Effect of Exchange Rates and Oil Prices in Export of Agricultural Products: The Example of Turkey

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Extensive Summary

1. Introduction

Agricultural products are so important export goods to compensate trade deficit in terms of balance of payments in developing countries. However, recently the unit price of agricultural goods tends to increase remarkably. An increase in price of agricultural production is the function of input item because, agricultural production is sensitive for energy prices with high level. For that reason, the export of agricultural products triggers the countries' gasoline imports considerably. Furthermore, both agricultural production and exporting its goods are depend mostly on imported fertilizer and seed. Therefore, a change in exchange rate can influences the cost of raw material of agricultural production as well.

There are different views and discussion regarding the relationship between exchange rate and export volume. Two different opinion exist about the relationship of variables. According to standard theory, the direction of the causality is from the change of external trade to real exchange rate. According to first approach, recovery of external trade causes the flow of income transfer from outside to inside of countries and the domestic market prices will increase more comparing to foreign markets. According to second approach which is reflection theory, there is causality from exchange rate to external trade.

The similar relationship of export volume and exchange rate is existed for energy price and export volume. The one of the most important factor of production cost is energy cost which influences export prices directly. The impact of exchange rate and oil price on agriculture goods exports are examined clearly. Recently, two exchange rate regimes are implemented in Turkey. Change in exchange rate is analyzed after adapting floating exchange rate regime in Turkey.

2. Methodology

In methodology part of this paper, econometrical analysis is used including multivariate regression, ADF unit root test, Johansen co-integration test, VAR analysis Impulse response and variance decomposition. First, the effect of oil price and exchange rates on agricultural goods have been discussed in this paper. Agricultural good is determined as dependent variable and oil price and exchange rates are determined as independent variable. Multivariate regression test is implemented to reveal the effect of oil price and exchange rates on agricultural goods. Data are derived from International Trade Center as monthly and they all used in econometrical analysis.

Besides, Johansen co-integration test is implemented to determine long-run linkage among relevant variables. After determining that the VAR analysis is stationary, both impulse response and variance decomposition analysis are used to comprehend which independent variable affects more the dependent variable comparing other independent variable. In this paper, according to econometrical findings, there is long-run linkage among variables and both oil price and exchange rates influence agricultural goods.

3. Findings

First, multivariate regression is used to determine the impact of agricultural goods on oil price and exchange rates. The logarithm of data is taken to prevent variance booming. According to results of multivariate regression, score of p-value for oil price is 0.00 and p-value for exchange rate is 0.00 which is significant findings. Thus, there is positive correlation between oil price, exchange rates and agricultural goods.

There is no autocorrelation and the evidence are; Durbin Watson test is scored as 1.90 which is closest to 2. Second proof is the score of AR(1) is 0.00 which should be less than 0.05 to comprehend that there is no autocorrelation. The last proof is residuals distributed randomly which is demonstrated at Figure 1 above. On the other hand, the score of @trend is more than 0.05 that there is no spurious relationship between variables. Therefore, the multivariate regression model is correct and accepted as true.

Afterwards, time series analysis is implemented such as Johansen co-integration test to comprehend long-term relationship between variables. Firstly, ADF unit root test is used to determine that the series is stationary or not. According to test results of ADF, the series are not stationary at I(0). After converting from I(0) to I(1) it scored as stationary except the series of agricultural goods. For that reason, all series are converted from I(1) to I(2) including the series of agricultural goods. Consequently, all series are converted as stationary at Table 2. Above. According to co-integration test results there is long-term relationship between oil price, exchange rates and agricultural products which is scored as 0.00, 0.01 and 0.03.

Finally, VAR analysis is implemented to execute impulse response and variance decomposition analysis. VAR is stationary that all points are remained within the same circle at Figure 2. above. According to results of impulse response and variance decomposition analysis oil price influence more the agricultural good in comparison with exchange rate which is scored as 0.95. In the light of this findings, government should concentrate more on alternative energy resources such as wind power, solar energy to compensate the deficit of trade.

4. Conclusion and Discussion

To sum up, agricultural goods are essential by providing energy resources and its strategical importance to increase competition among international markets. The production of agricultural goods is so vital via petroleum resources which increases strategic advantage of its significance. Therefore, agricultural goods exporting countries should develop supportive policy for producing agricultural goods due to lack of petroleum resources.

According to empirical results of this work, the price level of oil carry weight in terms of exporting agricultural products. Some working paper and academic article have mentioned about agricultural product, oil price and exchange rate. According to research results of Bond (1983), Mitchell (2008), Trostle (2008), Harri, Nalley and Hudson (2009) and Nazlioglu and Soytas (2011) both oil prices and exchange rate affects agricultural goods which is consistent with this papers' findings.

A rise in energy price triggers the cost of transportation and fertilizer and affects the input of agricultural goods in terms of price indirectly. Rising the price level of exchange rate and oil price affects the agricultural producer companies negatively and due to that fact, they cannot compete in domestic and international market. The government should take measures to make the firms and companies as more persevering by investing more in alternatives sources including wind power and solar energy.