



The Effect of Exchange Rate Uncertainty on Pharmaceutical Exports in Iran

Ramin Radmanesh¹, Sara Parhizkar^{2*}

1. Department of Pharmacoconomics and Pharmaceutical Management, Faculty of Pharmacy, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran.

2. Phar.D., Faculty of Pharmacy, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran

*Corresponding Author-Sara.parhizkar73@gmail.com

Use your device to scan and read the article online



Citation Radmanesh,R, Parhizkar,S. The effect of exchange rate uncertainty on pharmaceutical exports in Iran, t Journal of Pharmacoconomics and Pharmaceutical Management. 2022; 8(4): 23-28

Running The effect of exchange rate uncertainty

Article Type Research Paper

Article info:

Received: 16.05.2021

Revised: 01.03.2022

Accepted: 10.03.2022

License Statement

This work is licensed under a Creative Commons Attribution NonCommercial 4.0 International license

(<https://creativecommons.org/licenses/by-nc/4.0/>).

Non-commercial uses of the work are permitted, provided the original work is properly cited

Copyright

© 2022 The Authors.

Publisher

Tehran University of Medical Sciences

ABSTRACT

Background: The study aimed to investigate the effect of exchange rate uncertainty on pharmaceutical exports in Iran, which was studied by longitudinal studies from 2003 to 2018.

Methods: The statistical population was pharmaceutical companies active in exports based on data, information, and reports that were selected officially. The generalized conditional heterogeneous variance self-regression econometric method (GARCH-M) is used to analyze the data and estimate the actual exchange rate uncertainty index. Petroleum GMM econometric technique was used using EVIEWS econometric software.

Results: According to the results, non-oil exports in the Iranian economy are a crucial variable because its prosperity is a sign of the existence and continuity of the country's economy and the government itself for continuous growth.

Conclusion: The economy is competitive, and the performance of non-oil exports and their trend in Iran could have been more favorable. Although the massive import of goods and services into the country over the past years has been continuously financed through revenues from oil exports, the slowness of non-oil exports will hamper both productivity growth and future foreign exchange needs.

Keywords: exchange rate, longitudinal studies, pharmaceutical companies.

Introduction

Non-oil exports are a crucial variable in Iran's economy because its prosperity is a sign of the existence and continuity of the country's economy. The government itself was not favorable to the continued growth and competitiveness economy and the performance of non-oil exports. Although the massive import of goods and services into the country over the past years has been continuously financed through revenues from oil exports, the slowness of non-oil exports will hamper both productivity growth and future foreign exchange needs (1)

Assuming companies are risk-averse, exchange rate risk reduces the benefits of international trade. Ethier (1973) argued that exchange rate fluctuations harm international trade; the existence of financial markets allows economic agents to redefine currency risk, and this can reduce the potential negative impact of exchange rate fluctuations on international trade. (2) Exchange rate uncertainty in a free economy, including in Developed and developing countries, has caused widespread concern. Although long-term exchange rate fluctuations may be necessary to make macroeconomic stability, exchange rate fluctuations could hurt the country's economy in the event of an external shock. (3) In addition, short-term fluctuations in exchange rates may also negatively affect the micro level. Therefore, exchange rate fluctuations are usually recognized as a risk. Higher risk leads to higher costs for venture capitalists, thus leading to fewer jobs. As a result, fluctuations will lead to uncertainty and higher transaction costs (4).

Theoretically, there are hypotheses to explain the asymmetric effect of exchange rate fluctuations on exports. The first idea is based on studies such as Marston (1990), Nitter (1994), and Mahdavi (2000), which state that asymmetric reactions may occur due to asymmetric pricing behavior in the market. Marston (1990) showed asymmetric market pricing by examining the pricing behavior of Japanese firms, saying that in response to changes in the real exchange rate, Japanese firms behave differently in pricing, depending on whether the yen rises or falls. They try to maintain their market share by increasing the value of the yen by reducing export prices, but when the yen falls, they try to keep their market share by keeping export prices constant. Increase. Nitter (1994) also stated that firms that export to gain market share do not allow foreign currency prices to rise when the value of the domestic currency increases. However, when the domestic currency depreciates, exporters

reduce prices in foreign currencies due to increased sales motivation and market share. In this regard, Mahdavi (2000) examined the reactions of the export price index to the increase and decrease of the effective nominal exchange rates for Japan, Germany, and the United States. He found that for Japan and Germany, the tendency to moderate the effects of exchange rate fluctuations on export prices was asymmetric (5).

In recent years, significant empirical evidence on the effect of exchange rate fluctuations on international trade has been found in many previous studies (6-8). If the exchange rate is not adjusted correctly and in harmony with the world inside and outside the economy and a safe environment, it can slow down economic growth. The exchange rate is a crucial variable in an open economy due to its interrelationship with other domestic and foreign variables, which are greatly affected by domestic and foreign economic policies and developments. The wide fluctuations of the exchange rate, which are characteristic of developing countries, create an atmosphere of uncertainty for productive and trade decisions, and therefore, the importance of paying attention to the exchange rate and the uncertainty behind it, as well as The system governing the currency system of countries is not hidden from anyone (9)

According to the economic theory of exchange, exchange rate changes cause production, inflation, and interest rates by changing relative prices in the country and foreign goods and services. The exchange rate affects the import demand and regulates net exports (16). Rate fluctuations are also critical for investment planning, especially capacity investment in exportable sectors (13).

All countries, especially developing countries, are affected by domestic events and external shocks and experience more fluctuations. In each country, foreign trade is the main reason for growth and is considered equal to the country's general economic growth. The exchange rate is considered an influential factor in foreign trade volume (6).

Exchange rate stability and supportive policies such as banking aid, insurance, and risk reduction activities ensure that imports and exports are rational and thus boost growth. Developing countries have high uncertainty in macroeconomic variables, and exchange rate volatility leads to increased uncertainty, thus increasing the risk of trade activities and ultimately reducing trade volume. If the exchange rate fluctuates sharply, exporters and importers will not have an accurate idea of export earnings and the cost of imports in domestic currency when concluding a contract. Of course,

the exchange value of exported and imported goods is known at the time of the contract. Since there is a time interval between the receipt of export revenue or the sale of imported goods, exchange

rate fluctuations can reduce the value of exported goods and the cost of imported goods. Affect the national currency, and these revenues and expenditures can easily be drastically and unexpectedly different from the time of the transaction (10). Therefore, because of the importance of non-oil exports and drug manufacturing capabilities in Iran, the study aimed to investigate the effective exchange rate and uncertainty of drug exports in Iran.

Method

The research was a longitudinal study from 2003 to 2018. The study's statistical population was pharmaceutical companies active in the field of export. The sampling method was random based on official information and reports; the sample included time series data from 2003 to 2018. We used the Generalized Autoregressive Conditional Heteroskedastic Model (GARCH-M) to analyze data and the exchange rate uncertainty index. Since estimating the parameters and evaluating macroeconomic variables' effects on Non-oil exports using the GMM econometric technique using EViews econometric software.

Findings

The best-estimated pattern is the GARCH-M model, which consists of self-explanatory residuals and conditional variance, both of which appear with interruptions in the model, determining the optimal order of the pattern (Table 1).

In order to select one of the methods of panel data or integrated data, the F-Limer test was used. The F-Limer test statistic determines whether the width is from a separate origin for each section or course. If there is inhomogeneity or individual differences between observations, the panel data method is used. Otherwise, the combined data method is used. Because the data are stacked on top of each other, the difference between them is not considered. In the F-Limer test, the null hypothesis indicates that the widths of the sources (integrated data) are the same. The opposite hypothesis indicates that the widths of the sources (panel data) are heterogeneous. The results of Chow (F-Limer) and Hausmann tests to select the appropriate model are presented in Table 2.

As seen in Table 3, the value of the F-statistic and the level of significance associated with this statistic indicate that the null statistical hypothesis, which is the meaninglessness of the whole model (zero of all coefficients), is rejected, and the estimated regression model is rejected. It is meaningful in general. In this model, the coefficient of determination is equal to 0.26. That is, 26% of the changes in the dependent variable can be explained by independent and control variables. Also, the value of the Camera-Watson statistic of the model, which is equal to 1.65, is between 1.500 and 2.500, indicating no autocorrelation between the model errors. The following results of the study of the coefficients of the model variables are presented in table .4

The coefficients are still significant in the above-estimated model for drug export (Prob <0.05). The estimation results of this model are shown in the table below. The negative coefficient of the studied independent variable (UNC) indicates the inverse relationship between exchange rate uncertainty and drug exports. Also, this relationship is significant since the corresponding significance level (0.032) is less than the acceptable test error level (0.05). It means that with increasing uncertainty about the exchange rate, the risk of export activities increases, interest in export activities decreases, and the amount of drug exports decreases. The negative coefficient of the studied independent variable (DEX) indicates the inverse relationship between the exchange rate and drug exports. Also, this relationship is significant since the corresponding significance level (0.036) is lower than the acceptable test error level (0.05). It means that with the increase of the real exchange rate, the amount of exports has been affected and decreased, which is different from the theory in Iran. The Independent Positive Negative Ratio (GDP) indicates the inverse relationship between economic growth policies and drug exports. Also, this relationship is significant since the corresponding significance level (0.030) is less than the acceptable test error level (0.05). This level shows that economic growth policies align with export development policies. In other words, the goals that pursue economic growth naturally increase the supply of drug exports. In other words, the country's exports increase with increasing drug production. As the domestic production of medicine increases, more tradable goods will be offered for export to foreign markets, so the export of medicine will increase.



Conclusion

The exchange rate has fluctuated widely since the collapse of the fixed exchange rate system (Bretton Woods's system). Since then, the effect of exchange rate volatility on international trade has been the focus of proponents of both fixed and floating exchange rate systems. Proponents of a fixed exchange rate system argue that the system provides a more conducive environment for international production, trade, and investment by reducing the range of exchange rate fluctuations. In comparison, the proponents of a floating exchange rate system believe that the flexibility (floating) of the exchange rate facilitates adjustment of the payment system against external shocks. The exchange rate is an essential factor in the export and import of institutions and products, and its uncertainty affects the decisions of those involved in this sector. The impact of fundamental exchange rate uncertainty on the economy occurs more than the export channel and the import of inputs. How will the exchange rate differ from the goods' export time? This rate grows, and there is more uncertainty when there is a gap between trading goods and receiving the currency. Therefore, with the exchange rate fluctuation and creating an atmosphere of uncertainty, the exporters of goods and products will limit their exports due to their lack of knowledge about the future trend.

Proponents of a fixed exchange rate system believe that the system provides a more conducive environment for international production, trade, and investment by reducing the range of exchange rate fluctuations. At the same time, the proponents of a floating exchange rate system believe that the flexibility (floating) of the exchange rate facilitates the adjustment of the payment system against external shocks. The exchange rate is an essential factor in the export and import of institutions and products, and its uncertainty affects the decisions of those involved in this sector. The impact of fundamental exchange rate uncertainty on the economy occurs more through the export channel and the import of inputs. So exporters learn foreign currency by exporting the product, which uncertainty and fluctuations dominate the exchange rate market. They need to be sure when What is a difference between the exchange rate and the time of export of goods when they convert foreign currency into domestic currency? It would be uncertain; when there is a gap between the time of trading the goods and receiving the currency. Therefore, with the exchange rate fluctuation and creating an atmosphere of uncertainty, the exporters of goods and products will limit their

exports due to their lack of knowledge about the future trend.

In this study, the asymmetric effect of exchange rate uncertainty on drug exports from 2001 to 2018 was investigated—the ARCH-M index helped reduce the uncertain exchange rate. Then, the drug export model was estimated by the Ordinary least squares (OLS) regression equation; the exchange rate uncertainty effect on drug exports was negative, and the asymmetric effect was approved.

According to the functions, the drug export function with the independent variables has the following relationships:

The negative coefficient of the studied independent variable (UNC) indicates the inverse relationship between exchange rate uncertainty and drug exports. Also, this relationship is significant since the corresponding significance level (0.032) is less than the acceptable test error level (0.05). So with increasing uncertainty about the exchange rate, the risk of export activities increases, interest in export activities decreases, and the amount of drug exports decreases.

The negative coefficient of the studied independent variable (DEX) indicates the inverse relationship between the exchange rate and drug exports. Also, this relationship is significant since the corresponding significance level (0.036) is lower than the acceptable test error level (0.05). Ultimately increase in the real exchange rate, the amount of exports has been affected and decreased, which is not by the theory in Iran.

The Independent Positive Negative Ratio (GDP) indicates the inverse relationship between economic growth policies and drug exports. Also, this relationship is significant since the corresponding significance level (0.030) is less than the acceptable test error level (0.05). It shows that economic growth policies are in line with export development policies. In other words, the goals that pursue economic growth naturally increase the supply of drug exports. In other words, the country's exports increase with increasing drug production. As the domestic production of medicine increases, more tradable goods will be offered for export to foreign markets, so the export of medicine will increase.

According to empirical studies on the effects of exchange rates on exports, it is clear that exchange rate changes have had several consequences on exports. It goes back to the nature of countries and their export goods. In developed countries, due to their main exports being industrial goods, the decrease in the

exchange rate causes these goods to become more expensive, and due to the high price elasticity of these goods, their exports decrease. Suppose in less developed countries, the export action is mainly raw materials, minerals, or foodstuffs with less price elasticity. Accordingly, the change in the exchange rate has a different effect than what is in theory in this field. Economic dominance lies. In general, in the commodity market, an increase in the exchange rate will make imported goods more expensive and export goods cheaper, increasing the demand for domestic goods.

On the other hand, with the devaluation of the national currency, enterprises' liquidity demands increase and therefore increase the demand for money. On the supply side, it can be argued that in developing countries, the exchange rate increases (the devaluation of the national currency). It increases the cost of imported intermediate goods, and as a result, the import of these goods becomes more expensive and therefore increases the cost of production, which is called imported inflation; from this perspective, export valuation is raised.(11)

In analyzing the issue of exports and especially in examining the impact of exchange rates on non-oil exports, the issue of the value of non-oil exports is significant and decisive. Assume that the value of a country's exports is high and much, in which case, if the country's economic policymakers want to increase their exports by weakening the domestic currency and making foreign currencies more expensive, even if conditions are favorable, due to difficulty in achieving this goal, because the appreciation of foreign currency (due to the high valuation of export goods), will increase the production costs of export goods, and this is the reason It is considered as an export limiter

Of course, note that in recent years the value of our goods has declined. In studies conducted in this field, the value of costs related to imported inputs has been divided by the value of its products to calculate the degree of valuation of a commodity. According to these studies, the degree of valuation of the industry and mining sector has been higher than the three sectors of agriculture, construction, and services. The high valuation of the industry and mining sector is mainly due to this sector's dependence on importing raw materials and intermediate goods. The value of an export commodity only indicates the foreign exchange policy's limitation to promoting that commodity's export. However, valuation is not an obstacle to exports in general;

even in the context of new theories of international trade, intra-industrial trade is in the interest of all countries. If there are comparative advantages, this is due to the greater use of the economies of scale of production at the international level. Therefore, the international division of labor between countries regarding the production of an industrial product is emphasized in this framework, which is entirely consistent with the high valuation of an industrial export product. However, it must be acknowledged that our export industries' value is different (12).

In the framework of traditional trade theories, the degree of valuation and its relationship with foreign exchange policies and exports is rooted in the issue of business strategy. That is, countries first cut their import needs and, so, the value of their production by substituting imports and adopting a subset strategy. After much more, their independent supply capacity focus on the strategy. Emphasize export incentives and leaps (13).

Increasing productivity of domestic resources and activating unused capacities to strengthen the country's drug production bases are adopting policies to cut exchange rate fluctuations. It includes clarifying government foreign exchange policies and binding policymakers to the correct and continuous implementation of policies. The use of monetary and financial instruments to cut exchange rate risk, including the creation and expansion of futures markets, were among the present research suggestions.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the ethical committee of the Tehran University of Medical Sciences (TUMS). All the participants accepted enrollment in the study orally and all of the data that were gathered was considered confidential.

Funding

There is no funding

Authors' contributions

All authors equally contributed to preparing this article.

Conflict of interest

The authors declare no conflict of interest



Tables

Table 1. Pattern check table GARCH-M

Variable	standard deviation	coefficients	z-statistic	Probability
GARCH	-2.486	1.542	-2.254	0.036
AR(3)	0.369	0.103	4.218	0.000
AR(1)	-0.452	0.120	2.987	0.000
MA(3)	-0.314	0.148	-2.458	0.006
Variance Equation				
RESID (-1)^2	0.761	0.045	28.212	0.0000

Table 2. Test results

Statistical test	Significant model	Sig	selection test
Chow test (F Limer)	2.241	0.048	
Hausman Test	0.514	0.972	

Table 3. Results of the model study

R Square	Adjusted R Square	F	Sig. F	DW
0.26	0.25	49.83	0/00	1.65

Table 4. Results of the study of partial coefficients of the model

Model	Unstandardized Coefficients	Unstandardized Coefficients	t	Sig.
Constant	0.106	0.326	0.325	0.744
UNC	-0.009	0.004	-2.141	0.032
Dum*UNC	0.0685	0.0275	2.491	0.012
DEX	-0.001	0.0008	-2.096	0.036
GGDPWOIL	0.056	0.025	2.179	0.030

Reference

- [1] Mohammadi, Shakeri, Abbas, eskandari, Karimi, David. The effect of exchange rate fluctuations on non-current demand in the Iranian banking system. *Journal of Planning and Budgeting*. 2016;21(2):3-24.
- [2] Rahman S, Serletis A. The effects of exchange rate uncertainty on exports. *Journal of Macroeconomics*. 2009;31(3):500-7.
- [3] Chang S-C. The interrelationship between exchange-rate uncertainty and unemployment for South Korea and Taiwan: Evidence from a vector autoregressive approach. *International Economics*. 2011;125:65-82.
- [4] Demers M. Investment under uncertainty, irreversibility, and the arrival of information over time. *The Review of Economic Studies*. 1991;58(2):333-50.
- [5] Hook LS, Boon TH. Actual exchange rate volatility and Malaysian exports to its major trading partners. ASEAN in an Interdependent World: Studies in an Interdependent World: Routledge; 2017. p. 95-117.
- [6] McKenzie MD. The impact of exchange rate volatility on international trade flows. *Journal of Economic Surveys*. 1999;13(1):71-106.
- [7] Edwards S, Ostry JD. Anticipated protectionist policies, real exchange rates, and the current account: the case of rigid wages. *Journal of International Money and Finance*. 1990;9(2):206-19.
- [8] Cho G, Sheldon IM, McCorriston S. Exchange rate uncertainty and agricultural trade. *American Journal of Agricultural Economics*. 2002;84(4):931-42.
- [9] Ashraf MA, Chowdhury AZ. Determinants of Bangladesh's Export Flows to The USA, 2003–2010: An Empirical Review. *Jurnal Agro Ekonomi*. 2016;28(2):189-99.
- [10] Ozturk I. Exchange rate volatility and trade: A literature survey. *International Journal of Applied Econometrics and Quantitative Studies*. 2006;3(1).
- [11] Deltas H, Zilberfarb B-Z. Real exchange rate volatility and international trade: a reexamination of the theory. *Southern Economic Journal*. 1993:641-7.
- [12] Goldberg LS, Tille C. Micro, macro, and strategic forces in international trade invoicing: Synthesis and novel patterns. *Journal of International Economics*. 2016;102:173-87.
- [13] Subbarao N, KR L. An Empirical Analysis of the Relationship between Currency Futures and Currency, Exchange Rate, Economical Formulas, Prediction Models, and Volatility in India regarding the US Dollar, Great Britain Pound, and Euro Currency. 2017.