INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN ECONOMICS & MANAGEMENT SCIENCES

OPEN ACCESS JOURNAL

Vol 3, Issue 3, (2014) E-ISSN: 2226-3624

Investigating the Short Term and Long Term Impact of Exchange Rate and Inflation Fluctuation on Iran's Non-Oil Export

Farzad Karimi

Assistant professor, Management Department, Islamic Azad University, Branch of Dehaghan, Iran

Fariddeddin Allammeh Haery

Assistant professor, Management Department, Islamic Azad University, Branch of Mobarakeh, Iran

Nasim Malekzadehfar

Corresponding Author

M.S.C., Business Management, Islamic Azad University, Branch of Mobarakeh, Iran

To Link this Article: http://dx.doi.org/10.6007/IJAREMS/v3-i3/975 DOI:10.6007/IJAREMS/v3-i3/975

Published Online: 06 June, 2014

Abstract

That emerged more than before in recent decades is internalization of commerce and companies movement toward global market. In order to enter to this global market, companies benefited from different approaches which one of them is development of export. But, it can be said that a wide set of factors affect export. Among important effective factors on foreign trade pattern are fluctuations of variables such as exchange rate and inflation rate. Risk derived from exchange rate fluctuations is one of the factors that always is considered as a problem for country economy especially foreign trade section. This issue is so important that in some cases this risk exerts vast and irrecoverable damage to exporters.

The purpose of this study is investigating the impact of exchange and inflation rate fluctuations on the amount of export of exporters in different sectors of country (Iran) during 2001 to 2010 based on monthly data. Generalized autoregressive conditional heteroskedasticity (GARCH) method was used in order to calculate the fluctuations and Vector Auto Regression (VAR), impulse response Function (IRF), Variance Decomposition (VD) and Autoregressive Distributed Lag model (ARDL) methods were used to investigate the short term and long term impacts of exchange rate and inflation rate fluctuations on export.

Findings generally show that the impact of internal exchange rate and inflation rate fluctuations on export power of exporters in short term is more and associated impacts in long term is decreased and neutralized.

Keywords: Non-Oil exports, Exchange rate fluctuations, Inflation rate fluctuations, Vector Auto Regression, Generalized autoregressive conditional heteroskedasticity.

Introduction

Foreign trade is one of major parts of country's economy and it can have an important role in determining the country's fate and future. Accordingly, export development strategy is considered as one of economic growth strategies by developed and developing countries. Export of goods cause decrease in foreign exchange earnings and employment rate. Thus, development of non-oil export is a necessity. Regarding the companies intention to enter foreign markets, companies moved toward various approaches which one of them is export development. For managers of such companies, identifying the effective factors on export is very important. Many factors have impact on export. Although, there is a censuses about impact of factors such as foreign earnings and exchange rate on export, but the impact of exchange rate and inflation rate fluctuations on export is ambiguous. So, investigating and analyzing these factors could be useful in success of companies in taking adequate policies to develop export which is the main goal of this study.

Theoretical framework

Globalization trend of trade make companies to engage in export process gradually and move toward global markets. But, it should be considered that motive and drivers of start to export for various companies are different (Yang, 1995). It can be said that companies begins to export based on different internal and external reasons. But, that in the path of has most priority, is export consistency or in other words, commitment to export among companies. This issue encompasses many factors including export problems and restrictions and effective factors on export performance (Nategh and Niakan, 2009).

Exchange rate volatility

Besides the impact and importance of exchange rate in economy, economic conditions and its fluctuations have their specific circumstances. Fluctuations of exchange rate, made forecast of Rial earnings from export difficult for exporters and off course it makes marketing, right planning and identifying the export policy facing with difficulties for them. Basically, from one hand, because of lack of trust with rates and increasing of risk from their changes long term planning is impossible and made it stop or cause decrease in export activities, and on the other hand these kind of fluctuations increased motivation of speculative exchange exchanges and damaged market health. In addition to, it disrupted the planning for entering goods and services from these exchanges (Asgari, 1387).

Exchange rate volatility can be an independent reason for inflation pressures. Unreliability of earnings from foreign trade that is formed by exchange rate volatility, caused those who works in foreign trade and didn't stop their activities because of unreliability, demand more profit. If this profit doesn't give to them, move their capitals toward activities that with giving previous profit has less risk. Since, usually these countries are small one and have no power to affect global prices, with assumption of inelastic demand towards price, foreign trade activist supply this increased profit from selling more expensive goods or services to domestic customers and this increase in prices will enhance domestic inflation. Maybe, the main problem that exchange rate changes generate relating to inflation is a potential endless cycle of exchange rate changeability (Hosseini, 2009).

Exchange rate volatility can be one of them. If exchange rate has less volatility, it can have good impact on foreign trade, because growth of exchange rate volatility will create risk and unreliability which means increasing of trade costs. That is, with the assumption of fixed other conditions, less trade occur under exchange rate volatility. With decrease of volume of

international trade international expertise will be decreased and as a result global welfare will be less than non-volatility exchange rate status (Hosseini, 2009).

Inflation rate volatility

Exchange rate volatility can be an independent cause of inflation pressures. Unreliability of earnings from foreign trade which is formed by exchange rate volatility made those of foreign trade activist that didn't stop their activity because of unreliability, demand more profit. If this profit doesn't give to them, they move their capitals towards activities that with giving previous profit have less risk and since these countries are usually small one and have no power to impact on global prices with assumption of inelastic demand towards price, foreign trade activists supply this increased profit from selling more expensive goods or services to domestic customers and this increase in prices will enhance domestic inflation (Hosseini, 2009).

Maybe the most basic reason of exchange rate changes that creates inflation is a potential endless cycle of exchange rate changeability (Billson, 1989). The hypothesis of endless cycle suggests that fast moving inflation in country becomes immortal with exchange rate volatility. Adequate sphere for investment is stability before everything. Key factors in this sense are low inflation rate, shortage of controllable budget and actual exchange rate. Since instability makes future benefits unreliable, it hinders investment. Also, the value of assets in economic instability situation strongly fluctuates. High fluctuation of actual exchange rate and inflation are considered as factors of economic instability. Their impact especially for those who have fixed revenue and have assets that are evaluated in terms of domestic money and for those who have less tools for protecting their buying power from reduction, are deleterious. These cases also weaken creditors' position and makes access to the credit difficult. Big companies have more freedom to handle these risks including better access to dollar accounts, financial tools and credit out of country. But, small and medium sized enterprises are damaged more from instability of inflation and exchange rate.

Literature review

In the following we refer to a number of studies carried out related to the current study's topic.

Ramen and Serltez (2009) investigated the impacts of uncertainty of exchange rate on export in a multivariate framework in the US. They separated the impacts of exchange rate uncertainty on export and using GARCH method analyzed them. They found that exchange rate uncertainty had an important and negative impact on US export and also suggested that justification of exchange rate uncertainty enhances dynamic response of export to exchange rate shocks and asymmetric export responds to the positive and negative exchange rate with equal magnitude.

Bog and Fugerneg (2007) were following causal relationship between export performance and exchange rate volatility in different monetary policies in the shared and integrated VAR framework. For doing this they used conditional variance and a GARCH model as volatility scale. Empirical findings of their study show that causal relationship resulted from exchange rate uncertainty with the export performance if any is available, has the most weakness.

Sajadvar and Apostolos (2009) studied the impacts of exchange rate uncertainty on international trade. Data used in this study is monthly which analyzed using GARCH and VAR models. Study findings show that calculation of exchange rate uncertainty, enhances the

export against shock in exchange rate. And export responds with equal magnitude to the positive shocks in exchange rate rather than negative shocks.

Serge Ray (2006) investigated the seasonal data of years between 1970-2002 using ARCH. He investigated the instability of effective exchange rate in six countries as members of MENA to the European Union. Study findings show that export in long term for countries such as Algeria, Egypt, Tunis and Turkey has negative relationship with instability exchange rate index and for countries such as Morocco and Israel has positive relationship.

Wang and Bart (2007) investigated the impact of exchange rate instability on export of goods of 8 economic sectors of Thailand to the US using monthly data during 1989-1998. In this study which used GARCH model, results show that exchange rate instability have no equal impact on all of sectors. Agricultural sector suffered the most influence while exchange rate risk has very small impact on other sectors.

Description of model

Variables of exchange rate and inflation rate fluctuations are built using generalized autoregressive conditional heteroskedasticity (GARCH) method. Then, we analyze the impact of exchange rate and inflation rate fluctuations on Iran's foreign trade using Vector Auto Regression (VAR), impulse response Function (IRF) and Variance Decomposition (VD) during studying period in short term and long term. Accordingly, study model is specified as follows:

$$\mathrm{EX_{t=}}a_{11}\mathrm{EX_{t-1}} + a_{12}\mathrm{EX_{t-2}} + \cdots + a_{1p}\mathrm{EX_{t-p}} + b_{11}\mathrm{VIn_{t-1}} + b_{12}\mathrm{VIn_{t-2}} + \ldots + b_{1p}\mathrm{VIn_{t-p}} + c_{11}\mathrm{VER_{t-1}} + c_{12}\mathrm{VER_{t-2}} + \cdots + c_{1p}\mathrm{VER_{t-p}} + \in_{1t}$$

$$\mathrm{VIN}=a_{21}\mathrm{EX_{t-1}} + a_{22}\mathrm{EX_{t-2}} + \cdots + a_{2p}\mathrm{EX_{t-p}} + b_{21}\mathrm{VIn_{t-1}} + b_{22}\mathrm{VIn_{t-2}} + \cdots + b_{2p}\mathrm{VIn_{t-p}} + c_{21}\mathrm{VER_{t-1}} + c_{22}\mathrm{VER_{t-2}} + \cdots + c_{2p}\mathrm{VER_{t-p}} + \in_{2t}$$

$$\mathrm{VER}=a_{31}\mathrm{EX_{t-1}} + a_{32}\mathrm{EX_{t-2}} + \cdots + a_{3p}\mathrm{EX_{t-p}} + b_{31}\mathrm{VIn_{t-1}}b_{32}\mathrm{VIn_{t-2}} + \cdots + b_{3p}\mathrm{VIn_{t-p}} + c_{31}\mathrm{VER_{t-1}} + c_{32}\mathrm{VER_{t-2}} + \cdots + c_{3p}\mathrm{VER_{t-p}} + \in_{\mathbf{3t}}$$

Where

EX=non-oil export

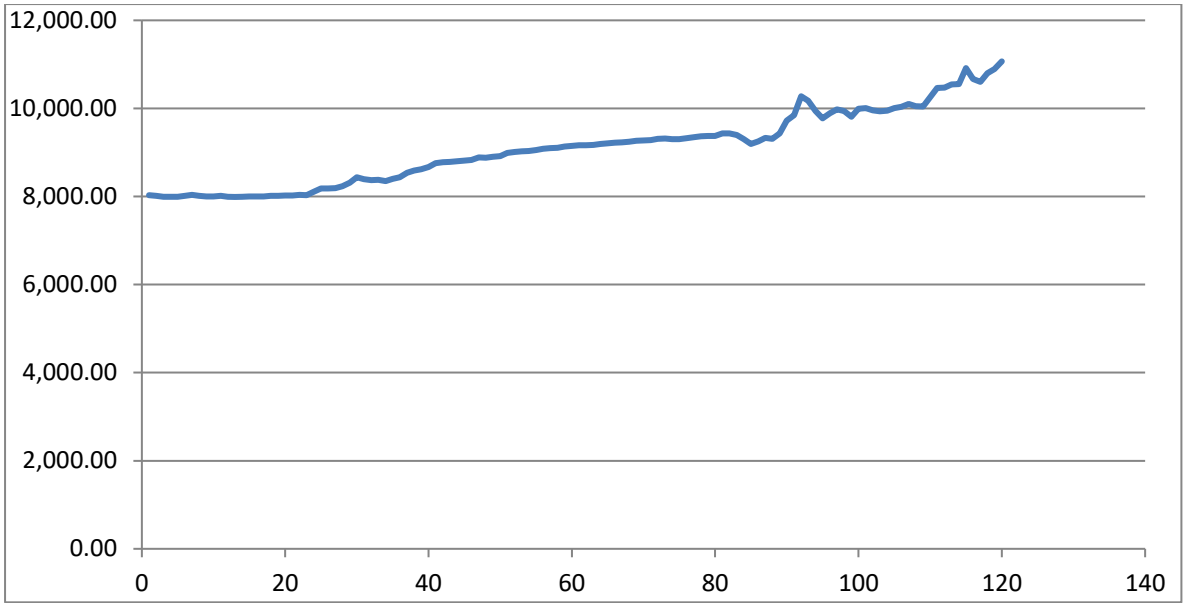
VER= exchange rate fluctuations

VIN= Inflation rate fluctuations

Data introduction

The purpose of this study is investigating the short term and long term impact of exchange rate and inflation rate fluctuations on Iran's non-oil export. For doing this, applied data include exchange rate, inflation rate and non-oil export during March, 2001 to February, 2010. From depicting the exchange rate chart (Figure 1.6) it can be seen that data scatter at beginning of the has significant changes and then in a period of time it is without any changes and after that again it has fluctuations. Thus, in order to achieve to more accurate data can be divided into three time spaces, so data analysis was carried out in three separate period of time.

Figure (1-5) Exchange rate changes in the studied period



Resource: study calculations

Model structure

Measuring exchange rate fluctuation

In order to measure exchange rate fluctuations in this study generalized autoregressive conditional heteroskedasticity (GARCH) method was used. In this method, first we estimate residuals of changes in time series of exchange rate through equation 1.4:

$$\mathrm{EXR}_t = \gamma_0 + \sum_{j=1}^{p} \gamma_{t-j}\, \mathrm{EXR}_{t-j} + \varepsilon_t \qquad (1\text{-}6)$$

Where, EXR: Exchange rate, P: amount of delay, ε_t: Residual

Akaike and Schwartz criteria are used to identify the optimized lag. After determining the changes residual using equation 2.7 we estimate exchange rate fluctuations:

$$h_t^2 = \beta_0 + \beta_1 h_{t-1}^2 + \beta_1 h_{t-2}^2 + \beta_1 \varepsilon_{t-1}^2 + \beta_1 \varepsilon_{t-2}^2 \qquad (2\text{-}6)$$

Where, $h_t^2 = var(\varepsilon_t)$

Measuring inflation rate fluctuations method

For measuring the inflation rate fluctuations we used GARCH model. First we estimate inflation rate changes residual using equation 3.6.

$$\mathrm{INF}_t = \gamma_0 + \sum_{j=1}^{p} \gamma_{t-j}\, \mathrm{INF}_{t-j} + \varepsilon_t \qquad (3\text{-}6)$$

Where, INF: Inflation rate, P: amount of delay and ε_t: residual

Then, amount of inflation rate fluctuations is estimated through equation 4.6

$$h_t^2 = \beta_0 + \beta_1 h_{t-1}^2 + \beta_1 h_{t-2}^2 + \beta_1 \varepsilon_{t-1}^2 + \beta_1 \varepsilon_{t-2}^2 \qquad (4\text{-}6)$$

Where $h_t^2 = var(\varepsilon_t)$.

Tables 1-6 and 2-6 show the results from estimation the exchange rate and inflation rate fluctuations:

Table. 1.6.
Estimation of exchange rate fluctuations using GARCH (1,1)

Variable	Coefficient	Std.Error	z-Statistic	prob
C	67992.53	116.332	0.058597	0.95
AR(1)	0.99968	0.006254	159.8813	0.00
Variance Equation				
C	18287.15	1873.74	9.759706	0.00
RESID(-1)^2	0.03546	0.007669	4.62385	0.00
GARCH(-1)	0.997712-	0.001073	930.1415-	0.00
R-squared		0.98788		

Resource: study calculations

Table. 2.6.
Estimation of inflation rate fluctuations using GARCH (1,1)

Variable	Coefficient	Std.Error	z-Statistic	prob
C	1.201348	0.126031	9.532139	0.00
AR(1)	0.413316	0.103504	3.993253	0.00
Variance Equation				
C	0.434224	0.226354	1.918345	0.05
RESID(-1)^2	0.296958	0.140294	2.116689	0.03
GARCH(-1)	0.100226	0.349241	0.286983	0.77
R-squared		0.133583		

Resource: study calculations

Unit root test

Table 1.7: Unit root test of variables results

Variable	Trend and intercept	Dickey Fuller test	Critical value❋	Probability Level
EX	Trend and intercept	-4.653	-3.149	0.0014
VER	Intercept	-4.572	-2/580	0.0003
VIN	Intercept	-6.920	-2/580	0.000

Resource: study calculations
*Critical ratio in 90% certainty level
As it has been shown in table 1.8 all of variables in certainty level of 90%, H_0, variables have unit root, is rejected. Thus, all of variables are in constant level.

Results of estimation in the first period (From March, 2001 to March, 2005)

Selection of optimized lag of VAR model in the first period

Table 8.1:

results of selection of optimized lag of VAR model numbers in the first perio

Break	AIC	SBC	LR
0	-420.719	425.470-	392.8[0.00]
1	417.830-	-429.706	369.0[0.00]
2	-326.031	-345.033	167.4[0.00]
3	-323.211	-349.339	134.8[0.00]
4	-320.200	-353.454	119.8[0.00]
5	-324.457	-364.855	110.3[0.00]
6	-325.331	-327.836	94.0[0.00]
7	324/526-	379.158-	74.4[0.00]
8	317.746-	379.503-	42.8[0.00]
9	-305.299	374.182-	---------

Resource: study calculations

AIC: Akaike information criterion

SBC: Schwarz information criterion

LR: sequential modified LR test statistic

Estimation of VAR model in the first model

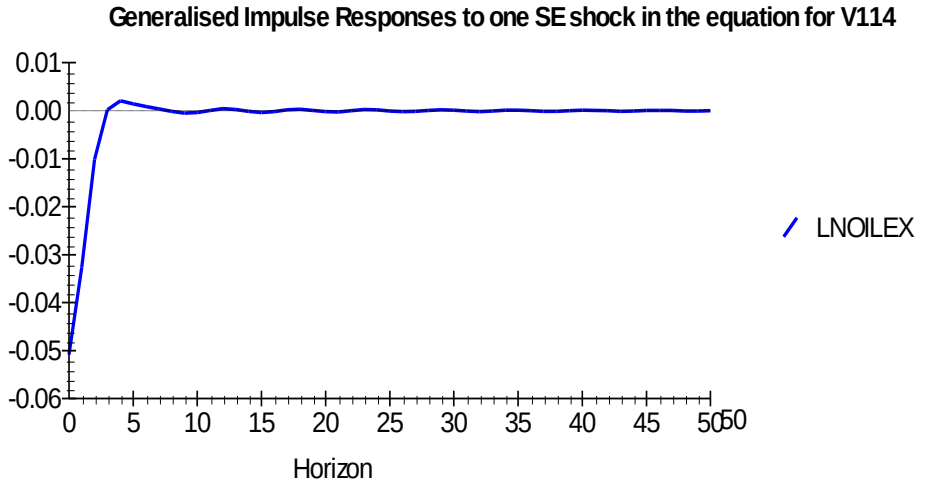
Table 2.8. Results from estimation of VAR model in the first period

	Coefficient	T-statistics
EX	0.744837	4.15367
VER	1.20E-07	0.26200
VIN	-0.271428	1.29340-
C	2.233914	3.01042

Source: study calculations

Impulse response functions in the first period

Figure 8.1. Generalized response of variable to an standard deviation shock occurrence in inflation rate fluctuations

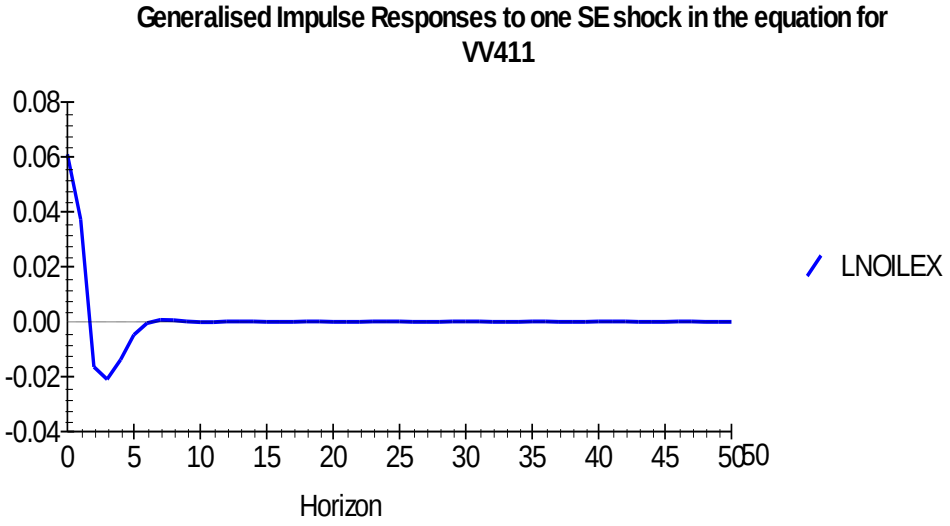


Source: study calculations

Table 7.4 and figure 3.4 show the variable response to standard deviation of shock occurrence in inflation rate fluctuations. As it has been shown, a change in inflation rate fluctuations in the same period, increase non-oil export as much as 0.06 and in the first period increase it as much as 0.03. It can be said that, increase in exchange rate fluctuations has a positive impact on non-oil export and cause increasing of this variable. But negative circumstances of increasing the inflation rate fluctuations will show themselves up from second period of non-oil export. Increasing of inflation rate fluctuations from second period cause reducing of non-oil export and lessen this variable as much as 0.01 and this reduction continues until sixth period. Then from seventh period, again, increasing of inflation rate fluctuations causes increasing non-oil export and this trend of increasing and decreasing is repeated.

Regarding the figure 3.4 we can suggested that in short term increase in inflation rate fluctuations strongly lead to reduction in non-oil export, but in the long term this impact is eliminated and increase in inflation rate fluctuations will have no impact on non-oil export.

Figure 8.2. Generalized response of variable to occurrence of an standard deviation shock in inflation rate fluctuations



Source: study calculations

Variance analysis of prediction error in the first period

Table 8.3. Variance analysis of prediction error of non-oil export in the first period

Period	VER	EX	VIN
0	0.00	1.0000	0.00
1	0.000005	0.99994	0.17378
2	0.00026	0.98146	0.20382
3	0.00044	0.97256	0.18330
4	0.00052	0.97019	0.19781
5	0.00053	0.97003	0.17868
6	0.00053	0.97002	0.18640
7	0.00054	0.97001	0.18711
8	0.00054	0.97001	0.18683
9	0.00054	0.97000	0.16032
10	0.00055	0.97000	0.21830
11	0.00055	0.97000	0.22288
12	0.00055	0.97000	0.23142

Source: study calculations

Results of estimation of model in the second period (Aprill, 2005 to January, 2008)

As mentioned before at the beginning of this paper regarding the figure 1.6 in the second period fluctuations are very small. Thus, we can't consider this part in order to calculate the extent of impact of exchange rate and inflation rate fluctuations on non-oil export. Because of this reason, only with estimation of Autoregressive Distributed Lag model (ARDL) model we suggest the impact of exchange rate and inflation rate on non-oil export.

Table 9.1.

Results of ARDL identifying the optimized lag using Akaike criterion of second period

Variable	Coefficient	T-statistics	Probability
Rate of exchange	0.89	2.2	0.03
Rate of Inflation	17.2	0.4	0.07
Interrupted exports	0.29	1.6	0.01
Intercept	7508-	2.09-	0.04
R-Squared=0.51		F=10.99	
R-Bar-Squard=0.46		DW-statistic=2.06	

Source: study calculations

According to table 9.4, the results of estimation show that exchange rate has a positive and significant impact on non-oil export. Likewise, 2.2% change in exchange rate cause an increase as much as 0.89% in non-oil export. But, impact of inflation rate on non-oil export is not significant and is neutral.

Results of estimation of model in third period (February, 2008 to March, 2010)

Selection of optimized lag of VAR model in third period

Table 10.1.

Results of selection of optimized lag of VAR model numbers in third period

AIC	SBC	LR	Break
436.212-	440.878-	215.5[0.00]	0
440.573-	452.238-	206.3[0.00]	1
435.849-	454.513-	178.8[0.00]	2
-423.161	-448/824	135.4[0.00]	3
428.060-	460.722-	127.2[0.00]	4
433.359-	473.020-	119.8[0.00]	5
423.469-	470.130-	82.1[0.00]	6
-415.287	468.947-	47.7[0.00]	7
400.418-	-461.076	------	8

Source: study calculations

AIC: Akaike information criterion

SBC: Schwarz information criterion

LR: sequential modified LR test statistic

Source: study calculations

Estimation of VAR model in third period

Table 10.2.

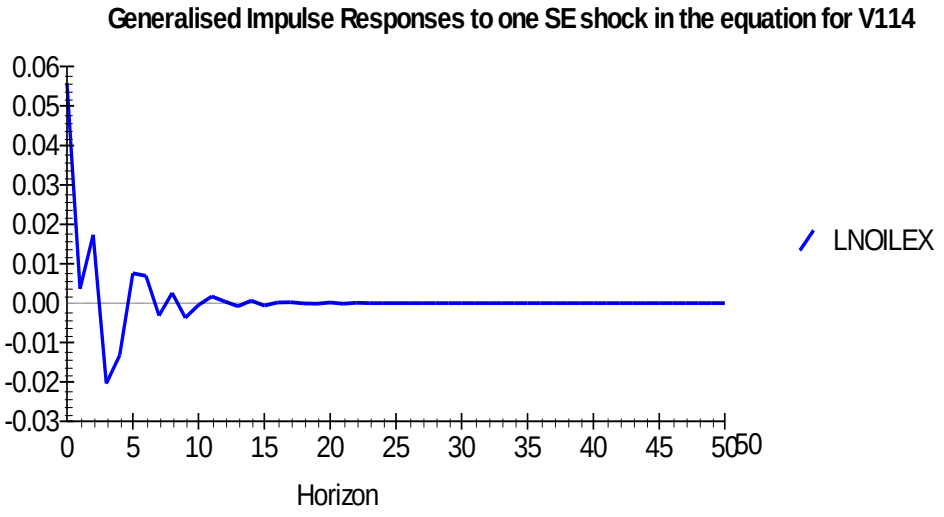
Results of estimation of VAR model in third period

	Coefficient	T-statistics
EX	0.063954	0.23756
VER	1.21E-06-	0.49711-
VIN	0.509878	1.22347
C	2.174225	1.0935

Source: study calculations

Impulse response functions in third period

Figure 10.1. Generalized response of variable to occurrence of an standard deviation in exchange rate fluctuations

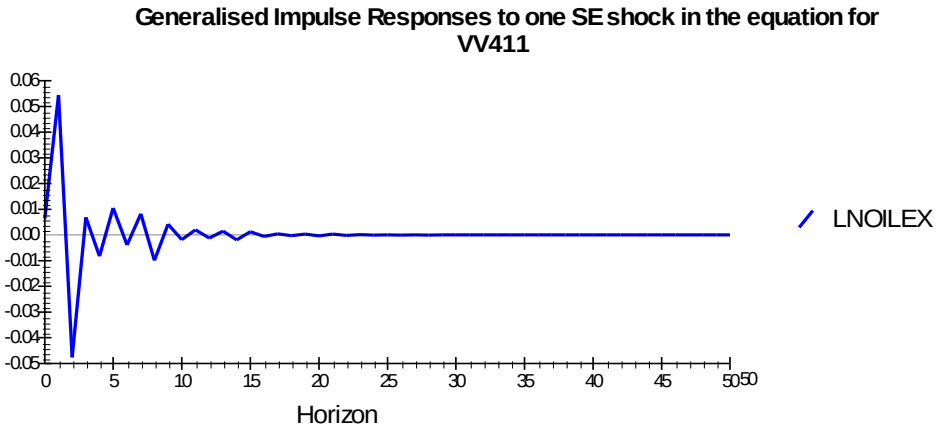


Source: study calculations

Table 4.13 and figure 4.5 show the response of variable to a standard deviation shock in inflation rate fluctuations. As illustrated, in short term a change in inflation rate fluctuations, in the same period, increase non-oil export as much as 0.006 and in the first period increase it as much as 0.05. it can be said that increase in exchange rate fluctuations in the first period has a positive impact on non-oil export and causes increasing this variable. But, negative circumstances of increasing of inflation rate fluctuations will show up from second period in non-oil export. Increasing the inflation rate fluctuation from second period causes reduction in non-oil export and reduce this variable as much as 0.04% in this period. Then, from third period increasing inflation rate fluctuations again causes increasing in non-oil export and this trend of increase and decrease will be repeated in short term.

Regarding figure 4.5 it can be said that in short increasing in the inflation rate fluctuations at first, cause an increase in non-oil export, but after two periods cause strong reduction in no-oil export. It can be said that the short term impact of inflation rate fluctuations in the third period is more that first period but like first period this impact will be eliminated in the long term and increasing the inflation rate fluctuations has no impact on non-oil export.

Figure 10.2. Generalized response of variable to occurrence of an standard deviation shock in inflation rate fluctuations



Source: study calculations

Table 10.3.
Variance analysis of prediction error of non-oil export in the third period

Period	VIN	VER	EX
0	0.00	0.00	1.0000
1	0.17378	0.09130	0.73492
2	0.20382	0.07498	0.72120
3	0.18330	0.06868	0.74802
4	0.19781	0.10228	0.69991
5	0.17868	0.24557	0.57575
6	0.18640	0.25133	0.56227
7	0.18711	0.25748	0.55541
8	0.186883	0.25711	0.55607
9	0.16032	0.36343	0.47624
10	0.21830	0.39104	0.39066
11	0.22288	0.41472	0.36240
12	0.23142	0.39620	0.37238

Source: study calculations

Conclusion and implications

Now, regarding to the study findings we can say that exchange rate and inflation rate fluctuations have different impacts on non-oil export and with providing the following implications we can take an effective step forward to development of non-oil export:

1. Where the exchange rate has positive impact on non-oil export, the power of exporters can be enhanced through exchange market modification and finally moving towards single rate exchange and consequently, create a motivation for increasing the export.
2. Where the exchange rate fluctuations has negative impact on non-oil export, proposed policies for increasing the non-oil export can be investigated from two aspects: first, adequate policies for reducing exchange rate fluctuations in free market from balanced values of exchange rate and second, applying financial and monetary tools in order to neutralize risk of exchange rate for exporters. In the first case we can refer to solutions such as transparency of government's exchange policies and making politicians to right execution of policies and following them continuously. Since exchange rate fluctuations in free market strongly follow government's exchange policies and regulations, this issue is very important. In the context of coverage of exchange risk methods we can refer to creating and developing future markets of exchange rate and expanding exchange savings in banking system.
3. Allow exporters to minimize risks from formal rates fluctuations through currency future transactions in case of inability to predict the trend of currency values in the future and reducing the costs derived from exchange rate fluctuations so that, with preselling the considered currency to the bank and Rial rate fixation, they protect themselves against rate of interest.
4. Controlling the inflation is important in offering the non-oil export of country, because controlling of inflation will result in improvement in resource allocation. With Exerting a monetary, exchange and financial policy which results in reducing domestic inflation,

using price fixation and reducing inflation policies and also avoiding policies that cause price shocks and price instability we can prevent inflation rate fluctuations.

5. Reduction in value of money is that of increasing inflation which this policy will cause limitation in offering export. Required conditions for controlling inflation in Iran can be provided through taking required monetary tools and their complementary financial policies. Independence of central bank and creating public trust towards performance of country's banking system through transparency and creating stability and consistency in monetary policies along with modification of government's financial system through taking adequate budgetary policies are effective factors in controlling the inflation rates.
6. In situations that government economic policies in order to control the exchange rate go forward, automatically more pressure towards reducing value of domestic money is created implicitly to officially which we can see its presence as an excessive increase in price of materials and then manufactured materials. Thus, a part of inflation is related to the ordinary inflation and other part is related to the actual exchange rate. Therefore, solutions in order to increase GDP and move toward actual exchange rate and also investment cause reducing inflation and accordingly increasing non-oil export.

References

Asgari, M. (2007). "The impact of actual exchange rate fluctuations on export performance of Iran's selected industries". Journal of Trade Studies. No.48, pp. 103-131.

Bilson,John F.O.(1989).“The Vicious Circle Hypothesis Staff Paoers”.International Monetary Fund, Vol. 26,pp. 1-37.

Hosseini, K. (2008). "The impact of exchange rate volatility on Iran's industrial export". Unpublished master thesis, University of Isfahan, Isfahan, Iran.

Nategh, M and Niakan, N. (2008). "Creating foundation for export development emphasizing on restrictions, derivers and export performance". Journal of Trade Studies Quarterly. No.37, pp. 43-55.

Pal, B. and Andreas, F. (2007).“Exchange rate volatility and export performance:A cointegrated VAR approach”. Statistics Norway, Discussion Paper No. 522.

Rey Serge.(2006). “Effective Exchange Rate Volatility and Mena Countries’ Exports To the EU”. Journal of Economic Development 23 Vol.31, No 2,pp23-54.

Sajjadur, R., Apostolos, S. (2009). “The effects of exchange rate uncertainty on exports”. Journal of Macroeconomics VOL.31,pp 500-507.

Wang, Kai-Li, Barret Christopher B. (2007). “A New Look at the Trade Volume Effects of Real Exchange Rate Risk”, Forthcoming in Journal of Agricultural and Resource Economics.