Shahid Chamran University of Ahvaz

Quarterly Journal of Quantitative Economics

Journal Homepage: www.jqe.scu.ac.ir
Print ISSN: 2008-5850
Online ISSN: 2717-4271

Non-linear Response of Inflation: A Real Effective Exchange Rate in Iran

Mohammad Abdi Seyyedkolaee*, Amir Mansour Tehranchian**, Ahmad Jafari Samimi ***, Gino Favero ****

** Assistant Professor of Economics, Department of Economics, Faculty of Economics and Administrative Sciences, University of Mazandaran, Babolsar, Iran. (Corresponding Author)*
*** Professor of Economics, Department of Economics, Faculty of Economics and Administrative Sciences, University of Mazandaran, Babolsar, Iran.*
**** Professor of Economics, Department of Economics, Faculty of Economics and Administrative Sciences, University of Mazandaran, Babolsar, Iran.*
***** Assistant Professor of Economics, Department of Economics and Management, Universita degli Studi di Parma, Parma, Italy.*

ARTICLE HISTORY	**JEL CLASSIFICATION:**
	C22, E31, F31, F41
Received: 24 May 2020 ***Revision: 17 December 2021*** ***acceptance: 17 December 2021***	**KEYWORDS:** ***Non-linear Specification, Threshold Regression (TR), Real Effective Exchange Rate (REER)***

CORRESPONDING AUTHOR'S:
Email: **m.abdi.sk@umz.ac.ir**
0000-0002-0528-7974

Postal address:
Shahid Zolfaghari Blv, University Blv, University of Mazandaran Campus, Babolsar, Mazandaran, 47416-13534, Iran.

ACKNOWLEDGMENTS: Acknowledgments may be made to individuals or institutions that have made an important contribution.
CONFLICT OF INTEREST: The authors declare no conflict of interest.
FUNDING: The authors received no financial support for the research, authorship, and publication of this article.

Shahid Chamran University of Ahvaz
Quarterly Journal of Quantitative Economics
(former Economic Studies)

ABSTRACT

Exchange rate is a variable transferring international economic shocks to domestic economy. In countries like Iran who are experiencing a high inflation and whose GDP as well as consumption expenditures are mostly dependent on imports and foreign capital flows, exchange rate changes and its effects needs to be carefully monitored by policy makers and economic researchers. The purpose of the present paper is to measure a nonlinear model estimating the response of inflation to Real Effective Exchange Rate (REER) in Iran. The finding based on the time series data for the period 1971-2017 and a Threshold Regression (TR) model indicates that a Real Effective Exchange Rate (REER) of 6160.27 Rials has been applied as a threshold value. In other words, based on the above threshold value, the estimated model shows exchange rate coefficient has increased somewhat from the first to the second regime.

How to Cite:
Abdi Seyyedkolaee, Mohammad., Tehranchian, Amir Mansour., Jafari Samimi, Ahmad & Favero, Gino. (2022). Non-linear Response of Inflation: A Real Effective Exchange Rate in Iran. *Quarterly Journal of Quantitative Economics(JQE)*, *19*(1), 53-71.
10.22055/JQE.2021.33724.2251

1- Introduction

The rate of inflation, together with other macroeconomic variables such as economic growth rates, is undoubtedly one of the most important indicators of the economic performance of a country. One of the reasons for the importance of inflation is the wide range of this variable's effectiveness and influences. Indeed, inflation affects some of the most important key economic variables, such as unemployment, foreign trade, income distribution, savings, investment and economic well-being. No wonder a significant part of the economic literature is devoted to investigating factors that affect inflation.

In an open economy in which goods and services and capital have a two-way flow, Exchange Rate (hereafter so called ER) is a strategic variable. In such conditions, fluctuations of economic variables are transmitted between national economies. Hence, monetary and financial shocks are not enclosed within the boundaries of the domestic economy. ER can play the role of a "transitional variable" as well. Here, ER, in fact, transfers the effect of international economy shocks to the national economy variables. Hence, the study of the effect of ER and its fluctuations have always been special attraction for economists. Considering the importance of inflation in theoretical discussions and high inflation rate in some developing countries, the effect of ER on inflation has attracted the economists interested in monetary issues and international economics.

Although studies have mostly focused on measuring the extent of ER effect on price levels, we believe that investigating the possible existence of one or more thresholds in exchange rate effect is important, because the reaction of monetary policymakers may be somehow dependent on the extent of ER effect with respect to one (or more) threshold value(s). For instance, policymakers might not take care of ER fluctuations below a certain level, but as soon as it crosses such a level, they believe it damages to the economy and the welfare of the country, thus triggering some intervention in the currency market.

Shahid Chamran University of Ahvaz
Quarterly Journal of Quantitative Economics
(former Economic Studies)

Iran economy has experienced high, double-digit inflation rates since 1980s. Therefore, reducing and controlling inflation is one of the goals of policy makers and economic planners. From 1989 to 2020, the first to sixth development plans were designed and implemented to achieve important goals such as economic growth and reducing inflation. **Tabel 1** shows the approved values and performance of inflation and exchange rate growth in six development programs.

Tabel 1. Inflation Rate and Exchange Rate Growth in the Programs of Economic Development (1989-2021) (Percent)
Source: Central Bank of Iran

	Inflation Rate		Exchange Rate Growth
	Target	Performance Average	Performance Average
1st Development Plan (1989-1993)*	14.4	21.60	19.17
2nd Development Plan (1995-1999)	12.4	25.62	27.96
3rd Development Plan (2000-2004)	15.9	14.12	1.82
4th Development Plan (2005-2009)**	9.9	14.88	3.94
5th Development Plan (2011-2015)***	9.9	20.53	15.81
6th Development Plan (2016-2021)	8.8	29.6	91.65

Note 1: *Inflation rate and exchange rate growth of 1994 has calculated in the 1st Development Plan.
Note 2: **Inflation rate and exchange rate growth of 2010 has calculated in the 2nd Development Plan.
Note 3: ***Inflation rate and exchange rate growth of 2016 has calculated in the 3th Development Plan.

As can be seen in Tables above, there is a significant difference between inflation targets and performance during the five-year development plans. ER seems to be one of the most important determinants of this deviation. As the average ER growth increases, so does the average inflation rate. In the present study, we seek to answer this question, which is to what extent has the rise in ER shifted to inflation?

The present paper is organized in five sections, and in the second section, a review of the literature on the subject, including the principles of the theory and literature review, is addressed. In the third section, the research method is introduced. In the fourth section, the results of the model estimation are presented and the final section is dedicated to the conclusion and presentation of the proposal.

2- Literature Review

The exchange rate, as a measure of the value of a country's national currency against the currencies of other countries, reflects the economic situation of that country compared to other countries. Assuming the complete convertibility of currencies in a country, the exchange rate is an important indicator that has a great impact on all economic areas (Mahdiloo & Asgharpur, 2020).ER movements to domestic price are one of the ways through which inflation and business cycles are transmitted among countries (Aron, Creamer, Muellbauer & Rankin, 2014). Due to the dependence of domestic products and consumptions on import, ER is one of the determinants of raw materials price, intermediate goods, capital equipment and other final good prices. This way, variations in ER through the prices of imported goods open their way into the prices of domestic output and imported goods (Sharifi & Nabavi-Larimi, 2015).

A common method for studying the dynamic behavior of economic variables is using various time series models. Among time series methods, linear patterns, such as Autoregressive model, Moving Average (MA), or combination of these models (Autoregressive Moving Average (ARMA) are more popular. Although these approaches were widely used for many years to examine the effects of ER on inflation, there were significant reasons why economists were interested in the nonlinear analysis of inflationary response to ER. A part can be attributed to the nonlinear nature of ER trend, Lucas's critique (1976), the heterogeneous firms hypothesis, spillover effects

Shahid Chamran University of Ahvaz
Quarterly Journal of Quantitative Economics
(former Economic Studies)

of ER fluctuations, independent changes in the decision space, and Taylor's (2000) hypothesis.

A reason for the non-linear response of inflation is the non-linear nature of ER trend. In fact, geometrically, among all time paths of ER, the probability of a linear path between the two time points is very weak. The effect of all determinants of ER is displayed in its changes. Here are two important points to note. First, the cross-effects of ER determinants can influence the impact of each determinant. Second, the importance of currency, especially in developing countries, and its key role between the foreign exchange and financial markets, has made exchange rate an intelligent variable, which corrects mistakes at the next rate through learning process. Hence, the course of ER over time is expected to be nonlinear (Pérez Forero & Vega, 2015; Jašová, Moessner & Takáts, 2016; Forbes, Hjortsoe & Nenova, 2018).

Lucas (1976) challenged the stability of the coefficients of econometric models. He clearly showed that consumer preferences and technical conditions of production in firms were not fixed over time. According to Lucas's critique, consumers, producers and investors transmit the experience of ER changes through error correction mechanisms and in the context of market clearing to their predictions and future choices in pricing and trade and financial transactions. Hence, price level response as the consequence of consumer preferences, firms and investors in the course of ER changes will not be the same (Lucas, 1976).

Taylor (2000) showed that the response of inflation rate to ER fluctuations at various levels of inflation rate is not the same. Taylor's findings showed that in low rates of inflation, the Exchange Rate Pass-Through (hereafter so called ERPT) is low, and in high rates of inflation, ERPT to inflation is more (Taylor, 2000).

Nonlinear time series models have grown rapidly in the last two decades. In nonlinear models, pattern parameters are a function of variable or different regimes, and thus change over time. Of course,

nonlinear models are not ideal ones and have their own limitations, including the fact that estimating nonlinear patterns is relatively more difficult compared to linear labor patterns, and most nonlinear patterns are designed to describe a particular case of behavior of variables.

Nonlinear behavior in ER effect on inflation can provide false estimates of ER coefficient when the econometric model is estimated linearly. In such a circumstance, we can accommodate cases when the inflation condition and its rate affect economic factors in response to an ER shock. Indeed, due to a stable and low inflation, domestic prices may not respond to an ER shock. However, they may respond wildly to a similar shock when inflation is above some significant threshold (Aleem & Lahiani, 2014).

Da Silva Correa & Minella (2010) investigated the existence of nonlinear process of ERPT to inflation in Brazil. It was concluded that when the economy grows faster, ER devaluates above a threshold level and when ER fluctuations are lower, the pass-through rate in short-term is higher (Da Silva Correa & Minella, 2010). Shintani, et al., (2013) examined the relation between ER and inflation by estimating a nonlinear model. They showed that the dynamic of ER effect on inflation can be well estimated by a STAR model (Shintani, Terada-Hagiwara & Yabu, 2013). Pérez Forero & Vega (2015) examined the non-linear response of prices to ER shocks in Peru. To this end, they used the SVAR model and Impulse-Responses Functions to examine prices after ER shocks. The results provided a remarkable asymmetry in the response of CPI to ER shocks (Pérez Forero & Vega, 2015). Turner & Wood (2016) provided theoretical reasons for a nonlinear ERPT to import and export prices. Theoretical reasons are based on the menu-costs approach, in which small absolute changes in ER may not excite price changes, because the costs of doing so are more than additional benefits begotten by firms engaged in international trade (Turner & Wood, 2016). Marodin & Portugal (2018) based on Markov-Switching Semi-Structural New Keynesian model examined the nonlinearity of ERPT in Brazil during 2000-2015. In this survey,

Shahid Chamran University of Ahvaz
Quarterly Journal of Quantitative Economics
(former Economic Studies)

evidence was obtained from two different regimes for ERPT to inflation in Brazil during period under review (Marodin & Portugal, 2018).

Ben Cheikh, et al., (2018) examined the nonlinear dynamics in ERPT to inflation in 10 european economies. According to the research findings, ERPT to inflation responds to economic activities in a non-linear manner, meaning that ERPT over economic development periods is higher than recession (Ben Cheikh, Ben Zaied & Bouzgarrou, 2018). Musti & Siddiki (2018) tested the nonlinearitiy and asymmetry in the ERPT to Consumer Price Index in Nigeria. According to them, standard literature assumes the linearity and symmetry of ERPT to Consumer Price Index in a developing country, despite the importance and presence of potential asymmetry and nonlinearity as exemplified by various factors such as menu costs, capacity constraints and market share goals (Musti & Siddiki, 2018).

Caselli & Roitman (2019) presented evidence of nonlinearity and asymmetry in the transition of ER volatilities to prices from 27 emerging markets. They found documents of asymmetry in ER transmission over periods of ER appreciation compared to periods of ER depreciation. A threshold that could lead to nonlinearity emerged (ER decline of more than 24%) (Caselli & Roitman, 2019). Colavecchio & Rubene (2020) examined the probablity of non-linear transition of ER changes to imported prices and CPI in 19 european economies. They found that CPI and imported prices in the target countries respond significantly to ER fluctuations after a year, and the response is greater when ER changes are relatively large (Colavecchio & Rubene, 2020). Anderl & Caporale (2021) tried to explicate the Real Exchange Rate (RER) volatilities using two models of linear ARDL and Nonlinear ARDL (NARDL) for United Kingdom, Canada, Australia, New Zealand and Sweden. The results showed that due to the existence of asymmetry in the long and short term, the nonlinear model is more appropriate. Also, inflationary expectations perform an important role in this case (Anderl & Caporale, 2021).

Bilgili et al. (2021) using the Markov-Switching model, examined the pass-through effect in Turkey, and they found that there exists a nonlinear relation between ER and CPI (Bilgili, Ünlü, Gençoğlu & Kuşkaya, 2021). Moradi et al. (2021), using the NARDL method during 1986-2017, found that the degree of ERPT to CPI in short and long term in Iran is incomplete and asymmetric (Moradi, Anvari & Arman 2021).

In this study, we are empirically reviewing the effect of Real Effective Exchange Rate (hereafter so called REER) on inflation in Iran and also the possibility of existence of one or more thresholds by using a Threshold Regression (TR) method. In Iran, a threshold regression has been mainly used on issues of economic growth, based on the theory of purchasing power parity, etc. In this study, on the other hand, we aim at keeping an eye on the critical level for ER while investigating the extent of ER effect on inflation in Iran and, therefore, unlike conventional econometric methods, a threshold regression turns out to be fully appropriate.

3- Methodology

In the present study, all data and information are gathered through library methods. Also, with using yearly data of official ER of Iran, price index and ER of Iran's major trade partners, REER during 1971-2017 was calculated as follows:

Real Effective Exchange Rate (REER) = Σ[Exchange Rate of Iran's Major Trade Partners (In terms of Rials)×Consumer Price Index of Iran's Major Trade Partners×Share of Currencies of Iran's Major Trade Partners in SDR]/ Iran's Consumer Price Index

In nonlinear models, the response of one variable to changes in other variables is examined nonlinearly. In this regard, threshold regression model can be used as a nonlinear model. Research of Calvo & Reinhart (2002), Mihaljek & Klau (2008), Kohlscheen (2010), Bussiere (2013), Shintani, et al., (2013), Alvarez, Lippi & Passadore

Shahid Chamran University of Ahvaz
Quarterly Journal of Quantitative Economics
(former Economic Studies)

(2016), and Marodin & Portugal (2018) indicates the extensive usage of threshold models in experimental economics. Linearity is a basic premise many people who use linear models, unless there is convincing evidence to prove it nonlinear.

To investigate the threshold effects of ER on inflation, the following Posedel & Tica (2009) model is used:

$$\pi_t = I_{t-d}\left[\alpha_1 + \sum_{i=0}^{k}\beta_{1i}e_{t-i}\right] + (1-I_{t-d})\left[\alpha_2 + \sum_{i=0}^{k}\beta_{2i}e_{t-i}\right] + \varepsilon_t$$

(1)
$$e_{t-i} \geq \tau \quad if \quad I_{t-d} = 1$$
$$e_{t-i} < \tau \quad if \quad I_{t-d} = 0$$

where inflation π_t is a function of REER. Variable I_t is a dummy variable. $I_t = 0$ if REER (e_t) is smaller than threshold (τ); also, $I_t = 1$ if REER (e_t) is equal or bigger than the threshold (τ). To estimate the desired threshold model, STATA software was used.

In an experiment on the effect of ER on inflation in Iran, first, Lagrange Multiplier is applied to nonlinearity test. Afterwards, the suggested model (1) is estimated by a threshold regression. The required information has been extracted from the Central Bank of Iran portal and World Development Indicator (WDI) database.

4- Results

4-1- Stationary Test

Since in macroeconomic analysis, as usual, time series are non-stationary and their non-stationarity provides the possibility of a spurious regression in experimental studies, we are first of all testing the stationarity of variables by using the KPSS[1] test. As shown in **Tabel 2**, inflation and REER are stationary in level.

[1] Kwiatkowski-Phillips-Schmidt-Shin

Tabel 2. Stationary Test Results
Source: Author's computation

Variable		Level		Results
		Intercept	Trend and Intercept	
Inflation Rate	Lagrange Multiplier-Statistic	0.193	0.146	I(0)
	Critical Values: 1% Level	0.739	0.216	
Real Effective Exchange Rate (REER)	Lagrange Multiplier-Statistic	0.556	0.104	I(0)
	Critical Values: 1% Level	0.739	0.216	

4-2- Threshold Regression

The research model is specified as follows:

(2) $$\pi_t = \alpha e_t + \varepsilon_t$$

Where, π_t is inflation rate for period t and e_t is REER.

In the study of Durlauf-Johnsone (1995), it was proved that the error term ε_t in a structure such as equation (2) has heteroskedasticity, and therefore they presented their results in the form of corrected standard errors to heteroskedasticity. In this study, their approach is followed, and under a modified heteroskedasticity process, the nuisance coefficient η^2 is applied using Epanechnikov kernel with a continuous bandwidth.

In this research, Lagrange Multiplier (LM) test is used to test the existence of a threshold. Using 5000 times repetition of Bootstrap process, the P-value for threshold model, using REER as threshold variable, is significant at 0.0346.

Tabel 3. Lagrange Multiplier Test Results
Source: Author's computation

Test of null of no threshold against alternative	
Threshold estimate	6160.27
LM-test for no threshold	8.22
Bootstrap P-Value	0.0346
Critical value 95%	7.69

Shahid Chamran University of Ahvaz
Quarterly Journal of Quantitative Economics
(former Economic Studies)

Based on the information in **Tabel 3** and considering that the value of Lagrange Multiplier test (8.22) is bigger than the critical value in confidenc level 95% (7.69), the null hypothesis is rejected. Therefore, the research model is nonlinear. **Figure 1** shows the result of this test for Lagrange Multiplier test, which in fact indicates the values of F (Gamma) test to examine existence or non-existence of a threshold. The critical value of 95% is equal to the P-value at that point, which here is equal to 7.69 and is plotted on a continuous line. According to the evidence obtained in **Tabel 3**, it can be observed that the effectiveness structure of REER on inflation in the examined period is nonlinear and follows the threshold regression process.

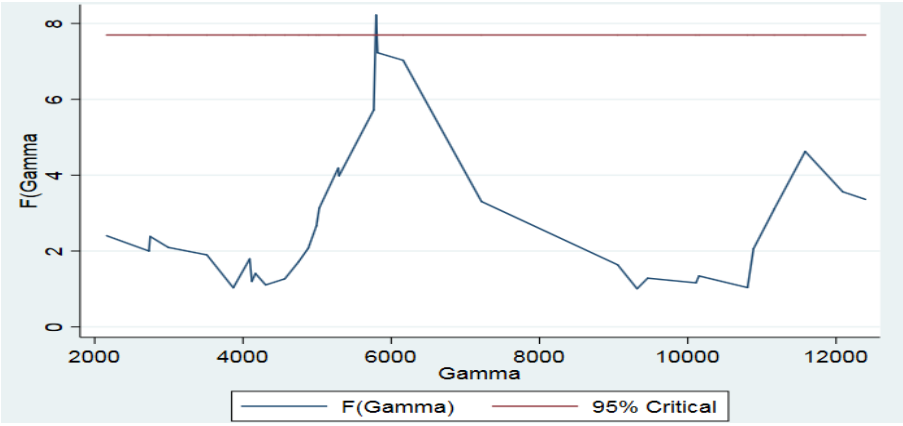

Figure 1. F Test to Reject the Existence of a Threshod
Source: Author's computation

To determine the number of thresholds in this study, the likelihood ratio test presented by Hansen (1999) was used. In this test, the following two hypotheses were tested:

A) Linear model versus a threshold model

B) One-threshold model versus two-threshold model

Tabel 4. Specifying the Threshold Number
Source: Author's computation

Hypotheses	Test Statics	Critical Value	Result
Hypothesis A	24.14	13.98	The null hypothesis is rejected
Hypothesis B	7.20	15.72	The null hypothesis is not rejected

The results of the first hypothesis indicate that the test statistics amount is bigger than the critical value. As a result, the null hypothesis of the linear model is rejected. Results of the second hypothesis also indicate that the null hypothesis is confirmed. Therefore, the model has only one threshold.

Figure 2 shows the normalized likelihood ratio $LR_n(\tau)$ as a function of the threshold variable. Estimation of Ordinary Least Squares (OLS) of τ is the value at which this figure is minimized, and is achieved at REER $\hat{\tau} = 6160.27$ The critical value of 95% is equal to the P-value at that point, which here is equal to 7.35 and is plotted on a continuous line.

Results indicate that there exists logical evidence for model specification with two regimes, and there is also comparative confidence for threshold value.

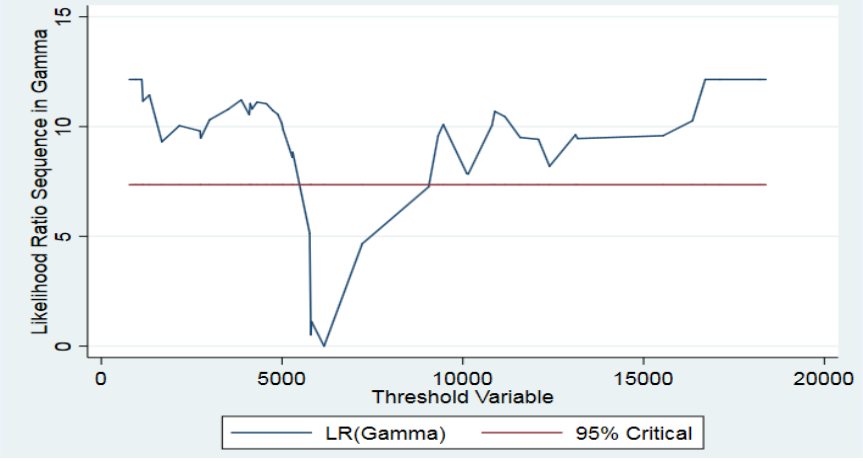

Figure 2. Confidence Interval Construction for Threshold
Source: Author's computation

Shahid Chamran University of Ahvaz
Quarterly Journal of Quantitative Economics
(former Economic Studies)

Tabel 5. The Estimation Results of Inflation Rate Threshold Model
Source: Author's computation

Variable	$q \leq 6160.27$	$q > 6160.27$
Intercept	22.50	36.43
Real Effective Exchange Rate (REER)	0.0013	0.0017
	R-squared: 0.66	R-squared: 0.57

According to **Tabel 5**, the estimated threshold for REER is 6160.27 Rials. According to **Tabel 5** and **Figure 2**, only one threshold was observed in impact process of ER on inflation. Also, considering that the effect coefficient of ER on the inflation has increased in the second regime compared to the first, rising from 0.0013 to 0.0017, it can be concluded that the extent of ER effectiveness on inflation has increased during the time.

The data seems to clearly point out that, according to threshold regression process, the effect of ER on inflation in Iran is nonlinear. This might happen because of the existence of high inflationary expectations in Iran, which intensifies into inflation when ER goes beyond a certain threshold level.

5- Conclusions

Besides some macroeconomic variables, such as economic growth rates, inflation rate makes one of the most important indicators of the assessed economic performance of a country. Inflation affects some of the most important key economic variables, such as unemployment, foreign trade, income distribution, savings, investment, and economic well-being. For such a reason, investigating the factors affecting inflation is allocated to a significant part of the economical scientific literature. There are several causes for inflation in macroeconomics, one of the most important connections to the outside world and the experience of external shocks. In this context, an important role is played by the effect of ER volatilities on domestic prices.

Although studies have mostly concentrated on measuring the extent of ER effect on price levels, we believe that investigating the

possible existence of one or more thresholds in ER effect is important, because the reaction of monetary policymakers may be somehow dependent on the extent of ER effect with respect to one (or more) threshold value(s). For instance, policymakers might not take care of ER fluctuations below a certain level, but as soon as it crosses such a level, they believe it damages the economy and the country welfare, thus triggering some intervention in the currency market.

Iran's economy, especially after the Islamic Revolution, has experienced imposed war and unconventional sanctions with free trade basics, REER having had significant increases. Looking at the statistical data related to the general level of prices, it is clear that, during the years 1971-2017, the CPI increased about 1250 times. Hence, it seems that there is a close relation between ER and changes in the general level of prices in Iran. Therefore, in this research, the effect of REER on inflation in Iran was experimentally tested by using the threshold regression method.

The present study showed that the impact structure of REER on inflation in the period under review is non-linear, and that it follows the threshold regression process. Also, the threshold regression model results showed that there is only a threshold in the period under review. The threshold value has been estimated at the level of REER of 6160.27 Rials and, according to the increase of REER coefficient to 0.0017 in the second regime with respect to 0.0013 in the first one, it can be concluded that the extent of ER effect on inflation has increased during time.

Considering the fact that preserving the value of national currency is one of the most important tasks of central banks, to control inflation it seems necessary to give due attention to ER and its threshold impacts when planning, designing and implementaing monetary and exchange policies. The results of this study suggests a policy guideline, namely, to limit the damaging effects of inflation on the economy and household welfare. Monetary policy makers in Iran must restrain foreign exchange shocks. In this regard, it is recommended to take the

Shahid Chamran University of Ahvaz
Quarterly Journal of Quantitative Economics
(former Economic Studies)

appropriate policies to prevent ER fluctuations in the market and its stabilization, among which we can mention controlling liquidity, fiscal and monetary discipline. Reducing the intensity of ER fluctuations can prevent raising prices of imported goods, and help stabilizing the domestic price level.

It is significant that the impact of low transition of ER to CPI contains an important point for domestic monetary policymakers. Indeed, the effect of lower transmission of ER provides more freedom to pursue an independent monetary policy, in particular, via inflation targeting system.

Finally, due to difference in the impact of ER on inflation on the two sides of threshold, policymakers should focus more on the threshold itself.

References

Aleem, A., & Lahiani, A. (2014). A Threshold Vector Autoregression Model of Exchange Rate Pass-Through in Mexico. *Research in International Business and Finance, 30*, 24-33.

Alvarez, F. E., Lippi, F., & Passadore, J. (2016). Are State and Time Dependent Models Really Different? *National Bureau of Economic Research (NBER) Working Paper, 22361*, Retrieved from http://www.nber.org/papers/w22361.pdf

Anderl, C., & Caporale, G. M. (2021). Nonlinearities and asymmetric adjustment to PPP in an exchange rate model with inflation expectations. *Journal of Economic Studies*, Retrieved from https://doi.org/10.1108/JES-02-2021-0109

Aron, J., Creamer, K., Muellbauer, J., & Rankin, N. (2014). Exchange Rate Pass-Through to Consumer Prices in South Africa: Evidence from Micro-Data. *The Journal of Development Studies, 50*(1), 165-185.

Ben Cheikh, N., Ben Zaied, Y., & Bouzgarrou, H. (2018). Nonlinear Exchange Rate Pass-Through: Does Business Cycle Matter? *Journal of Economic Integration, 33*(2), 4–13.

Bilgili, F., Ünlü, F., Gençoğlu, P. & Kuşkaya, S. (2021). .Modeling the exchange rate pass-through in Turkey with uncertainty and geopolitical risk: a Markov regime-switching approach. *Applied*

Economic Analysis, Retried from https://doi.org/10.1108/AEA-08-2020-0105

Bussiere, M. (2013). Exchange Rate Pass-Through to Trade Prices: The Role of Nonlinearities and Asymmetries. *Oxford Bulletin of Economics and Statistics, 75*(5), 731–758.

Calvo, G. A., & Reinhart, C. M. (2002). Fear of Floating. *Quarterly Journal of Economics, 117*(2), 379-408.

Caselli, F. G., & Roitman, A. (2019). Nonlinear exchange-rate pass-through in emerging markets. *International Finance, 22*(3), 279-306.

Colavecchio, R., & Rubene, I. (2020). Non-linear exchange rate pass-through to euro area inflation: A local projection approach. *European Central Bank (ECB) Working Paper, 2362,* Retrieved from https://www.econstor.eu/bitstream/10419/228240/1/1688060650.pdf

Da Silva Correa, S., & Minella, A. (2010). Nonlinear Mechanisms of the Exchange Rate Pass-Through: A Phillips Curve Model with Threshold for Brazil. *Revista Brasileira de Economia, 64*(3), 231–243.

Durlauf, S. N., & Johnson, P. A. (1995). Multiple Regimes and Cross-Country Growth Behavior. *Journal of Applied Econometrics, 10*(4), 365-384.

Forbes, K., Hjortsoe, I., & Nenova, T. (2018). The Shocks Matter: Improving Our Estimates of Exchange Rate Pass-Through. *Journal of International Economics, 114*, 255-275.

Hansen, B. E. (1996). Inference When a Nuisance Parameter Is Not Identified Under the Null Hypothesis. *Econometrica, 64*(2), 413–430.

Jašová, M., Moessner, R., & Takáts, E. (2016). Exchange Rate Pass-Through: What Has Changed Since the Crisis? *Bank for International Settlements (BIS) Working Paper, 583,* Retrieved from https://www.bis.org/publ/work583.pdf

Kohlscheen, E. (2010). Emerging Floaters: Pass-Throughs and (Some) New Commodity Currencies. *Journal of International Money and Finance,* 29, 1580–1595.

Liu, H. Y., & Chen, X. L. (2017). The Imported Price, Inflation and Exchange Rate Pass-Through in China. *Cogent Economics & Finance, 5*(1), 1-13.

Lucas, R. E. (1976). Econometric Policy Evaluation: A Critique. *Carnegie-Rochester Conference Series on Public Policy, 1*, 19–46.

Mahdiloo, A. & Asgharpur, H. (2020). Nonlinear Transmission Mechanism of Monetary Policy from Exchange Rate Channel in Iran: Approach (MS-VAR). *Quarterly Journal of Quantitative Economics(JQE)*, *17*(1), 121-153. doi: 10.22055/jqe.2019.27873.1990 (in persian).

Marodin, F. A., & Portugal, M. S. (2018). Exchange Rate Pass-Through in Brazil: A Markov-Switching Estimation for the Inflation Targeting Period (2000-2015). *Central Bank of Brazil Working Paper, 473*, Retrieved from https://www.bcb.gov.br/pec/wps/ingl/wps473.pdf

Mihaljek, D., & Klau, M. (2008). Exchange Rate Pass-Through in Emerging Market Economies: What Has Changed and Why? *BIS Papers, 35*, Retrieved from http://www.bis.org/publ/bppdf/bispap35d.pdf

Moradi, P., Anvari, E., & Arman, S. A. (2021). The Effect of cross-over effect of positive and negative monetary regimes on the incomplete and asymmetric Degree of Exchange Rate Pass-Through with: NARDL and Markov-switching Method. *Quarterly Journal of Quantitative Economics (JQE)*, Doi:10.22055/JQE.2021.36717.2351 (in persian).

Musti, B., & Siddiki, J. U. (2018). Nonlinear and Asymmetric Exchange Rate Pass-Through to Consumer Prices in Nigeria: Evidence from a Smooth Transition Autoregressive Model. *Economics Discussion Papers, 03*, Retrieved from http://staffnet.kingston.ac.uk/~ku33681/RePEc/kin/papers/2018_003.pdf

Pérez Forero, F. J., & Vega, M. (2015). Asymmetric exchange rate pass-through: Evidence from Peru. *Central Reserve Bank of Peru (BCRP) Working Paper, 2015-011*, Retrieved from www.bcrp.gob.pe/docs/.../2015/documento-de-trabajo-11-2015.pdf

Posedel, P., & Tica, J. (2009). Threshold Model of Exchange Rate Pass-Through Effect: The Case of Croatia. *Eastern European Economics, 47*(6), 43-59.

Sharifi, N., & Navai-Larimi, M. (2015). Exchane Rate Pass-Through to Prices Indices and Inflation in Iran. *Journal of Economic Research (Tahghigat-e-Eghtesadi), 50*(3), 639-658.

Shintani, M., Terada-Hagiwara, A., & Yabu, T. (2013). Exchange Rate Pass-Through and Inflation: A Nonlinear Time Series Analysis. *Journal of International Money and Finance, 32*, 512-527.

Taylor, J. B. (2000). Low Inflation, Pass-Through, and the Pricing Power of Firms. *European Economic Review, 44*(7), 1389-1408.

Turner, P., & Wood, J. (2016). Nonlinear exchange rate pass-through in industrial economies. *Applied Economics*, *49*(4), 397–402.

World Bank. (2018). World Development Indicator (WDI) 2017. Retrieved from https://databank.worldbank.org/data/source/world-development-indicators.