

Identifying and ranking financial market risks in Iran

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Abstract

Fluctuations in asset prices and the resulting uncertainty are one of the most important macroeconomic variables that affect different sectors of the economy in various ways. Therefore, this study is conducted to identify and rank financial market risks in Iran. This study was performed in two parts: qualitative and quantitative. The statistical population in the qualitative section includes the University of Professors in the field of economics in Iran, where 10 people were selected as a statistical sample by available sampling. The statistical population in the quantitative section were professors and doctoral students in the field of economics. By random sampling method, 30 people were selected. Data collection tools are the Delphi questionnaire and pairwise comparison questionnaire. Data analysis was performed by fuzzy Delphi and AHP methods. In the results of the qualitative section, 7 components including 4 components for bad economic uncertainty and 3 components for good economic uncertainty were identified. In the results of the quantitative section, stock index uncertainty with a weight of 0.391 and inflation uncertainty with a weight of 0.276 rank first and second in bad economic uncertainty. Also, economic growth uncertainty with a weight of 0.493 and liberalization of financial markets with a weight of 0.311 rank first and second in good economic uncertainty, respectively.

Keywords: financial market risks, fuzzy Delphi, AHP
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1 Introduction

The 2008 global financial crisis and the following debt crisis in Europe have illustrated that we need a better understanding of the impact uncertainty has on financial markets. Both the Federal Open Market Committee (FOMC) in 2009 and the IMF in 2012 claimed that uncertainty surrounding US and European tax, spending, monetary and regulatory policies were partly to blame for the economic recessions experienced in 2007-2009 and the subsequent slow recovery [3]. Consequently, researchers have since looked at various measures of uncertainty in order to evaluate its impact on the economy [29].

It is crucial to identify financial risk components for effective risk management and supervision. In recent years, there have been frequent regional financial crises, such as the US subprime crisis and the European debt crisis, some of which have even evolved into global financial crises and had a tremendous impact on international financial markets. In 2020, the COVID-19 pandemic also triggers a worldwide market slump and causes global economic recessions. Under this background, the evaluation of financial risk contagion has become a great concern for applicants and

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academicians. However, the existing research mainly focuses on a certain time horizon and does not pay enough attention to multiscale risk contagion by using information from different time domains, which could provide a more valuable basis for investors and regulators to make long-term and short-term risk management decisions in different frequencies [38].

In [25] authors study various measures of risk and find that risk measures related to financial risk are most important in predicting stock returns. We, therefore, focus on financial risk. The economic policy uncertainty (EPU) index introduced by [3] is formed of three components: tax code expiration data, economic forecaster disagreement and the frequency of articles in leading newspapers that contain combinations of words reflecting economic policy uncertainty, for example “economy”, “uncertainty and “regulation”.

Fluctuations in asset prices and the resulting uncertainty are one of the most important macroeconomic variables that affect different sectors of the economy in various ways. Since these fluctuations and the resulting uncertainty do not have the same effect on all sectors of the economy, it is important to study how these changes affect them. It is important to note that good and bad uncertainties have different effects on risk-taking, and these effects will have different behavioural consequences for economic actors. Thus, distinguishing between good and bad uncertainty, as well as examining its effects on risk fluctuations and examining the impact of these fluctuations on macroeconomic variables, make it possible for economic actors to better invest or consume when making policies or rationally. Take action to reduce the negative impact of the shock or increase the positive impact of the shock [43]. Therefore, this study is conducted to identify and rank financial market risks in Iran.

2 Literature review

The impact of uncertainty on the economy has been studied utilizing various measures of policy uncertainty. Early work on the topic by [9] found that policy uncertainty led to a rapid drop followed by a rapid rebound in aggregate output and employment. One explanation could be that during times of policy uncertainty firms freeze investments and hold off hiring staff as these are relatively irreversible actions. Further research was conducted into macro uncertainty by [7] and [37], and into employment uncertainty by [15] and [33], who emphasized that periods of high uncertainty are associated with declining stock prices and declining economic growth. Evidence of declining stock prices as a result of government policy uncertainty was also found in a broader study on government policy changes by [40]. The EPU index has been utilized frequently in research. [45] study whether commodity prices predict EPU. Klossner et al study spillovers between EPU indices of various countries. [34] shows that EPU can explain the cross-section of stock returns in China, and [27] comes to a similar conclusion for the UK. The comovement between economic policy uncertainty and stock market returns has also been studied utilizing various methods, such as with dynamic conditional correlation [2], quantile regression and wavelet coherence [21].

Authors in [42] showed that the set of uncertainties is divided into “good” and “bad” fluctuations in the sense that whether the shocks will improve macroeconomic indicators or the impact of these shocks on the economy and macroeconomic indicators will be negative. Examining these positive and negative effects will lead to predicting good and bad uncertainties. The reason for this is that economic actors, as rational people, make changes in their consumption, savings and investment based on their predictions of the future, which determines the level of risk-taking of individuals, see [1, 23, 24, 30, 35, 41], for more details, also related to the more recent and rapidly growing literature on the pricing of downside tail, or crash, good risk and bad risk, including [5, 6, 10, 11, 12, 13, 16, 17, 19, 26, 31, 36, 39].

In particular, researchers such as [8, 14, 20, 28, 32, 44], identified poor economic uncertainty in financial markets, including inflation uncertainty, interest rate uncertainty, monetary growth uncertainty, stock index uncertainty, and economic policy uncertainty. [22] also introduces good economic uncertainty in financial markets, including good news, economic growth uncertainty, financial development uncertainty and production uncertainty. In other studies, good economic uncertainty includes the liberalization of financial markets [3], the openness of capital accounts, and the openness of trade [4].

In Iran, no research has been conducted so far based on good and bad economic uncertainty in stock market fluctuations. Thus, based on the review of the research literature, it is observed that so far no research has identified and ranked the components of financial market risks in Iran, which shows the gap between previous research and innovation of this study.

3 Methodology

The article was performed with a mixed (qualitative-quantitative) approach. In the qualitative section, first by reviewing the research literature, the components of financial market risks including good economic uncertainty and

bad economic uncertainty were identified. Then the identified indices were validated by fuzzy Delphi method. The statistical population in this section includes the University of Professors in the field of economics in Iran, where 10 people were selected as a statistical sample by available sampling. Among the statistical sample, 8 were male and 2 were female. Also, all members of the statistical sample had doctoral education and had more than 10 years of work experience.

In the quantitative part, a pairwise comparison questionnaire was first designed from the components identified in the fuzzy Delphi method. The components were then ranked by the AHP method and Expert choice Software to identify the most important components of good economic uncertainty and bad economic uncertainty. The statistical population in this section were professors and doctoral students in the field of economics. By random sampling method, 30 people were selected as a statistical sample to answer the questionnaire. Among the statistical sample in this section, 15 were men and 15 were women. There were also 10 university professors and 20 doctoral students.

4 Results

4.1 Qualitative Results

In this section, the components identified by the research literature were validated by the fuzzy Delphi method. 13 components for stock market fluctuations, including 6 components for bad economic uncertainty and 7 components for good economic uncertainty were identified in the research literature. To this end, the identified categories were presented to 10 experts in the form of a questionnaire. Afterwards, the validation of the model was determined according to mean fuzzy triangular and mean definite based on the second stage survey and the study of their differences with the opinion of other experts. The survey process will stop if the difference between the two steps is less than the very low threshold (i.e., 0.1) [18].

4.2 Definition of Linguistic Variables

The Delphi Fuzzy Questionnaire was designed to receive experts' opinions regarding agreement with the identified categories following the identification of the categories of grounded theory. The response range and triangular fuzzy numbers are shown in Table 1.

The definite fuzzy numbers were obtained by the Minkowski's formula in the form of equation (4.1):

$$x = m + \frac{\beta - \alpha}{4}. \tag{4.1}$$

For instance, definite fuzzy number in was obtained very high in the linguistic variable, as follows:

$$x = 1 + \frac{0 - 0.25}{4} = 0.9375.$$

Table 1: The range of answers to questions and triangular fuzzy numbers

Linguistic variables	Triangular fuzzy numbers	Definite fuzzy number
Very high	(1, 0.25, 0)	0.9375
High	(0.75, 0.15, 0.15)	0.75
Moderate	(0.5, 0.25, 0.25)	0.5
Low	(0.25, 0.15, 0.15)	0.25
Very low	(0, 0, 0.25)	0.0625

Reference: [18]

5 Expert Survey of the First Stage

In this stage, the categories identified in qualitative fuzzy were presented to 10 experts in the form of a questionnaire, and mean triangular fuzzy numbers was obtained by equations (5.1) and (5.2).

$$A_i = (a_1^{(i)}, a_2^{(i)}, a_3^{(i)}), \quad i = 1, 2, 3, \dots, n \tag{5.1}$$

$$A_{ave} = (m_1, m_2, m_3) = \left(\frac{1}{n} \sum_{i=1}^n a_1^{(i)}, \frac{1}{n} \sum_{i=1}^n a_2^{(i)}, \frac{1}{n} \sum_{i=1}^n a_3^{(i)} \right) \tag{5.2}$$

where A_i indicates the viewpoint of the i th expert and A_{ave} indicates the mean viewpoints of experts. Table 2 presents the mean triangular fuzzy estimated by equation (5.2) using definite Minkowski's formula. The definite mean obtained showed the severity of the expert's agreement with each of the categories.

Based on the results, the definite mean in components of interest rate uncertainty, economic policy uncertainty, financial development uncertainty, production uncertainty, the openness of capital accounts and openness of trade is less than 0.5. Therefore, these components are removed and the second phase of fuzzy Delphi is performed with 7 components.

Table 2: Mean fuzzy triangular and definite mean of categories (the first stage)

Column	Variables	Components	Mean Triangular Fuzzy			Mean Degraded Fuzzy (definite)
			β	α	m	
1	Bad economic uncertainty	inflation uncertainty	0.090	0.213	0.715	0.750
2		interest rate uncertainty	0.058	0.134	0.421	0.402
3		monetary growth uncertainty	0.079	0.231	0.798	0.836
4		stock index uncertainty	0.087	0.230	0.789	0.825
5		economic policy uncertainty	0.079	0.161	0.366	0.3455
6		Bad news	0.068	0.235	0.857	0.916
7	Good economic uncertainty	good news	0.089	0.234	0.802	0.838
8		economic growth uncertainty	0.102	0.209	0.777	0.803
9		financial development uncertainty	0.054	0.115	0.427	0.41175
10		production uncertainty	0.085	0.161	0.398	0.379
11		openness of capital accounts	0.058	0.124	0.321	0.3045
12		openness of trade	0.054	0.125	0.327	0.30925
13		liberalization of financial markets	0.098	0.212	0.718	0.746

Reference: Research findings

6 Expert Survey of the Second Stage

At this stage, the second questionnaire was designed and again presented to the group of experts along with the previous comments of each expert and the extent of their differences with the views of other experts. The stages of estimating the mean triangular fuzzy and definite mean were similar to the previous stage. According to Table 3, the difference between the first and second stages was less than 0.1 in all components categories identified. Therefore, the consensus was reached in all three categories, which resulted in the discontinuation of the survey. Therefore, the validation of the categories identified by the consensus of the experts and the fuzzy Delphi method was confirmed.

7 Quantitative Results

In this section, first, the pairwise comparison questionnaire was designed by the 7 final components in the fuzzy Delphi method and then the questionnaire was provided to the statistical sample in the quantitative section. Financial

Table 3: Mean triangular fuzzy and definite mean of categories (the second stage)

Column	Variables	Components	Mean Triangular Fuzzy			Mean Degraded Fuzzy (definite)	Difference between the first and second stages
			β	α	m		
1	Bad economic uncertainty	inflation uncertainty	0.102	0.246	0.719	0.755	0.005
2		monetary growth uncertainty	0.089	0.251	0.802	0.835	0.001
3		stock index uncertainty	0.090	0.235	0.799	0.798	0.027
4		Bad news	0.075	0.241	0.862	0.903	0.013
5	Good economic uncertainty	good news	0.079	0.231	0.898	0.934	0.096
6		economic growth uncertainty	0.095	0.201	0.790	0.816	0.013
7		liberalization of financial markets	0.098	0.239	0.765	0.800	0.054

Reference: Research findings

market risks in the AHP method were ranked separately in terms of good economic uncertainty and bad economic uncertainty. The ranking results for bad economic uncertainty and good economic uncertainty are in accordance with Figures 1 and 2, respectively. According to the results, the inconsistency rate is 0.5, which indicates that the rating is valid. Thus, stock index uncertainty with a weight of 0.391 and inflation uncertainty with a weight of 0.276 ranks first and second in bad economic uncertainty. Also, economic growth uncertainty with a weight of 0.493 and liberalization of financial markets with a weight of 0.311 ranks first and second in good economic uncertainty, respectively.



Figure 1: Ranking the components of bad economic uncertainty



Figure 2: Ranking the components of good economic uncertainty

8 Conclusions

Fluctuations in asset prices and the resulting uncertainty are one of the most important macroeconomic variables that affect different sectors of the economy in various ways. Therefore, this study is conducted to identify and rank financial market risks in Iran. This study was performed in two parts: qualitative and quantitative.

In the qualitative section, 7 components including 4 components for bad economic uncertainty and 3 components for good economic uncertainty were identified by the fuzzy Delphi method. In the quantitative section, stock index

uncertainty and inflation uncertainty rank first and second in bad economic uncertainty. Also, economic growth uncertainty and liberalization of financial markets rank first and second in good economic uncertainty, respectively.

These results show that the most important bad economic uncertainties for the stock market and the financial sector are stock index uncertainty and inflation rates. Since the inflation rate in Iran has a lot of volatilities, this issue also affects the stock index and makes it face a lot of volatilities. But in financial markets, stock index volatilities and their consequences play a more important role in creating risk and uncertainty. These factors can cause many problems for investors in stock companies and greatly reduce their profitability or cause uncertainty.

Also, the most important good economic uncertainties include economic growth and liberalization of financial markets. Therefore, the risk of economic growth of the country can be considered a positive criterion for investors. If the country's production increases sharply, economic growth will increase and in line with that, the profitability of investors in stock companies will also increase. Liberalization of financial markets is also in the interest of investors because it can make stock exchanges and financial markets more traded. Liberalization of the stock market gives foreign investors the opportunity to invest in the stocks of other countries and allows domestic investors to invest in foreign stocks. It is very important for the governments of countries to know the effects of the reopening of their stock market on foreigners.

The results of this study are consistent with the results of research by [3, 4, 8, 14, 20, 22, 28, 32, 44]. Based on the results, it is suggested that the government and central bank use economic policies to reduce inflation to improve the situation in the financial markets. Because by reducing inflation, stock index volatilities can be controlled and financial market risk can be reduced. Also, by liberalizing the financial markets, it is possible to increase domestic trade and international trade with other countries for the financial markets.

Future research is suggested to examine the components of this research in regression. Researchers in their studies can examine the financial risks identified in this study in influencing financial assets and macroeconomic variables.

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