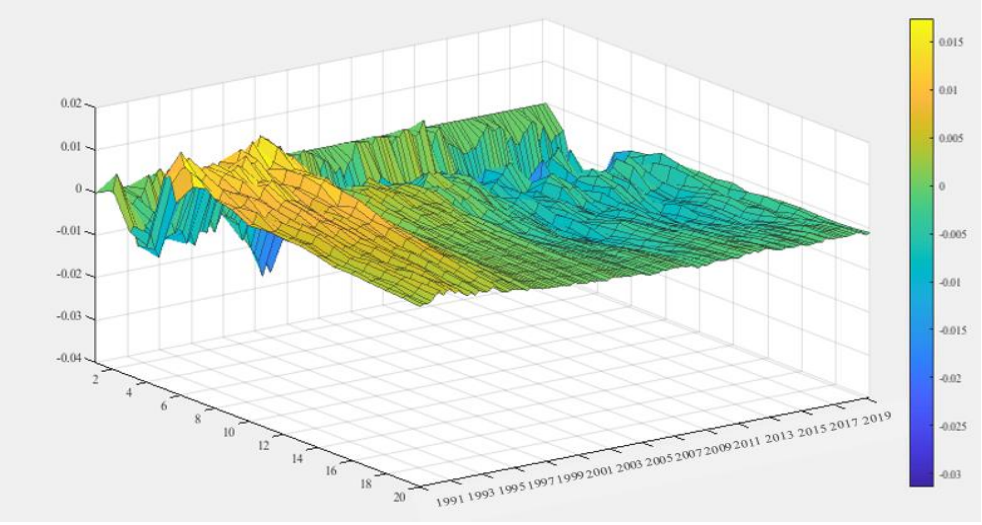

Figure 6. The Response of the FCI Variable to the Gini Coefficient Shock
Source: Research finding.

4.3.5 The Effect of Budget Deficit Shock on FCI Variable

Table 5 shows the coefficients of the effects of the budget deficit shock on the variables of the present study. As shown in Table 5, comparing the coefficients of model variables indicates that the maximum amount of the coefficients belonged to the first lag of the unemployment rate variable, with a value of 0.982, and the highest mean coefficients of model variables were related to the first lag of the budget deficit variable, with a value of 0.459.

Table 5. Coefficients of the Effects of the Budget Deficit Shock

coefficients(beta): Endogenous: DB	Max	Min	Standard deviation	Mean
FCI(-1)	0.215	0.011	0.048	0.099
FCI(-2)	0.011	-0.212	0.056	-0.096
INF(-1)	0.453	-1.172	0.436	-0.218
INF(-2)	0.599	-1.049	0.393	-0.037
GDB(-1)	0.394	-0.413	0.209	-0.069
GDB(-2)	0.397	-0.302	0.185	-0.043
GDP(-1)	0.614	0.289	0.089	0.459
GDP(-2)	0.146	-0.223	0.098	-0.063
GINI(-1)	0.872	-0.730	0.412	0.026
GINI(-2)	0.782	-0.770	0.406	0.042
RU(-1)	0.982	-0.628	0.132	0.096
RU(-2)	0.794	-0.615	0.364	0.063
Constant	0.451	-0.426	0.250	0.097

Source: Research finding.

Figure 7 shows the response of the FCI variable to the budget deficit shock. The results show that the effects of the budget deficit shock after one period affect the FCI variable, and at first, the response of the FCI to the budget deficit shock was negative. This negative response has continued for four periods, and the most negative impact of the budget deficit shock occurred in the second period of impact. From the fifth period of the impact of the budget deficit shock, the response of the FCI to the above shock was positive; However, the intensity of this positive effect was very small and had a shorter duration compared to the negative effects of the budget deficit shock.

The budget deficit is one of the problems that has plagued the economy in recent years. The country's economy has always faced a continuous budget deficit for many years. Due to its pervasive effect on economic variables, it has left many destructive effects on economic and financial conditions.

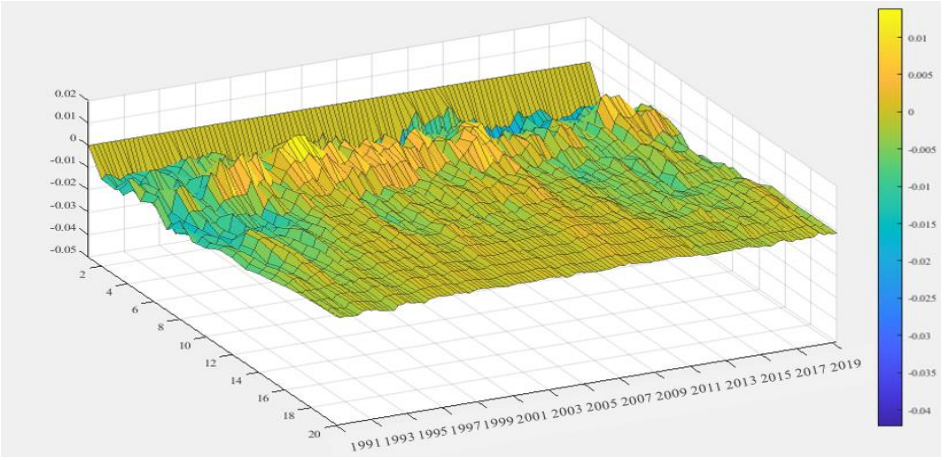

Figure 7. The Response of the FCI Variable to Budget Deficit Shock
Source: Research finding.

5. Conclusion

We investigated the reaction of the financial conditions index to the macroeconomic variables shocks in Iran using quarterly data. The results indicate that the effects of unemployment and economic growth rate variables shocks on the financial conditions index in the short and long term are negative. According to the country's economic conditions, the effects of the Gini coefficient shock on the financial conditions index are also different in the short and long term. The financial conditions index variable has shown a negative and positive reaction to the behavioral changes of inflation and budget deficit variables in the short and long term.

In other words, the financial conditions index has a different reaction to the macroeconomic variables shocks over time, and the reaction rate has not been the same.

According to the results of this study, the country's macroeconomic environment has been associated with many instabilities. With increasing uncertainties and the upsetting of the balance of different markets over time have led to instability of the country's FCI. In other words, the instabilities of macroeconomic variables have caused many changes in the country's FCI, and

behavioral changes have been macroeconomic variables in the country one of the important factors affecting the movement trend of the FCI.

Unfortunately, the policy maker in Iran has islanded operation and the adopted policies were not following the economic and financial conditions of the country. The reason for this was that the structure of the economy was not considered a connected whole and a system; When a part becomes unstable, it destabilizes the whole system. In other words, if macroeconomic variables do not have the necessary stability, they cause instability in other economic sectors. Therefore, policymakers should adopt appropriate policies according to these effects until they can finally improve the country's financial conditions.

Accordingly, although macroeconomic policies are necessary to stabilize the financial sector, they are never sufficient. Therefore, economic policymakers are advised to consider macro-prudential tools and policies as a sufficient condition for stability in the financial conditions and pay special attention to monitoring the country's financial conditions and how it interacts with macroeconomic variables to ensure the effectiveness of policies.

Statements and Declarations

- Funding: This work does not receive any funding.
- Conflict of interest: The authors declare that there is no conflict of interest.

References

Acharya, V., & Naqvi, H. (2012). The Seeds of a Crisis: A Theory of Bank Liquidity and Risk Taking over the Business Cycle. *Journal of Financial Economics*, *106*(2), 349-366. Retrieved from https://papers.ssrn.com/sol3/Delivery.cfm?abstractid=1719428

Adrian, T., Boyarchenko, N., & Giannone, D. (2019). Vulnerable Growth. *American Economic Review*, *109*(4), 1263-1289. Retrieved from https://papers.ssrn.com/sol3/Delivery.cfm?abstractid=2845784

Adrian, T., & Liang, N. (2016). Monetary Policy, Financial Conditions, and Financial Stability. *CEPR Discussion Paper*, Retrieved from https://ssrn.com/abstract=2811090

Adrian, T., & Shin, H. S. (2010). Financial Intermediaries and Monetary Economics. *Handbook of Monetary Economics, 3,* 601-650. Retrieved from https://papers.ssrn.com/sol3/Delivery.cfm?abstractid=1491603

Altunbas, Y., Gambacorta, L., & Marques-Ibanez, D. (2010). Does Monetary Policy Affect Bank Risk-Taking*? ECB Working Paper, 1166*, Retrieved from https://ssrn.com/abstract=1574188

Angelopoulou, E., Balfoussia, H., & Gibson, H. D. (2014). Building a Financial Conditions Index for the Euro Area and Selected Euro Area Countries: What Does it Tell Us about the Crisis? *Economic Modelling, 38*, 392–403. Retrieved from https://papers.ssrn.com/sol3/Delivery.cfm?abstractid=2253844

Arman, S. A., Anvari, E., & RakiKianpour, S. (2022). The Modeling of the Dynamic Financial Conditions Index and Assessing It's Effectiveness in Predicting Iran's Stock Returns. *Journal of Asset Management and Financing, 10*(1), 47-72. Retrieved from https://amf.ui.ac.ir/article_26718_en.html?lang=fa

Bernanke, B. S., & Gertler, M. (1986). Agency Costs, Collateral, and Business Fluctuations. *Working Paper*, Retrieved from https://www.nber.org/system/files/working_papers/w2015/w2015.pdf

Boivin, J., Kiley, M. T., & Mishkin, F. S. (2010). How has the Monetary Transmission Mechanism Evolved over Time? *In Handbook of Monetary Economics, 3*, 369-422. Retrieved from https://www.nber.org/system/files/working_papers/w15879/w15879.pdf

Brunnermeier, M. K., & Sannikov, Y. (2014). A Macroeconomic Model with a Financial Sector. *American Economic Review, 104*(2), 379-421. Retrieved from https://www.econstor.eu/bitstream/10419/144448/1/wp236en.pdf

Christiano, L. J., Motto, R., & Rostagno, M. (2014). Risk Shocks. *American Economic Review, 104*(1), 27-65. Retrieved from https://www.nber.org/system/files/working_papers/w18682/w18682.pdf

Dell'Ariccia, G., Laeven, L., & Suarez, G. A. (2017). Bank Leverage and Monetary Policy's Risk-Taking Channel: Evidence from the United States. *the Journal of Finance, 72*(2), 613-654. Retrieved from https://www.econstor.eu/bitstream/10419/154336/1/ecbwp1903.pdf

Deng, C., Teng, L., & Xu, M. (2016). The Fluctuation of China's Financial Conditions and Its Macroeconomic Effects. *Studies of International Finance, 3*, 17-27. Retrieved from https://jpbud.ir/browse.php?a_id=2197&sid=1&slc_lang=fa

Doz, C., Giannone, D., & Reichlin, L. (2011). A Two-Step Estimator for Large Approximate Dynamic Factor Models Based on Kalman Filtering. *Journal of Econometrics, 164*(1),188–205. Retrieved from https://hal.science/hal-00844811/document

Ganchev, G. T., & Paskaleva, M, G.(2020). The Importance of Financial Condition Indices in South-Eastern Europe. *International Journal of Contemporary Economics and Administrative Sciences, 10*(1), 78-106. Retrieved from http://www.ijceas.com/index.php/ijceas/article/download/335/253

Gilchrist, S., & Zakrajšek, E. (2012). Credit Spreads and Business Cycle Fluctuations. *American Economic Review, 102*(4), 1692-1720. Retrieved from https://www.nber.org/system/files/working_papers/w17021/w17021.pdf

Gómez , E., Murcia, A., & Zamudio, N. (2011). Financial Conditions Index: Early and Leading Indicator for Colombia? *Ensayos sobre Politica Economica, 29*(66), 174-221. Retrieved from http://www.scielo.org.co/scielo.php?pid=S0120-44832011000300006&script=sci_arttext&tlng=en

Goodhart, C., & Hofmann, B. (2001). Asset Prices, Financial Conditions, and the Transmission of Monetary Policy. *Conference on Asset Prices, Exchange Rates, and Monetary Policy*, Stanford University, Stanford. Retrieved from https://www.frbsf.org/wp-content/uploads/0103conf6.pdf

Hatzius, J., Hooper, P., Mishikin, F. S., Schoenholtz, K. L., & Watson M. W. (2010). Financial Conditions Indexes: A Fresh Look After The Financial Crisis. *National Bureau of Economic Research*, Retrieved from https://www.nber.org/system/files/working_papers/w16150/w16150.pdf

Herculano, M. C. (2022). A Monthly Financial Conditions Index for New Zealand. *Reserve Bank of New Zealand*, Retrieved from https://ideas.repec.org/p/nzb/nzbdps/2022-1.html

He, Z., & Krishnamurthy, A. (2012). A Model of Capital and Crises. *The Review of Economic Studies, 79*(2), 735-777. Retrieved from https://www.nber.org/system/files/working_papers/w14366/w14366.pdf

Huang, Y. F., Liao, W., & Luo, S. (2022). Financial Conditions, Macroeconomic Uncertainty, and Macroeconomic Tail Risks. Retrieved from https://ssrn.com/abstract=4212865

Jermann, U., & Quadrini, V. (2012). Macroeconomic Effects of Financial Shocks. *American Economic Review, 102*(1), 238-271. Retrieved from https://www.nber.org/system/files/working_papers/w15338/w15338.pdf

Kazdal, A., Korkmaz, H. İ., & Yilmaz, M. H. (2022). Composing a High-Frequency Financial Conditions Index and the Implications for Economic Activity. *Borsa Istanbul Review, 22*(4), 769-779. Retrieved from https://www.sciencedirect.com/science/article/pii/S2214845022000023

Kiyotaki, N., & Moore, J. (1997). Credit Cycles. *Journal of Political Economy, 105*(2), 211-248. Retrieved from https://www.nber.org/system/files/working_papers/w5083/w5083.pdf

Koop, G., & Korobilis, D. (2014). A New Index of Financial Conditions. *European Economic Review, 71*, 101–116. Retrieved from https://eprints.gla.ac.uk/95030/1/95030.pdf

---------- (2013). A New Index of Financial Conditions. *SSRN, 2347980*, Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2374980

Li, N., & Yuanchun, L. (2019). Construction of China's Financial Conditions Index in the Post-Crisis Era. *China Political Economy, 2(2)*, 258-276. Retrieved from https://www.emerald.com/insight/content/doi/10.1108/cpe-10-2019-0025/full/pdf

Liu, Z., Wang, P., & Zha, T. (2013). Land-price Dynamics and Macroeconomic Fluctuations. *Econometrica, 81*(3), 1147-1184. Retrieved from https://www.nber.org/system/files/working_papers/w17045/w17045.pdf

Mayes, D., & Viren, M. (2001). Financial Conditions Indexes. *Bank of Finland Working Paper, 17/2001*, Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=315489

Mbelu, A., & Soobyah, L. (2019). Financial Conditions Indices and Economic Downturn: New Evidence from Developing Economies. *The Economic Society of South Africa, 3897*, Retrieved from file:///C:/Users/TORANJ/Downloads/essa_3897.pdf

Miranda-Agrippino, S., & Rey, H. (2015). *World Asset Markets and the Global Financial Cycle*. Cambridge, MA: National Bureau of Economic Research. Retrieved from https://www.aeaweb.org/conference/2015/retrieve.php?pdfid=2270&tk=7E7fr7Tk

Mohseni, H., Pahlevani, M., Shahiki Tash, M. N., & Mir Jalili, S. H. (2019). Analyzing the Role of Unconventional Monetary Policy Using the Financial Conditions Index: A Bayesian Self-Explained Approach. *Quarterly Journal of Economics and Modeling, 1*, 211-240. Retrieved from https://ecoj.sbu.ac.ir/article_87141_1daac734b5c2cb7cbb9182906e3155db.pdf

Montagnoli, A., & Napolitano, O. (2005). Financial Conditions Index and Interest Rate Settings: A Comparative Analysis. *Instituto di Studi Economici Working Paper, 8*, Retrieved from https://core.ac.uk/download/pdf/6759114.pdf

Morana, C. (2021). A New Macro-Financial Conditions Index for the Euro Area. *Econometrics and Statistics*, Retrieved from https://www.sciencedirect.com/science/article/abs/pii/S245230622100112X

Plasil, M., Seidler, J., & Hlaváč, P. (2016). A New Measure of the Financial Cycle: Application to the Czech Republic. *Eastern European Economics, 54*(4), 296–318. Retrieved from https://www.tandfonline.com/doi/abs/10.1080/00128775.2016.1192950

Rajan, R. G. (2006). Has Finance Made the World Riskier? *European Financial Management, 12*(4), 499-533. Retrieved from https://www.tandfonline.com/doi/abs/10.1080/00128775.2016.1192950

Stein, J. C. (2012). Monetary Policy as Financial Stability Regulation. *The Quarterly Journal of Economics, 127*(1), 57-95. Retrieved from https://www.nber.org/system/files/working_papers/w16883/w16883.pdf

Swiston, A. (2008). A U. S. Financial Conditions Index: Putting Credit Where Credit is Due. *International Monetary Fund,* Retrieved from https://www.imf.org/en/Publications/WP/Issues/2016/12/31/A-U-S-22077

Taghizadeh, H., Zamanian, G., & Harati, J. (2016). Calculation of Indicators of Monetary and Financial Conditions Using the Method of Analysis of Basic Components for the Iranian Economy. *Iranian Journal of Applied Economic Studies, 19*, 29-57. [in Persian] Retrieved from http://journals.basu.ac.ir/article_1597_f464c3838874b9b9ecc9df74787e0990.pdf

Wacker, K. M., Lodge, D., & Nicoletti, G. (2014). Measuring Financial Conditions in Major Non-Euro Area Economics. *Working Paper Series, 1743*, Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2528401

Cite this article: Alahverdi, A., Daei-Karimzadeh, S., & Ghobadi, S. (2025). The Reaction of the Financial Conditions Index to the Macroeconomic Variables Shocks. *Iranian Economic Review*, *29*(2), 557-579.