

Evaluating the effect of smuggling on the black market exchange rate in Iran

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Abstract

Nowadays, the concept of smuggling and its effect on the macroeconomic variables and the way for dealing with its consequences are considered as the important subject in the economic planning. Identifying an effective variable helps us to achieve the desired results in solving the macroeconomic equations. This study seeks to evaluate the effect of smuggling on the black market exchange rate for Iran in the form of four equations; For this aim, as we can not estimate the exact value of smuggling, two variables : (1) regulation and law alternative and(2) the import price index have been used instead of smuggling as virtual variables; we applying stationary test of variables by the Dickey-Fuller Unit Root Test and the structural break tests. The short-term relationships were estimated by using the error correction techniques and finally the long-term relationships were estimated by using the Engle Granger and Johansson tests in order to ensure that the unit root has not been the result of structural break. According to the results of tests, the Import price index is a better alternative for smuggling variable and results indicates that smuggling has reverse effect on the black market exchange rate in Iran.

JEL classification numbers: F₄, C₅₉, G₁₀₀,

Keywords: Black market exchange rate; exchange rate; smuggling

1-Introduction

By an overviewing the history of mankind about the ways that they lived in the society and met their needs, we find that humans have always sought to obtain their demand with minimum cost, but limitations of available resources, laws and regulations enforcement in the society and every other things have created the complexities in the relationship between people and their governments. On one hand, the hidden and illegal business, which is called as the "Smuggling" in the economic literature, became the main problem of communities when humans were looking for everything that they want; and on the other hand, the

governments enforced the stricter laws and obtained heavier taxes in order to regulate the trade, finance and protect the domestic industries and achieve the proper results in the macro-economic equations. In addition, the exchange rate is the connector of each country to the outer world, whether in the goods market or in the assets markets, therefore, the exchange rate affects the cost of goods which we import from other countries, import services, and also the cost of goods which produce locally in the domestic markets. Because the black market exchange rate has the illegal nature in some cases and causes the irregularity and disorder in the exchange market and also according to the unclear relationship in this market, we can define that as a "parallel market" with strong effect on macroeconomic variables. The other subject that we should consider about that and measuring approximately the quantity of that, is "smuggling" which exist almost in all countries and because of its nature no one can estimate smuggling exactly but it is important to care about that in economic planning.

2 Theoretical principles of research

Since changes in the exchange rate causes the disorders in the macro-economic policies, this paper wants to examine relationship between smuggling and changes in the black market exchange rate in Iran. For finding this relationship, as the data for smuggling is not available, the "Import price" and "the law and regulations" will be used as the alternative indicators for smuggling;

3- Literature

Few studies have been conducted inside and outside Iran about the smuggling and the exchange rate and its relationship with the black market exchange rate in Iran, that some of them are mentioned bellow:

"Determinants of exchange rate in the black market exchange rate in Iran," is a survey conducted by Javadpour Moghim (2001) and it reviews and analyzes the determinants of exchange rates in the black market exchange rate in Iran during 1970 - 1999. M. Hashem Pesaran (1990) in an article entitled "Exchange policy of Iran and the black market of dollar" reviews the status of exchange rate in Iran and criticizes the exchange rate policies caused by the oil shocks. Bahmani Oskoe (1993) examined the law of purchasing power parity in Iran in an article entitled "The black market exchange rate and the official exchange rate" and pointed out that we can trust the results of purchasing power parity test only when the data and statistics of official exchange rate are used; and if the black market is as the marginal market, the empirical studies and data of this market should also be used. Abbas ValadKhani

(2003) tested the determining parameters of exchange rate in the black market of Iran during 1960-2000 in an article entitled "The empirical analysis about the black market exchange rate in Iran" and found that the black market exchange rate had a relationship with the inflation, GDP, and Import price index rates. Mohsen Bahmani Oskoe (2003) has written another article entitled "The smuggling interests of exchange rate black market" and examined the relationship between the goods smuggling and interest of exchange rate black market in 70 countries during 1956-1998 using the econometric techniques and has indicated that the smuggling can be considered as the important explanation for the current benefits and revenues in the black market. In another study, entitled as "The long-term relationship between the Black Market Exchange Rate and the Trade Balance" he reviewed this relationship for years 1938-1969.

Theoretical bases of current study are based on the economic theories as follows: "Theory of purchasing power parity and exchange rate in the black market " by William Patten and Weberston (2001), "The purchasing power parity puzzle," by Rogoff (1960), "Trade and Price Discrimination" by M. Pitt (1981), "Theoretical analysis of smuggling" by Bhagwati and Hansen (1973), "Smuggling, production and welfare," by Sheikh (1974), and "The theory of risk, smuggling and welfare," by Sheikh (1989).

4-Research question

We seek to answer the following question:

- 1- What kind of relationship exists between the smuggling and the black market exchange rate?

Hypotheses which test is:

1. The black market exchange rate has a direct relationship with the smuggling.

5-Research limitations

In this paper, we have examined the relationship among the variables such as the productivity, Import price index, index of rules and regulations, real exchange rate, and black market exchange rate by using the time series data in the Iranian community during the years 1978-2010; the statistics related to the GDP (Gross Domestic Product) are annually gathered from the balance sheets of Central Bank, the foreign and domestic price levels and also the statistics related to the productivity index and the real exchange rate are gathered from the Penn World Table, and the black market exchange rate gathered from the Universal Exchange Yearbook.

6-Pattern Introduction

As previously mentioned, In order to achieve our goal in this paper and observing the effect of smuggling on the black market exchange rate, four below equations are estimate , for the immeasurable variable of smuggling, two alternative variables including the Import price index and the level and severity of law and regulations are used, in order to considering this in the pattern. Virtual variable of law and regulations, which is mentioned as the SMUG1 in the equations, can take the value zero or one. The value 1 indicates the severity of law and regulations, and the value 0 indicates the lack of law and rules or in the other words enforcing the easy regulations in the foreign trade. High or low effective rate of tariff has been a criterion for choosing the value 1 or 0 for this variable in a particular year. In other words, the value 1 is included in the equations for years which the effective tariff rate has been higher than the average effective tariff rate during the mentioned date otherwise the value zero is included in the equations. The Import price index, which is shown as the SMUG2 in the equations will also be a value between zero and one and if the number increases toward the number 1, the Import price and also the smuggling will be increased, and if the number decreases toward the number 0, Import price and also the smuggling will be reduced.

7-Equations:

$$1- \ln (BME)_t = \alpha + \beta \ln(\text{PROD})_t + \delta (\text{SMUG1})_t + \epsilon_t$$

$$2- \ln (BME)_t = \alpha + \beta \ln(\text{PROD})_t + \delta (\text{SMUG2})_t + \epsilon_t$$

$$3- \ln (BME)_t = \alpha + \beta \ln(\text{RER})_t + \delta (\text{SMUG1})_t + \epsilon_t$$

$$4- \ln (BME)_t = \alpha + \beta \ln(\text{RER})_t + \delta (\text{SMUG2})_t + \epsilon_t$$

Where:

PROD: The ratio of output to input

BME: Black market exchange rate

SMUG1: Variable of law and regulations (as the alternative virtual variable for smuggling variable)

SMUG2: Import price index (alternative variable for smuggling)

The results show:

$$1-\text{Ln (BME)}_t = -84.59 + 9.15\text{Ln(PROD)}_t - 1.44(\text{SMUG1})_t$$

$$2-\text{Ln (BME)}_t = -56.84 + 6.33\text{Ln(PROD)}_t - 2.08(\text{SMUG2})_t$$

$$3-\text{Ln (BME)}_t = -84.59 + 9.94\text{Ln(RER)}_t - 3.15(\text{SMUG1})_t$$

$$4-\text{Ln (BME)}_t = -9.66 - 1.69\text{Ln(RER)}_t - 3.04(\text{SMUG2})_t$$

Table 1- Results of evaluating the stationary test on the surface of variables

Variable	Computational ADF	Appropriate interruption
Productivity	-1.2824	3
Tariff	-2.1218	0
Black market exchange rates	0.4025	0

The critical statistic is -3.0115.

Source: Research Findings

By comparing the critical and computational statistics, it has been concluded that none of the variables are static.

Table 2- Results of evaluating the stationary test on the process of variables

Variable	Computational ADF	Appropriate interruption
Productivity	-1.536	3
Tariff	-2.356	0
Black market exchange rate	0.648	0

The critical statistic is equal to -3.6593.

Source: Research Findings

Table 3- Results of evaluating the stationary test on the first order difference of variables

Variable	Computational ADF	Appropriate interruption
Productivity	-3.5110	2
Tariff	-5.3020	0
Black market exchange rate	-3.0747	0

The critical statistic is equal to -3.0192.

Source: Research Findings

Table 4- Structural break test on the intercept of trend function

Variable	Phillips Peron statistics
Productivity	-1.4298
Tariff	-2.3481
Black market exchange rate	-1.6946

The critical statistic is equal to -3.68.

Source: Research Findings

Table 5- Structural break test on the slope of trend function

Variable	Phillips Peron statistics
Real exchange rate	-1.5735
Productivity	-2.8567
Tariff	-2.5023
Black market exchange rate	-1.6014

The critical statistic is equal to -3.65.

Source: Research Findings

Table 6- Structural break test on the intercept of trend function

Variable	Phillips Peron statistics
Productivity	-1.4298
Tariff	-2.3481
Black market exchange rate	-1.6946

The critical statistic is equal to -3.68.

Source: Research Findings

Table 7- Structural break test on the intercept and slope of trend function

Variable	Phillips Peron statistics
Productivity	-1.655
Tariff	-1.787
Black market exchange rate	-1.654

The critical statistic is equal to -3.75.

Source: Research Findings

Table 8- Results of error correction pattern test

Effect of independent variable on the	Error correction coefficient	Standard error	T statistic
Black market exchange rate in the equation 1	-0.0502	0.0265	-1.8941
Black market exchange rate in the equation 2	-0.01924	0.0149	-2.8510
Black market exchange rate in the equation 3	-0.01824	0.05421	-1.2838
Black market exchange rate in the equation 4	-0.02151	0.01625	-0.3239

Table 9- Stationary test on the remaining sentences

Effect of independent variable on the	Computational statistics
Black market exchange rate in the equation 1	-0.8829
Black market exchange rate in the equation 2	-0.5026
Black market exchange rate in the equation 3	-1.5312
Black market exchange rate in the equation 4	-1.0516

The critical statistic is equal to -0.365.

Source: Research Findings

Conclusion:

After estimating the long-term relationships, the values of coefficients, and their signs, results indicate:

There is an inverse relationship between the Import Price Index and the virtual variable of regulations and laws (as replacement of smuggling) with the black market exchange rate, so we can say that the tested hypothesis in this study is rejected.

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