International Journal of
Business Management and Entrepreneurship
Journal homepage: mbajournal.ir

The effect of monetary policies on the intensity of Exchange Rate Pass-Through considering different levels of inflation uncertainty with the approach of dynamic systems

Elham Nouraei [1], Seyyed AbdolMajid Jalaee [2], Hamid Kakaei [3]

Received: 2023/11/15 Accepted: 2023/12/13 Published: 2023/12/15

Abstract

This study has been conducted with the aim of investigating the effect of optimal monetary policies on Exchange Rate Pass-Through with the approach of dynamic systems. The present study is considered as an applied study in terms of the method used. In this study, the dynamic systems approach in Vensim software space has been used to estimate the model. Three scenarios and three policies are defined in this study. A low level of inflation uncertainty is included in scenario one, a medium level of inflation uncertainty in scenario two, and a high level of inflation uncertainty in scenario three. Interest rate changes are included in the first policy, open market operations in the second policy, and liquidity changes in the third policy. According to the results, it is quite evident that the increase in inflation uncertainty from scenario one to scenario three has caused a sharp increase in inflation in the coming years; As a result, it can be said that in a situation where inflationary uncertainty is high, Exchange Rate Pass-Through has been more intense. The policies of liquidity changes have not had a favorable effect on the Exchange Rate Pass-Through and these policies have caused the worsening of the Exchange Rate Pass-Through and a sharp increase in inflation in the Iranian economy. In the second policy of open market operation, it is also evident that the presence of the central bank in the exchange rate market has not improved the exchange rate transition, and this may be due to the central bank's lack of independence from the government's financial policies. The interest rate policy has been more successful in the Exchange Rate Pass-Through than other policies; The results show that it has not worked successfully even in the high level of uncertainty.

Keywords

exchange rate, Exchange Rate Pass-Through, monetary policy, dynamic systems approach.

1. PhD student in international economics, Islamic Azad University, Kerman branch, Kerman, Iran. nouraie@yahoo.com

2. Professor of Economics, Bahoner University of Kerman, Kerman, Iran. Jalaee@uk.ac.ir

3. Instructor of the Department of Economics, Islamic Azad University, South Tehran Branch, Tehran, Iran. hamidkakaei306@yahoo.com

Introduction

In the macroeconomic and international literature, the domestic price changes rate as a result of exchange rate changes is known as the Exchange-rate pass-through (ERPT)[1] (Anderl & Caporale, 2023). This issue is important from the aspect that the impulses on the economy are transferred from the exchange rate channel to the relative prices of the economy. Furthermore, ERPT is influenced by micro and macroeconomic variables, and the ERPT in the economy will also change with the change of each of these variables (Ezzati Shurgoli & Khodavisi, 2021). In the studies related to Exchange Rate Pass-Through in the literature of international economics, Dornbusch (1987), it has been stated that the incomplete transmission of prices is caused by the partial adjustment of the profit margin by producers in response to the exchange rate shock in the framework of imperfect competition[2]. The ERPT review literature is extensive. Early studies tested the theoretical framework underlying Exchange Rate Pass-Through and found that Pricing-To-Market (Betts & Devereux, 1996; Krugman, 1986) points to the imperfection of the equilibrium process in markets (Gron & Swenson, 1996; Enon, 1995). Recent experimental works have expanded the causes of this phenomenon. Some researches consider the occurrence of this phenomenon as a result of companies' response to cost shocks and barriers related to pricing (Burstein & Gopinath, 2014), the role of the type of currency regime (Devereux et al., 2015; Gopinath et al., 2010) and the difference in size and the pricing behavior of heterogeneous firms (Atkeso & Burstein, 2008; Berman et al., 2012). These articles have produced different results regarding the degree of ERPT. According to the results of various studies, the inflation conditions of a country have a significant effect on ERPT. ERPT has reacted to consumer prices in the 1990s that were adopted as a result of price stabilization policies by central banks in developed countries (Taylor, 2000; Takhtamanova, 2010; Bailliu & Bouakez, 2004). The hypothesis that "ERPT adjustment effect reflects a mild inflationary condition" was empirically confirmed by Chaudhri & Hakura et al. (2006), using data from 71 countries with different inflation targeting conditions. Evidence was also found for emerging markets that experienced similar declines in ERPT for lower levels and greater stabilization of inflation rates (Winkelried, 2014; Mihaljek & Klau, 2008).

A handful of studies have reported nonlinearity in ERPT behavior, and the results of these studies have been reported differently depending on the country in question. For example, Przystupa & Wróbel (2011) confirmed a linear and weak behavior of ERPT in the short and long run in Poland, while Yanamandra (2015), concluded that this behavior in India is strong in both time frames. Short term and long term. Junttila & Korhonen (2012); They used threshold and smooth nonlinear transition models for Exchange Rate Pass-Through and showed that Exchange Rate Pass-Through elasticity is different depending on different inflation regimes. Odria et alet al. (2012); studied Peru and found that ERPT behavior follows a non-linear nature. Elim and Lahiani (2014); have used a semi-structured VAR model and shown that a valid monetary policy reduces ERPT with the aim of controlling inflation, which

[1] Exchange-rate pass-through (ERPT) is a measure of how responsive international prices are to changes in exchange rates.

[2] Imperfect competition exists whenever a market, hypothetical or real, violates the abstract tenets of neoclassical perfect competition. In this environment, companies sell different products and services, set their own individual prices, fight for market share, and are often protected by barriers to entry and exit.

has been the process in Latin American and East Asian countries. Sheikh (2012), confirmed the non-linear behavior of ERPT for 12 Eurozone countries. This result was confirmed by Cheikh & Louhichi (2016); In the framework of a panel threshold model with three regimes for 63 countries. Kilic (2016); A similar result was obtained by estimating the logistic smooth transition model for six large economies. Baharumshah et al. (2017); They reached the same result in the framework of Markov regime change models to investigate ERPT in Asian countries. According to these findings, policymakers should pursue a low inflation target because favorable monetary policies can reduce the impact of exchange rate pass-through. The present study will use a systemic approach that has not been investigated so far in internal and external research; accordingly, this study focuses on investigating the effect of optimal monetary policies on ERPT with the dynamic systems approach.

Basics of theory and research background

Industrialized countries and following them other countries gradually became inclined towards the appreciable rate system after the collapse of the Bretton Woods system and according to the theories of Friedman (1953); based on choosing a floating exchange rate system as a solution to increase the efficiency of the economic system. During this period, the currency market became one of the most volatile economic markets; therefore, exchange rate changes affected the real sector of the economy. This influence took place from the path of domestic prices, which became one of the most important concerns of the international economy. The term exchange rate transition entered the economic literature during this period. The first studies in the field of ERPT started in the 1970s and one of the first researches has been done in this field. In other words, Dornbush's study by Dornbush has been the basis of other studies about the ERPT on prices. In his research, he has evaluated the relationship between exchange rate and domestic prices in terms of market concentration, the value of imports, substitution of imports and domestic products. For the first time, he has worked on accurate modeling of exchange rate changes on the price index.

There are two main views about the factors affecting the degree of ERPT among economists. The first point of view emphasizes market power and price discrimination in international markets. According to this point of view, factors such as price elasticity of demand and market structure have a significant effect in determining the degree of ERPT. In this view, the degree of ERPT is independent of the monetary system of each country. The opposite view is proposed by Taylor (2000). According to Taylor's theory, the degree of ERPT changes depending on the inflationary conditions of the countries. To explain this relationship, Taylor states that the reaction of prices increases with the increase in costs due to the increase in the exchange rate, and the degree of ERPT increases in countries with higher inflation. According to this point of view, the degree of exchange rate transition depends on the monetary and currency systems of the countries; Therefore, in countries with a valid monetary system and a lower inflation rate, the ERPT is lower, and vice versa. According to Taylor's theory, monetary systems and ERPT are dependent on inflation environments (Asgharpour et al., 2014). According to Taylor's (2000) hypothesis, if a country adopts monetary policies that limit inflation, then the degree of ERPT will decrease. As the degree of ERPT reduces, the transfer effects of exchange rate changes on import prices will be reduced, and exchange rate changes lead to small changes in production costs (Shintani et al., 2013).

According to the basics of theory, there is a direct relationship between inflation and the degree of ERPT. In an open economy, in the conditions where a country has an economic relationship with other countries, the exchange rate can be important, and the effects of monetary policy and inflation targeting can be evaluated on it. It is of particular importance to evaluate the degree of ERPT and to consider the exchange rate as an intermediate target of the central bank due to the simultaneous consumption of domestic and foreign goods by the consumer and the effect of their prices on exchange rate changes. Extensive studies abroad have investigated the effects of the ERPT on commercial or domestic prices, considering the importance of the degree of ERPT. ERPT is considered as an important criterion for monetary policy and a key factor for central banks.

As mentioned earlier; the literature on this topic is extensive, and various methods have been used to investigate this phenomenon in economics, including simple univariate linear regression[3] models (Takhtamanova, 2010; Bailliu & Bouakez, 2004). Some VAR approaches have investigated the effects of fundamental exchange rate shocks (Tunc & Kilinc, 2018; Ito & Sato, 2008). Some researche have addressed the importance of elasticity and its difference in different countries; In general, relatively little reaction of prices to exchange rate changes has been found with some degree of variation in their elasticity across countries and over time (Bailliu & Bouakez, 2004; Campa & Goldberg, 2005; Goldberg & Campa, 2010; Bussière et al., 2014). Recently, evidence of nonlinearities and asymmetries in ERPT behavior was also presented (Devereux & Yetman, 2010; Shintani et al., 2013; Kiliç, 2016).

It is of great importance to understand how prices react to changes in exchange rates, especially for monetary authorities whose task is to achieve price stability, for example in the context of an inflation targeting regime. ERPT is actually considered as one of the effective factors on inflation identified in the literature (Campa & Goldberg, 2005; Cheikh & Rault, 2016; Hofmann & Mizen, 2004; Golinelli & Rovelli, 2005; Kwapil & Scharler, 2010). This index has a significant impact on inflationary expectations as well (Castelnuovo & Surico, 2010; Feldkircher & Siklos, 2019; Taylor, 2000; Choudhri & Hakura, 2006), offering monetary policies that anchor inflationary expectations and reduce inflation causes a reduction. the level of exchange rate transmission (De Mendonça, H. F., & Tiberto, 2017; Gayaker et al., 2021; Kabundi & Mlachila, 2019; Cuitiño et al., 2022); Therefore, the present paper aims to fill this gap by providing some more comprehensive evidence on the role of inflation expectations (which are obviously influenced by central bank credit), in determining the dynamic behavior of ERPT.

In the following, the domestic and foreign research conducted in line with the topic of the present research will be examined.

Ji (2022); investigated the ERPT to domestic inflation in a pricing model including the structure of the distribution chain in China and the results show the effect of the exchange rate on the entire supply chain; but according to the results, the production sector shows more resistance to price changes than the service sector, which can be seen in the costs of changing the price list.

[3] Univariate linear regression focuses on determining relationship between one independent (explanatory variable) variable and one dependent variable. Regression comes handy mainly in situation where the relationship between two features is not obvious to the naked eye.

De Mendonça & Tiberto (2017); used the GMM model for 114 developing countries and concluded that the higher credibility of central bank policies (as measured by the difference between the inflation target and inflation expectations); reduces the transmission of exchange rate shocks to inflation.

López-Villavicencio & Mignon (2017); through GMM estimation of a panel model for 14 emerging countries, conclude that ERPT decreases with more stable inflation (especially with the adoption of an inflation targeting framework).

Kabundi & Mlachila (2019); studied South Africa and conclude that ERPT will have less impact on inflation as inflation levels decrease and stabilize.

Cheikh & Zaied (2020); used a panel of regime changes and found that in a regime with low inflation and a credible monetary policy for some European transition economies, the impact of inflation on currency shocks is reduced.

Nasir et al. (2020); investigated the transmission of exchange rate to inflation expectations using the NARDL framework. According to the results, the real exchange rate has an asymmetric effect on inflation expectations.

Ezzati Shurgli and Khodavisi (2021); estimated the effect of the exchange rate on domestic prices, using the vector autoregression model of the added factor with random fluctuations and variable parameters over time (TVP-SFAVAR-SV), and data from the first season of 2019 to the second season of 2017. First, the hidden variable of speculative activities in the Iranian economy was modeled and extracted, and according to the results, the most speculation in the Iranian economy was in the periods (1994 to 1996), (1998 to 1999) and (2011 to 2012). Also, the shock of the hidden variable of speculation in the examined period has led to an increase in inflation in Iran's economy. According to the results of the estimation of the exchange rate pass rate in Iran, the exchange rate pass rate coefficient during the period under review was not constant and changed during this period. According to the results of historical variance analysis of ERPT with the presence of effective factors, almost most fluctuations of ERPT can be interpreted and explained by inflation and then exchange rate fluctuations and production gap.

Sadat Hosseini and Asgharpour (2021); investigated Taylor's theory in Iran's economy and the effects of monetary impulses on macroeconomic variables assuming the degree of exchange rate pass-through in different inflationary environments. For this purpose, firstly, the inflation regimes extracted by using the soft transition regression approach and using the seasonal time series data of the Iranian economy during 1988:4-2015, and then in the form of a stochastic dynamic general equilibrium model for the open small economy by considering exchange ERPT in different inflationary environments, the effect of monetary impulses on macroeconomic variables has been experimentally tested. According to the results of the research, Taylor's hypothesis, “There is a direct relationship between the degree of ERPT of the import price index and inflation levels” is confirmed in Iran's economy.

On the other hand, the results of the analysis of the instantaneous reaction functions of macroeconomic variables to the monetary impulse show that the fluctuations of macroeconomic variables under the second scenario (ERPT in a high inflation environment) is more than the first scenario (ERPT in a low inflationary environment**)** .

Rahimi and Khodaveysi (2018); They investigated the role of credibility of monetary policy on the degree of ERPT during the process of globalization. They investigated the degree of

ERPT to consumer prices under different globalization regimes by calculating and applying the monetary policy credit of different countries using data from 32 developing countries and 24 developed countries during the period from 1980 to 2015 and using the Gentle Panel Transition Regression (PSTR). According to the results of the present study, with the increase in the process of globalization and the transition from the first regime (a regime in which countries have moved towards economic globalization to a lesser extent) to the second regime (a regime in which countries have a high level of economic globalization), the degree of ERPT to consumer prices in developing and developed countries (with different intensity of the effect of monetary policy credit), increases and decreases, respectively.

Abtahi (2017); investigated the analysis of ERPT and inflation dynamics in the Iranian economy: regime rotation approach. According to the results of the present study, the issue of ERPT in the Iranian economy is an issue related to inflationary regimes, and the effective nominal exchange rate growth only in high inflationary regimes can be the Granger causality of the inflation rate, while the causality relationship of the effective exchange rate on the inflation rate in the regimes of low inflation is not significant. Therefore, in a managed floating exchange rate system, in a situation where the inflation rate is higher than the threshold value, and the economy is placed in higher inflation regimes, the mission of the central bank in controlling the exchange rate is more relevant in this situation, and market management can prevent the adverse effects of currency shocks on domestic inflation.

Research method

The current research is considered as an applied study in terms of purpose and in terms of nature, it is a descriptive-analytical study. In terms of the type of data, it is considered a quantitative study, and the system dynamics method has been used to analyze the data. This research has used information on government expenditures, gross domestic product, free exchange rate, inflation rate, oil income, export of goods and services, money volume, import price index, investment (gross capital), taxes, budget deficit, bank interest rate. It was used between 1370 and 1400. To estimate the model from Vensim software. A brief description of the systems thinking approach is provided below.

Systemic thinking refers to a kind of cognitive process that is based on analyzing and combining the subject in order to achieve a complete and comprehensive understanding of it. Systemic thinking is a way of looking at the universe from a wider perspective, which is not limited to observing components and phenomena and seeks to identify causes and patterns. Systems thinking is based on the premise that a system is a set of two or more components that have three conditions:

- The behavior of each component depends on the behavior of the whole.
- The behavior of the parts and their effect on the whole are interdependent.
- Each of the subgroups has a significant effect on the overall behavior, and the effect of none of them is independent; Therefore, the system is a collection of elements that cannot be separated into independent parts. None of the human parts is human, only the whole is human. If we physically or conceptually separate a system into components, it loses its essential properties; For this reason, the system has a general nature that cannot be known only by analysis. Understanding this matter is the first source of the intellectual revolution that transformed " Russell L. Ackoff " in the term "system" into the age of "machine" that brought about the change of the age and the age of four hundred years.

This concept refers to a set of tools (including causal loop diagrams, reservoir and material and information flow diagrams, and simulation models) that help us analyze the dynamic behavior of problems; Also, it empowers our systemic thinking in forming a novel attitude to events; an attitude in which the generality of affairs, its components and the mutual relations of these components are considered more carefully. Finally, systemic thinking has its own vocabulary that describes dynamic issues with its help. For example, terms such as reinforcement and balance process, constraint, delay, behavior over time, etc. are used to describe the dynamic behavior of problems.

Unfortunately, obstacles and factors cause people to move away from systemic thinking, despite the significant advantages of this way of thinking; Systemic thinking is holistic thinking, while relying solely on particularism eliminates the possibility of understanding the patterns governing the phenomenon and system. Focusing on events, and especially sudden events, makes one not understand the pattern of long-term changes that lie behind the events. Therefore, negativity and blaming the environmental conditions are intensified, and people think that something outside the system causes problems, while all the causes of the problems are hidden inside the system. Another pitfall in this context is double thinking, in which a person is trapped by a kind of simple-minded analysis, to the attitude of "zero and one". This attitude is based on preconceived notions and self-imposed limitations that keep the mind in closed formats. These conditions are prone to lead the human mind to the wrong path, and pay attention to the symptoms, more than the causes or instead, and rely on the apparent correlation of the variables, while there is no cause-and-effect relationship between them. Systemic thinking is seen in the form of the totality of the system, and in this way it goes from the surface to the depth and from the part to the whole. Over the years, systemic thinkers have succeeded in formulating a series of rules that are the starting point for the study of systemic thinking. Some of these rules are mentioned in this section:

Every cause has an effect. We live in a very complex world. All the components of this complex are related to each other in some way, and therefore it is not a solution to deal with a part of a system in isolation from the whole. Such an approach will usually have unexpected consequences; Because other subsystems usually react in untenable ways; for example, the use of chemical fertilizers may accelerate and strengthen the growth of plants; but by polluting the water and soil, it may cause the destruction of beneficial insects, which have a vital effect on the survival of the same plants due to the chain of factors, without solving the problems at the root, temporary policies will only have a palliative role, and worst of all, the sick system get used to this type of temporary solution.

The behavior of the system usually improves first and then goes downhill. The response of complex systems usually has a time delay; so when we try to change its behavior by interfering with the system, we usually get a positive answer; But often we don't know that soon this system may start to react. Eliminating wolves may be beneficial for deer in the early stages; But soon the situation of the deer will be worse than before due to the increase in population and lack of food. Simple solutions usually make the problem worse. Applying simple solutions to complex problems is a sign of non-systems thinking, and it creates problems in the long run. For example, when the police discover a large shipment of drugs, the lack of drugs in the market

causes the price to rise, making it attractive for traffickers to import other shipments into the market (Kiani et al., 2009).

Dimensions should be considered for a better understanding of systems thinking. Systemic thinking is dynamic, issues should be seen in the framework of behavioral concepts and over time according to this dimension of systemic thinking. Dynamic thinking is the exact opposite of static thinking, which is more focused on events. Systemic thinking looks for the cause in the system itself. The first step in understanding the system is to build a model or hypothesis that can explain the reason for a particular behavior of the system, and as a result, provide a solution to improve its behavior. In this passage, the boundaries of the system will be chosen so as to include most of the effective criteria in the behavior of the system. It should be noted that only components and relationships are included in the model, which are under control, and have the ability to create the observed behavior. Systems thinking sees the forest. In many offices and companies, they assume that they should only focus on details to understand everything. This type of thinking can be called tree thinking. Models built with this type of thinking are usually very large and contain a lot of detail.

The thinking that sees the forest has an opinion on the whole flow. It is clear that this type of observation puts more emphasis on the relations of the components than on the components themselves. In contrast to this type of thinking, there is the thinking of the system as an effect, which considers the behavior of the system to be mainly caused by the "system as a cause" from external factors. This point of view causes more criteria to be included in the model. The thinking of the components of the system and the relationships between them is responsible for the behavior of the system (Bahadri, 2022).

Therefore, the analysis of such a system requires an integrated approach to investigate the interactions and complex relationships in this system. The systemic approach is considered as a powerful tool for analyzing such systems, considering the investigated problem as a system that interacts with its environment and also interacts within itself. Models are always simplified dimensions of reality. The most important goal of systemic modeling is to gain an understanding and perspective on system relationships so that possible policies to improve the system can be explored. It is necessary for people to try to understand the behavior of the system with a systemic approach due to the interactions between different parts of a system. This understanding can only be obtained through studying and knowing all the components and the relationship between them in the form of a system. The systems approach was first taken seriously in the late 1950s by a group of researchers led by Forrester at MIT (Barlas, 2002).

The systemic approach is a method for analyzing systems and solving complex problems. Accordingly, many people today use the ability of this approach to create order in complex systems and help others to understand and learn from such systems (Lane & Oliva, 1998). The systems approach assumes that the components are related to each other in a complex pattern and the flow of information is more important than the physical flow (Spector et al., 2001); Also, this approach can help to understand complex environments.

Estimation of the model

After examining the background of the research, it was identified about the exchange rate transition and the relationship between the components. Based on this, the cause-effect diagram was extracted according to the principles of systems dynamics and finally, the state-flow model

was prepared according to the diagram (1). Then, it has been modeled and simulated using PLE Vensim software. The cause-and-effect relationships of the research are presented based on the economic relationships in the chart (1).

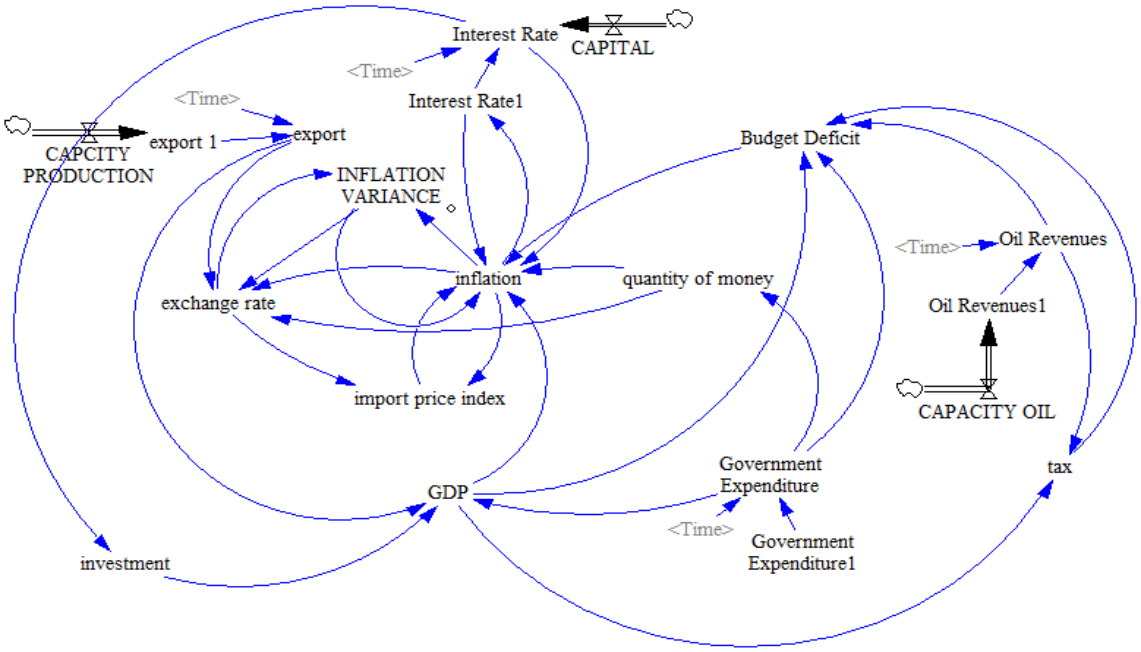
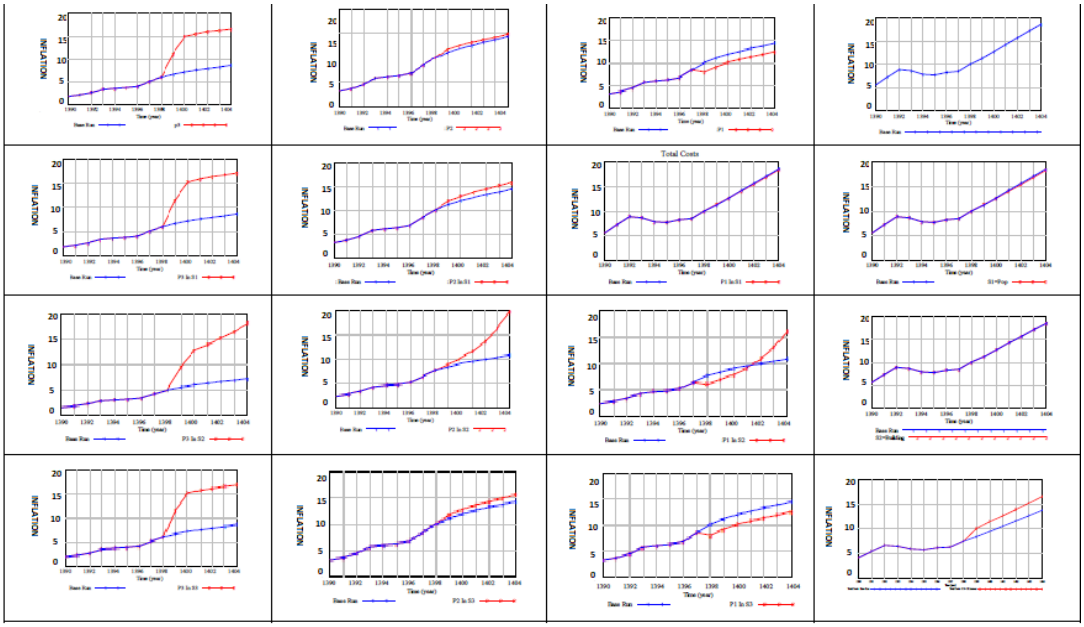


Figure (1): Cause–and–effect model of research

In the following, the effect of monetary policies on the reduction of ERPT on inflation and the effect of exchange rate shocks on inflation have been discussed. In this study, scenario 1 considers a low level of inflation uncertainty, a moderate level of inflation uncertainty is considered in scenario 2, and scenario 3 considers a high level of inflation uncertainty. The first policy represents interest rate changes, the second policy is open market operations, and the third policy is liquidity changes.



Base mode, Scenario 1, Scenario 2. Scenario 3
Base mode, Policy 1, Policy 2. Policy 3
Figure (2): Inflation response to research scenarios and policies

According to the results, it is quite evident that the increase in inflation uncertainty from scenario 1 to scenario 3 has caused a sharp increase in inflation in the coming years; It can be concluded that in a situation where inflationary uncertainty is high, the exchange rate has been more intense. According to the graph, the policies of liquidity changes have not had a favorable effect on the ERPT, and these policies have caused the worsening of the ERPT and a sharp increase in inflation in the Iranian economy. In the second policy, open market operation, it is also evident that the presence of the central bank in the exchange rate market has not improved the ERPT, and this could be due to the lack of independence of the central bank from the government's financial policies. The interest rate policy has been more successful than other policies in passing the exchange rate; Based on the results, it can be seen that the interest rate policy has not worked successfully at the high level of uncertainty.

Conclusion

The analysis of ERPT is of special importance in economic researches. Knowing how the ERPT moves can help a country's macro policy making in the short and long term. Accordingly, the current research has investigated the effect of optimal monetary policies on ERPT with the approach of dynamic systems. According to the results, uncertain conditions have had a significant impact on the ERPT. According to the results of the policies of liquidity changes and open market operations, they have not improved the ERPT; This can be caused by the central bank's lack of independence from the government's financial policies. It should be noted that although the interest rate policy has been more successful than other policies in ERPT; but this policy has not worked successfully in the high uncertainty level as well. Given that the monetary policies have not been successful in exchange rate adjustment, it is suggested that the central bank should have the least intervention in the foreign exchange market, and allow the exchange rate to be determined based on market supply and demand; Because if the central bank intervenes, as seen, one should expect sharp jumps in the exchange rate and increase in inflation in the long term.

The inflation uncertainty has a significant impact on the intensification of ERPT fluctuations, so it is suggested to implement inflation targeting policies; liquidity control in accordance with economic growth and policies to improve the perspective of expected inflation in order to control the effectiveness of monetary policies in improving the ERPT situation in the country's economy by reducing the uncertainty level of inflation.

It is suggested to index the interest rate due to the higher efficiency of the interest rate compared to other monetary instruments in passing the exchange rate; This means that with an increase in inflation, the interest rate will increase, and with a decrease in inflation, the interest rate will decrease, so that the interest rate will go out of the mandated state and become an endogenous state. This causes one of the most important variables affecting economic decisions to assume greater reliability in the direction of economic stability.

References

Abtahi, S. Y. (2016). Analysis of exchange rate pass-through and inflation dynamics in Iran's economy: regime rotation approach. *Economic Policy*, 9(18), 21-40. (in persian)

Aleem, A., & Lahiani, A. (2014). Monetary policy credibility and exchange rate pass-through: Some evidence from emerging countries. *Economic Modelling, 43*, 21-29.

Anderl, C., & Caporale, G. M. (2023). Nonlinearities in the exchange rate pass-through: The role of inflation expectations. *International Economics, 173*, 86-101.

Asgharpour, H.. Kazroni, A., & Mirani, N. (2014). The effect of the inflationary environment on the transmission of the exchange rate effect on the import price index in Iran. Quarterly Journal of Applied Economic Theories, No. 2, 155-178. . (in persian)

Atkeson, A., & Burstein, A. (2008). Pricing-to-market, trade costs, and international relative prices. *American Economic Review*, *98*(5), 1998-2031.

Bahadri, G. (2022). Dynamic analysis of quality cost with a systemic approach. S*cientific Journal of New Management and Accounting Research Approaches*, 6(20), 1051-1069. (in persian)

Bailliu, J., & Bouakez, H. (2004). Exchange rate pass-through in industrialized countries. *Bank of Canada Review*, *2004*(Spring), 19-28.

Barlas, Y. (2002). System dynamics: systemic feedback modeling for policy analysis in knowledge for sustainable development—an insight into the encyclopedia of life support systems. *Paris, France, Oxford, UK: UNESCO Publishing-Eolss Publishers*, *6*(2), 41-57.

Berman, N., Martin, P., & Mayer, T. (2012). How do different exporters react to exchange rate changes? *Quarterly Journal Economic*, 127 (1), 437–492.

Betts, C., & Devereux, M. B. (1996). The exchange rate in a model of pricing-to-market. *European Economic Review*, *40*(3-5), 1007-1021.

Burstein, A., & Gopinath, G. (2014). International prices and exchange rates. In *Handbook of international economics* (Vol. 4, pp. 391-451). Elsevier.

Bussière, M., Delle Chiaie, S., & Peltonen, T. A. (2014). Exchange rate pass-through in the global economy: the role of emerging market economies. *IMF Economic Review*, *62*, 146-178.

Campa, J. M., & Goldberg, L. S. (2005). Exchange rate pass-through into import prices. *Review of Economics and Statistics*, *87*(4), 679-690.

Castelnuovo, E., & Surico, P. (2010). Monetary policy, inflation expectations and the price puzzle. *The Economic Journal*, *120*(549), 1262-1283.

Cheikh, N. (2012). Non-linearities in exchange rate pass-through: Evidence from smooth transition models.

Cheikh, N. B., & Louhichi, W. (2016). Revisiting the role of inflation environment in exchange rate pass-through: A panel threshold approach. *Economic Modelling*, *52*, 233-238.

Cheikh, N. B., & Zaied, Y. B. (2020). Revisiting the pass-through of exchange rate in the transition economies: New evidence from new EU member states. *Journal of International Money and Finance*, *100*, 102093.

Cheikh, N., & Rault, C. (2016). Recent estimates of exchange rate pass-through to import prices in the euro area. *Review of World Economics*, *152*, 69-105.

Choudhri, E. U., & Hakura, D. S. (2006). Exchange rate pass-through to domestic prices: does the inflationary environment matter? *Journal of international Money and Finance*, *25*(4), 614-639.

Cuitiño, M. F., Medina, J. P., & Zacheo, L. (2022). Conditional exchange rate pass-through and monetary policy credibility: Insights from Uruguay and Chile. *Economic Modelling*, *114*, 105926.

De Mendonça, H. F., & Tiberto, B. P. (2017). Effect of credibility and exchange rate pass-through on inflation: An assessment for developing countries. *International Review of Economics & Finance*, *50*, 196-244.

Devereux, M. B., & Yetman, J. (2010). Price adjustment and exchange rate pass-through. *Journal of International Money and Finance*, *29*(1), 181-200.

Devereux, M. B., Lane, P. R., & Xu, J. (2006). Exchange rates and monetary policy in emerging market economies. *Economic Journal*, 116 (511), 478–506.

Devereux, M. B., Tomlin, B., & Dong, W. (2015). *Exchange rate pass-through, currency of invoicing and market share* (No. w21413). National Bureau of Economic Research.

Ezzati Shurgoli, A., & Khodavisi, H. (2021). An estimate of the degree of transmission of exchange rate to domestic prices in Iran's economy: an application of variable parameter models. *Economic research (sustainable growth and development).* 21 (1): 29-62. (in persian)

Feldkircher, M., & Siklos, P. L. (2019). Global inflation dynamics and inflation expectations. *International Review of Economics & Finance*, *64*, 217-241.

Gayaker, S., Ağaslan, E., Alkan, B., & Çiçek, S. (2021). The deterioration in credibility, destabilization of exchange rate and the rise in exchange rate pass-through in Turkey. *International Review of Economics & Finance*, *76*, 571-587.

Goldberg, L. S., & Campa, J. M. (2010). The sensitivity of the CPI to exchange rates: Distribution margins, imported inputs, and trade exposure. *The Review of Economics and Statistics*, *92*(2), 392-407.

Golinelli, R., & Rovelli, R. (2005). Monetary policy transmission, interest rate rules and inflation targeting in three transition countries. *Journal of Banking & Finance*, *29*(1), 183-201.

Gopinath, G., Itskhoki, O., & Rigobon, R. (2010). Currency choice and exchange rate pass-through. *American Economic Review*, *100*(1), 304-336.

Gron, A., & Swenson, D. L. (1996). Incomplete exchange-rate pass-through and imperfect competition: The effect of local production. *The American Economic Review*, *86*(2), 71-76.

Hofmann, B., & Mizen, P. (2004). Interest rate pass-through and monetary transmission: Evidence from individual financial institutions' retail rates. *economica*, *71*(281), 99-123.

Ito, T., & Sato, K. (2008). Exchange rate changes and inflation in post-crisis Asian Economies: Vector Autoregression Analysis of the exchange rate pass-through. *Journal of Money, Credit and Banking*, *40*(7), 1407-1438.

Ji, J. (2022). Exchange rate pass-through to domestic inflation in a pricing model incorporating distribution chain structure. *Journal of Applied Economics*, *25*(1), 432-453.

Junttila, J., & Korhonen, M. (2012). The role of inflation regime in the exchange rate pass-through to import prices. *International Review of Economics & Finance*, *24*, 88-96.

Kabundi, A., & Mlachila, M. (2019). The role of monetary policy credibility in explaining the decline in exchange rate pass-through in South Africa. *Economic Modelling*, *79*, 173-185.

Kiani, B., Shirouyehzad, H., Khoshsaligheh Bafti, F. & Fouladgar, H. (2009), System dynamics approach to analysing the cost factors effects on cost of quality, *International Journal of Quality &Reliability Management*, 26(7), 685-698.

Kiliç, R. (2016). Regime-dependent exchange-rate pass-through to import prices. *International Review of Economics & Finance*, *41*, 295-308.

Krugman, P. R. (1986). Pricing to market when the exchange rate changes. N*ational Bureau of Economic Research, NBER Working Paper Series*.

Kwapil, C., & Scharler, J. (2010). Interest rate pass-through, monetary policy rules and macroeconomic stability. *Journal of International Money and Finance*, *29*(2), 236-251.

Lane, D. C., & Oliva, R. (1998). The greater whole: Towards a synthesis of system dynamics and soft systems methodology. *European journal of operational research*, *107*(1), 214-235.

López-Villavicencio, A., & Mignon, V. (2017). Exchange rate pass-through in emerging countries: Do the inflation environment, monetary policy regime and central bank behavior matter? *Journal of International Money and Finance*, *79*, 20-38.

Menon, J. (1995). Exchange rate pass-through. *Journal of Economic Surveys*, *9*(2), 197-231.

Mihaljek, D., & Klau, M. (2008). Exchange rate pass-through in emerging market economies: what has changed and why?. *BIS papers*, *35*, 103-130.

Nasir, M. A., Huynh, T. L. D., & Vo, X. V. (2020). Exchange rate pass-through & management of inflation expectations in a small open inflation targeting economy. *International Review of Economics & Finance*, *69*, 178-188.

Odria, L. R. M., Castillo, P., & Rodriguez, G. (2012). Does the exchange rate pass-through into prices change when inflation targeting is adopted? The Peruvian case study between 1994 and 2007. *Journal of Macroeconomics*, *34*(4), 1154-1166.

Przystupa, J., & Wróbel, E. (2011). Asymmetry of the exchange rate pass-through: An exercise on polish data. *Eastern European Economics*, *49*(1), 30-51.

Rahimi, R., &. Khadavisi, H. (2018). The role of credibility of monetary policy on the degree of exchange rate pass-through during the process of globalization. *Economics and Modeling*, 10(1), 37-64. (in persian)

Sadat Hosseini, N., & Asgharpour, H. (2021). Exchange rate pass-through and monetary impulse effects in a stochastic dynamic general equilibrium model. E*conomic Growth and Development Research*, 11(42), 131-154. (in persian)

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.

Spector, J. M., Christensen, D. L., Sioutine, A. V., & McCormack, D. (2001). Models and simulations for learning in complex domains: Using causal loop diagrams for assessment and evaluation. *Computers in Human Behavior*, *17*(5-6), 517-545.

Takhtamanova, Y. F. (2010). Understanding changes in exchange rate pass-through. *Journal of Macroeconomics*, *32*(4), 1118-1130.

Taylor, J. B. (2000). Low inflation, pass-through, and the pricing power of firms. *European economic review*, *44*(7), 1389-1408.

Tunc, C., & Kilinc, M. (2018). Exchange Rate Pass-Through In A Small Open Economy: A Structural Var Approach. *Bulletin of Economic Research*, *70*(4), 410-422.

Winkelried, D. (2014). Exchange rate pass-through and inflation targeting in Peru. *Empirical Economics*, *46*(4), 1181-1196.

Yanamandra, V. (2015). Exchange rate changes and inflation in India: What is the extent of exchange rate pass-through to imports? *Economic Analysis and policy*, *47*, 57-68.