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The effects of external uncertainty shocks on Iran's macroeconomy

Fatemeh Ansari*, Ali Rezazadeh **

** PhD in Financial Economics, Department of Economics, Faculty of Economics and Management, Urmia University, Urmia, Iran*
Email: *f.ansari@urmia.ac.ir*

***Associate Professor of Economics, Faculty of Economics and Management, Urmia University, Urmia, Iran (Corresponding Author).*
Email: *a.rezazadeh@urmia.ac.ir*

0000-0003-4165-1523
Postal address*: Urmia, 11 km Sarv Road, Urmia University, Faculty of Economics and Management, Department of Economics, Postal Code: 5756151818.*

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EXTENDED ABSTRACT

INTRODUCTION

Uncertainty refers to factors that are likely to influence investors' financial decisions; Such as future government policies, financial trends and their potential effects. Among these, the macroeconomic variables of a country is one of the most important indicators whose changes are closely related to policy-making, market risk and market uncertainty given the complexities of the current world; Analyzing the macroeconomics of a country without considering the interdependencies between countries and external shocks that occur every day in different ways such as disease, sanctions, war, etc., is like a vicious circle from which no achievement can be achieved. Therefore, in order to grow and develop a country's economy in various dimensions, controlling inflation, risk management and improving foreign relations; We need to recognize the interdependencies between countries and analyze the shocks that affect the economic image of any country, willingly or unwillingly, in terms of the international economy.

Iran's economy has been affected by several shocks in different years. Among these, uncertainties in the area of oil shock, financial market shock and economic policy shock are the most important and obvious shocks that have affected macroeconomic variables. There are several common and well-known variables to indicate macroeconomic activity. The macroeconomic variables used in this study include gross domestic product (GDP), which shows Iran's output, and consumer price index (CPI), whose changes indicate inflation. And money supply (M2), which reflects the reaction of monetary power.

The main issue of this research is the answer to the question of how macroeconomic variables behave in the face of these three shocks?

Therefore, to answer this question and investigate the asymmetric effect of international uncertainty shocks, which include: oil shock, financial market shock and economic policy shock And analysis of its effects on Iran's macroeconomy, the NARDL nonlinear model has been used in the period 1985-2020.

METHODOLOGY

To investigate the effect of three indicators of economic uncertainty OVX, VIX, EPU as well as exchange rate shock on macroeconomic variables in Iran in the period 1985-2020, the NARDL autoregression model with nonlinear distribution intervals has been used.

The implicit equations of the present study based on the study (Wen et al., 2019) are as follows:

$$GDP=F\left(OVX^{\pm}.VIX^{\pm}.EPU^{\pm}.ER^{\pm}\right) \quad (1)$$

$$M2=F(OVX^{\pm}.VIX^{\pm}.EPU^{\pm}.ER^{\pm}) \quad (2)$$

$$CPI=F\left(OVX^{\pm}.VIX^{\pm}.EPU^{\pm}.ER^{\pm}\right) \quad (3)$$

Table 1. Introducing the variables used in the research

Source: Research results

Extraction source	Definition	Variable symbol
www.policyuncertainty.com	Uncertainty of economic policy as a logarithm and without units	Epu
www.spglobal.com	Uncertainty of financial markets as a logarithm of total and unit rate of return	vix
Website of the Central Bank of the Islamic Republic of Iran	Logarithm of OPEC heavy oil prices (dollars)	ovx
Website of the Central Bank of the Islamic Republic of Iran	Logarithm of the total consumer price index	cpi

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	of urban households by year (100 =2016)	
Website of the Central Bank of the Islamic Republic of Iran	Logarithm of GDP in terms of economic activities at constant prices in 2016 (billion rials)	Gdp
Website of the Central Bank of the Islamic Republic of Iran	Logarithm of money plus quasi-money in terms of billion rials	M2
Website of the Central Bank of the Islamic Republic of Iran	Informal exchange rate logarithm (Rials)	ER

FINDINGS

According to the estimation results, in the short run given in the table below, the three economic policy shocks (EPU), financial markets (VIX) and energy markets (OVX) have no effect on the GDP of the Iranian economy and the coefficient EC, which in Shown here as CointEq (-1), associated with a negative coefficient estimate of 0.94. This means that about 94% of any movement toward imbalance is corrected over a period of time. Also, in the short run, the negative shock of economic policy with coefficients of 10% and 3% and the energy market with 22% and 4% has intensified inflation, and the most effective shock on the money supply is the positive shock of the energy market with a coefficient of 19%, which has increased symmetrically.

Table 2. Selected wavelets baded on Simulation

Source: Research results

GDP			CPI			M2		
Variable	Coefficient	Possibility	**Variable**	Coefficient	Possibility	**Variable**	Coefficient	Possibility
D(C	0.49	0.00	D(EPUCYCLE_NEG)	0.10	0.00	D(OVXCYCLE_POS)	0.19	0.00

			D(EPUCYCLE_NEG(1))	0.03	0.00	D(OVXCYCLE_POS(-1))	0.16-	0.00
			D(OVXCYCLE_NEG)	0.22	0.04	D(VIXCYCLE_POS)	0.03	0.00
			D(OVXCYCLE_NEG(-1))	0.08	0.00	D(VIXCYCLE_POS(-1))	0.03-	0.00
			CointEq(-1)*	0.68	0.00	D(VIXCYCLE_NEG)	0.01	0.00
CointEq(-1)*	0.94-	0.00				D(ER_POS)	0.26	0.05
						CointEq(-1)*		0.0

Long-term relationships between external shocks and macroeconomic parameters have been estimated using the EC-term error correction test. The results show that in the long run, the positive and negative shocks of economic policy-making have no effect on the GDP of the Iranian economy, and this shows that economic news related to the US government has no effect on Iran's GDP. Energy market and exchange rate shocks in the long run have an asymmetric effect on Iran's GDP (8-%, 14%). The most effective parameter on GDP is the negative exchange rate shock with a coefficient of 31.48%. The negative exchange rate shock has reduced inflation by 13% and is the most important factor influencing inflation. Also, this negative exchange rate shock has reduced the money supply by 29.84%, and in this regard, it is considered to be the most effective shock on the money supply.

Table 3. Results of long-term coefficient estimation using NARDL nonlinear model

Source: Research results

Variable	GDP		CPI		M2	
	Coefficient	Prob	Coefficient	Prob	Coefficient	Prob
EPUCYCLE_POS	-0.56	0.067	7.52	0.002	-4.77	0.065
EPUCYCLE_NEG	-3.19	0.215	-4.80	0.000	-1.45	0.058
OVXCYCLE_POS	0.08-	0.00	0.51	0.011	3.87	0.004

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OVXCYCLE_NEG	0.14	0.00	0.40	0.005	3.41	0.013
VIXCYCLE_POS	0.002	0.052	0.13	0.089	-0.13	0.000
VIXCYCLE_NEG	-0.003	0.044	0.15	0.23	0.09	0.005
ER_NEG	31.48	0.000	13.1-	0.000	-29.84	0.023
ER_POS	-0.0013	0.031	7.23	0.000	1.54	0.010
C	13.10	0.000	12.41	0.000	10.12	0.000
R-squared	0.91		0.74		0.87	
F-statistic	83.78		3.14		31.57	
Prob(F-statistic)	0.000		0.007		0.000	
Durbin-Watson stat	2.22		2.13		2.45	

CONCLUSION

The three most widely used economic policy uncertainties (EPU), financial markets (VIX) and energy market (OVX) in the period 1985-2020 are considered in this paper and the short-term and long-term nonlinear asymmetric relationship between these three types of uncertainty and Macroeconomic variables are examined. Empirical results provide significant evidence of a short-term relationship between various types of uncertainty shocks and Iran's macroeconomy. In the long run, the results show that the most irrelevant parameter on domestic production is US government-based economic news and the most relevant factor of uncertainty on Iran's macroeconomy; Exchange rate and oil market shocks. International financial market shocks have an asymmetric effect on money supply, and reduced energy market uncertainty may lead to increased money supply. Based on the findings of the study, economic policymakers are advised to calculate the severity and direction of external shocks in their policies in order to create macroeconomic growth and stability, and to take preventive measures regarding them.

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