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Effects of Trade Openness, Exchange Rate, and Oil Price on the Exports in Syria

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Abstract

This study attempts to test the effect of trade openness, exchange rate and oil price on the exports in Syria over the period 1970-2010. The cointegration test indicates that exports are positively related to trade openness and oil price, but negatively related to exchange rate. Exchange rate has the biggest effect on the exports. The Granger causality test indicates bidirectional causality relationships between trade openness, exchange rate, oil price and exports in the short and long run. The study result indicates that, in order to boost the Syrian exports, it is vital for the Syrian government to open up the Syrian economy to foreign trade, decline the Syrian pound exchange rate, improve the quality of the Syrian exports, and decline the crude oil exports.

Keywords: Syria, exports, trade openness, exchange rate, oil price, VAR.

Introduction

Export plays an important role in developing the economy, and it is a main source of foreign exchange earnings for the state budget. Besides, export is an essential component in the national income of Syria and it has an important role in supporting the national economy. Moreover, the strategic location of Syria on major trade routes between the east and west has given it a significant role and increased its interest in foreign trade (Hamwi, 2005).

Syrian exports comprise primary products, oil, agriculture products, food, textiles, cotton, clothing and leather products (Ismail, Mustafa and Vernengo, 2005). Before 1991, the main markets for Syrian exports were the East European countries, but after the collapse of the Soviet Union in 1991, the European Union markets became the main markets for Syrian exports (Naial, 1996). Moreover, the largest market for Syrian primary products exports is the European Union markets, and the largest market for Syrian manufacturing and semi-manufacturing exports is the Arab countries' markets (Ismail, Mustafa and Vernengo, 2005).

Exports were controlled by the state until the late 1980s. Then the government has started gradually with an economic reform program from the beginning of the 1990s by encouraging the private sector and giving it more facilitation for foreign trade. For example, the government offered various facilities to Syrian exporters, and handed its monopoly on some exported goods to the private sector (ERF, 2005). Most importantly, the trade plans developed by the government seek to transform the Syrian economy from a relatively low productivity economy to an economy with a competitive production capacity, by improving the production base, creating an attractive

investment climate, and using modern technology to develop the production and trade with Arab and foreign countries (SPC, 2005). Moreover, since the beginning of the twenty-first century, the government has worked much harder to liberalize foreign trade, opening up to the global markets, and provide the requirements for economic and social development. In addition, the government has passed hundreds of laws and legislations to improve foreign trade, prevent monopoly, enhance transparency of the trading system, and improve the quality of exports.

Figure 1 shows a big rise in the total value of exports in the 21st century. Exports increased from USD 5129.92 million in 1999 to USD 20894.55 million in 2010. This increase is due to the export strategy that was adopted by the Syrian government to remove export barriers and offer more exports facilitation processes such as exempting Syrian exports from export authorization, taxes, and fees (Al-iqtissadiya, 2004). Furthermore, the increase in the value of crude oil exports with the increase in the international oil prices since the second half of 1999 have helped to increase exports. In addition, signing on many trade agreements with different countries, and creating free trade zones have given a positive effect on Syrian exports (Ismail, 2005). However, because of the global financial crisis in 2009, Syrian exports declined to USD 15681.91 million.

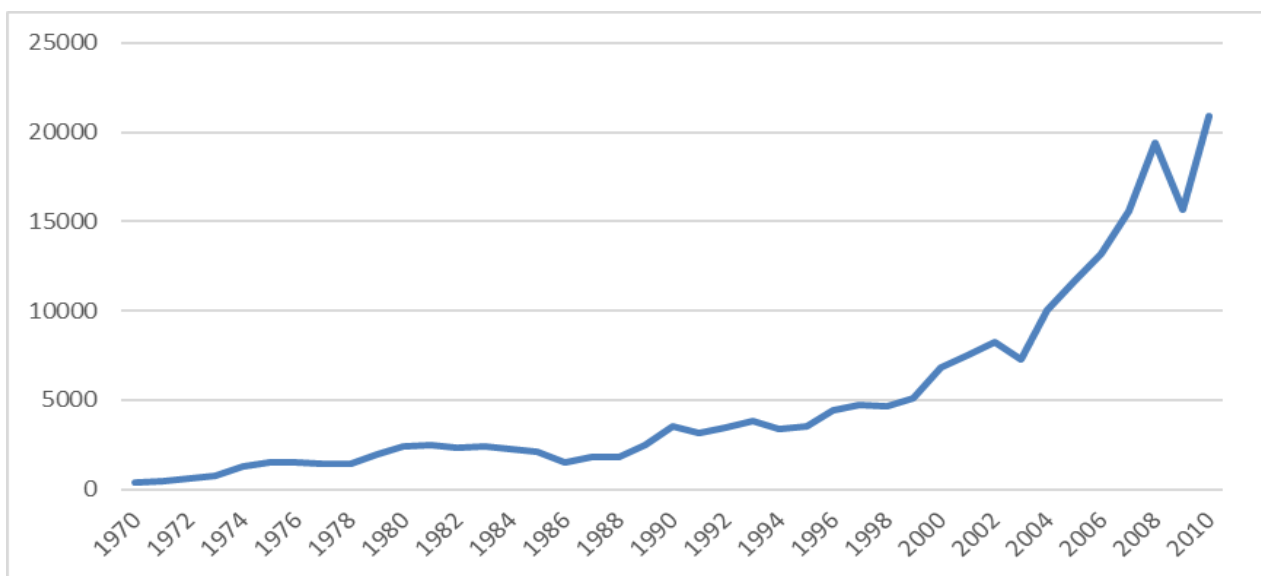


Figure 1 Syrian exports, at current prices, in million USD, 1970-2010 (World Bank)

Unfortunately, the war which started in 2011 has caused a huge damage on the Syrian economy, and created a new situation quite different than in before 2011. Many factories have been destroyed, investment has been declined, the infrastructure has been damaged, foreign trade has been declined, the deficit in the trade balance has increased, the depreciation of the exchange rate of the Syrian pound has increased, and many oil wells have been controlled by the terrorists (SCPR, 2014).

Given this backdrop, the aim of this study is to test the effect of trade openness, exchange rate and oil price on exports in Syria during the period 1970-2010, which may assist Syrian policy maker, after stopping the war, to develop an economic plan that takes into account the effect of trade openness, exchange rate and oil price on exports. The organization of this study is as follows. The next section is the literature review and Section 3 provides a brief discussion on the methodology. Section 4 reports the empirical results, and the conclusion and recommendations are presented in Section 5.

Previous Studies

Many studies investigated the effect of trade openness, exchange rate and oil price on exports of different countries. A few studies have been taken for review:

The World Development Report (1987) showed that countries which follow outward-oriented trade strategies have outperformed in export growth, income growth, savings, and employment, compared to other countries that adopt inward-oriented trade strategies (World Bank, 1987).

Besides, Thomas et al (1991), Weiss (1992), Helleiner (1994), Jenkins (1996), Joshi and Little (1996), Bleaney (1999), Ahmed (2000), Santos-Paulino and Thirlwall (2004), Edwards and Alves (2006), Wu and Zeng (2008), Anwar et al (2010), Hoque and Yusop (2012), and Allaro (2012) found that trade openness has a positive impact on exports.

However, Enimola (2011) found that trade openness has a negative and insignificant effect on exports in Nigeria, because the policies that are used to liberalize the trade are not effective enough to stimulate export, but there is a positive and significant relationship between exports and real exchange rate. Majeed and Ahmad (2006) also found that real exchange rate has a positive significant effect on exports for 75 developing countries. Hasanov and Samadova (2010) concluded that real exchange rate is one of the main factors that affect non-oil export growth in Azerbaijan, and non-oil export is affected negatively from real exchange rate. Besides, Homayounifar and Rastegari (2008) found that increase in real exchange rate of countries that have a trade relation with Iran affects negatively Iran's non-oil exports, because increase in exchange rate of these countries leads to a decline in exchange rate in Iran, then the prices of Iran's export goods will decline, which drive Iran to decrease its exports. Furthermore, Hatab et al (2010) found that the depreciation in Egyptian pound improves Egypt's agricultural exports. Erdal et al (2012) found that there is a positive unidirectional causality relationship moving from the real exchange rate volatility to agricultural export in Turkey.

In the other hand, Mohammad (2010) found that oil price volatility affects negatively export earnings in Pakistan, because the increase in oil price cases a rising in inflation and increasing in the prices of each item in the basket of commodity, than the aggregate demand will decline, and that will cause a reduction in output level. Rising in oil prices also causes an increase in import bill which affect on current account balances in Pakistan, and that also will cause a negative effects on output level. However, Hassani and Nojoomi (2010) found that oil price, Iranian oil production, and Iranian oil proved reserves positively affect Iran's oil export revenues, while world oil production and domestic oil consumption negatively affect Iran's oil export revenues in the long term.

Methodology

The vector autoregression (VAR) model will be used in this study. Our model consists of four variables: exports, tread openness, exchange rate, and oil price in Syria. Export is the dependent variable. The model is presented as follows:

$$\ln EXP = \alpha + \beta_1 OPEN + \beta_2 \ln EXR + \beta_3 \ln OP + \varepsilon_t$$

where α is the intercept, β_1 , β_2 , and β_3 are the coefficients of the model, $\ln EXP$ is the natural log of exports in real value (millions of SYP), $OPEN$ is the tread openness (the percentage of total exports and imports to GDP), $\ln EXR$ is the natural log of real exchange rate (US dollars per Syrian pound), $\ln OP$ is the natural log of oil price (US dollars per barrel), and ε_t is the error term.

The analysis begins with the unit root test to determine whether the time series data are stationary at levels or first difference. The Augmented Dickey Fuller (ADF) unit root test is used in this study to test for the stationary of the variables. After determining the order of integration of each of the time series, and if the variables are integrated of the same order, the Johansen cointegration test will be used to determine whether there is any long-run or equilibrium relationship between exports and the other independent variables in the model. If we found that the variables are cointegrated, the Granger causality tests will be conducted based on the VECM to determine the causality relationships among variables. On the other hand, if there is no cointegration among the variables, the VAR model will be employed to test for short-run Granger causality between the variables. Lastly, impulse response functions (IRF) test and variance decomposition (VD) analysis are used in this study to help in determining whether the independent variables play any important role in explaining the variation of exports at short and long forecasting horizons.

This study uses annual time series data of Syria during the period from 1970 to 2010. This data collected from the World Bank and United States Energy Information Administration. All data in this study will be expressed in the logarithmic form, except for $OPEN$.

Empirical Results and Discussion

From the results of the ADF unit root test in Table 1, we can see that all the variables are not stationary at the levels, but became stationary after first differencing at least at the 5 percent level of significance. This means that all the variables are integrated of order 1, that is, I (1).

Table 1: ADF unit root test results

ADF	Level			First difference		
	Intercept	Trend and intercept	None	Intercept	Trend and intercept	None
lnEXP	-1.074682	-2.425237	3.620430	-5.440409***	-5.357166***	-4.330685***
OPEN	-1.831914	-2.484195	0.319275	-7.536732***	-7.446232***	-7.525128***
lnEXR	-1.114265	-1.838314	0.691528	-6.250015***	-6.178614***	-6.161154***
lnOP	-1.840498	-2.059197	1.278568	-5.723066***	-5.688067***	-5.393166***

Note: *** Denotes significance at the 1 per cent level, and ** at the 5 per cent level.

1. Johansen Cointegration Test Results

After determining that all the variables are stationary in the first difference, we can use the cointegration test to determine the presence of any cointegration or long-run relationship among the variables based on the Johansen cointegration test. But before running the cointegration test, we run the VAR model first to determine the optimal lag length, based on the minimum Akaike Information Criterion (AIC). The maximum lag has been set to 5 in the lag length selection process. The optimal lag length selection is 2 lags based on the AIC.

After we have determined the number of lags, we proceed with the cointegration test for the model. Table 2 shows that there is one cointegration equation based on the trace and maximum eigenvalue tests. In other words, the results indicate that there is a long-run relationship between lnEXP, OPEN, lnEXR, and lnOP.

Table 2: Johansen cointegration test results

No. of CE(s)	Trace Statistic	Probability	Max-Eigen Statistic	Probability
$r = 0$	63.00076***	0.0065	29.69281**	0.0360
$r \leq 1$	33.30795	0.0788	17.85287	0.1864
$r \leq 2$	15.45508	0.2014	9.604986	0.3717
$r \leq 3$	5.850093	0.2026	5.850093	0.2026

Note: *** Denotes significance at the 1 per cent level, and ** at the 5 per cent level

After having found a cointegration relationships among the variables lnEXP, OPEN, lnEXR, and lnOP, the cointegrating equation was normalized using the real EXP variable. Table 3 shows the normalized cointegrating vector.

Table 3: Cointegration equation normalized with respect to EXP

lnEXP	OPEN	lnEXR	lnOP	C
1.000000	-0.229935	1.025716	-0.271649	-22.94339
	(0.04197)	(0.29094)	(0.05432)	(2.02601)

From the Table 3, the long-run lnEXP equation can be written as:

$$\ln EXP = 22.94339 + 0.229935 \text{ OPEN} - 1.025716 \ln EXR + 0.271649 \ln OP$$

The cointegration equation above shows that the EXP is positively related to OPEN and OP, but negatively related to EXR.

The coefficient of OPEN indicates that for every one unit increases in trade openness, exports will increase by 22.9 percent. This suggests that trade openness has an important role in supporting exports through opening up new markets for local products and reducing restrictions that affect exports, such as export taxes, and export's complex procedures. Our result agree with Wu and Zeng (2008), Anwar et al (2010), Hoque and Yusop (2012), and Allaro (2012). The coefficient of lnEXR indicates that for every one percent increases in exchange rate, exports will decrease by 1.03 percent. An increase in Syrian exchange rate indicates appreciation of the Syrian pound relative to the US dollar. When the Syrian pound appreciates, the prices of the Syrian products in international markets will increase and be more expensive compare to foreign products, which led to decline the external demand on the Syrian products. However, depreciation of Syrian pound will cause the Syrian products to be cheaper than the prices of foreign products, which raise the external demand on the Syrian products. Majeed and Ahmad (2006), and Hasanov and Samadova (2010) also found that an appreciation of the local currency has a negative effect on exports. The coefficient of lnOP indicates that for every one percent increases in oil price, exports will increase by 0.27 percent. Oil is one of the main exports in Syria, and its percentage share is more than 30% of total Syrian exports. Hence, oil price increases cause a rise in oil exports in the country, which in turn increases the total value of Syrian exports. Our result is in line with Hassani and Nojoomi (2010) who found that oil price affects exports positively.

2. Granger Causality Tests Results

Since the variables in the model are cointegrated, the Granger causality tests based on the VECM are used to determine the short and long run causal relationships among the variables. The Granger causality test results based on the VECM are shown in Table 4. The significance of the coefficient of the lagged error correction term shows the long run causal effect. It is clear from Table 4 that there are bidirectional causality relationships between OPEN, lnEXR, lnOP and lnEXP in the short and long run.

Table 4: Granger causality test results

	Independent variables				
	$\sum \Delta \ln EXP$	$\sum \Delta OPEN$	$\sum \Delta \ln EXR$	$\sum \Delta \ln OP$	ect(-1)
$\Delta \ln EXP$	-	3.642218(3)**	4.03547(4)**	2.680017(2)*	-2.132158**
$\Delta OPEN$	2.485034(2)**	-	3.10424(3)**	0.423085(2)	-2.014217**
$\Delta \ln EXR$	4.324101(3)**	2.301035(2)**	-	0.075823(2)	-2.962730**
$\Delta \ln OP$	2.501434(2)**	3.150811(2)*	1.009182(2)	-	-2.211756**

Notes: ect(-1) represents the error correction term lagged one period. The numbers in the brackets show the optimal lag based on the AIC. D represents the first difference. Only F-statistics for the explanatory lagged variables in first differences are reported here. For the ect (-1) the t-statistic is reported instead. ** denotes significance at the 5 per cent level and * indicates significance at the 10 per cent level.

3. Impulse Response Functions (IRF) Test Results

Impulse response functions (IRF) allow us to study the dynamic effects of a particular variable's shock on the other variables that are included in the same model. Besides, we can examine the dynamic behavior of the times series over ten-year forecast horizon. Figure 2 shows

that when there is a shock to OPEN or lnOP, lnEXP will respond positively in the following years. This shows the important role of the trade openness and oil price in boosting exports in the country. While, when there is a shock to lnEXR, lnEXP will respond negatively in the following years, because any depreciation of the Syrian pound makes the Syrian products cheaper than foreign products, which in turn leads to the increase in the foreign demand for Syrian products.

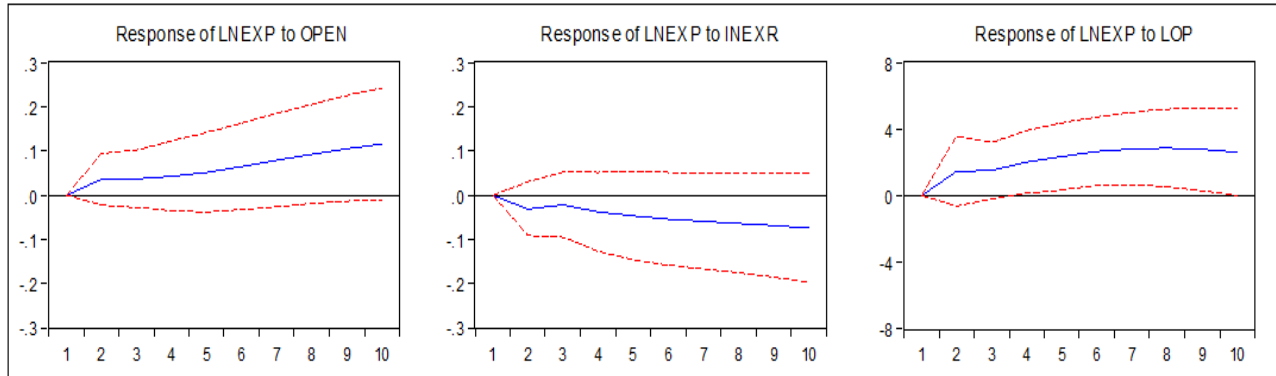


Figure 2. Impulse response functions (IRF) results

4. Variance Decomposition (VD) Analysis Results

The variance decomposition (VD) for 1-year to 10-year forecast horizons will be applied to explain how much of the uncertainty concerning the prediction of the dependent variable can be explained by the uncertainty surrounding the other variables in the same model during the forecast horizon.

The forecast error variance decompositions of the variables in our model are given in Table 5. In the first year, the error variance of EXP is exclusively generated by its own innovations and has been decreasing since then for the various forecast horizons. However, at the 10-year forecast horizon, its own shocks contribute about 50% of the forecast error variance. On the other hand, OPEN, lnEXR and lnOP shocks explain 24%, 12% and 14% respectively of the forecast error variance of EXP. Furthermore, the contributions of OPEN, lnEXR and lnOP in explaining lnEXP forecast error variance have increased during the 10-year forecast period.

Table 5: Variance decomposition (VD) analysis results

Period	S.E.	lnEXP	OPEN	lnEXR	lnOP
1	0.167998	100.0000	0.000000	0.000000	0.000000
2	0.229573	95.74418	2.415561	1.829450	0.010805
3	0.272212	93.76557	3.554366	1.911628	0.768433
4	0.302535	89.11321	4.922349	3.120450	2.843994
5	0.329335	83.14711	6.597840	4.602851	5.652196
6	0.355010	76.30527	9.013991	6.281390	8.399353
7	0.380783	69.28058	12.16135	7.864026	10.69405
8	0.407292	62.40433	15.87140	9.345273	12.37899
9	0.434695	55.98342	19.83617	10.72167	13.45873
10	0.462832	50.20374	23.75961	12.01883	14.01782

Conclusion

This study investigated the effect of trade openness, exchange rate and oil price on the exports in Syria using annual time series data from 1970 to 2010. The model has four variables, with the exports as the dependent variable. The ADF unit root test, Johansen cointegration test, Granger causality tests, impulse response functions (IRF), and variance decomposition (VD) analysis were used in this study. The ADF test results indicate all variables are I(1). The Johansen cointegration test showed that trade openness and oil price have a positive and significant long-run relationship with exports, while exchange rate has a negative and significant long-run relationship with exports. Furthermore, from the Granger causality tests, we found that there are bidirectional causality relationships between trade openness, exchange rate, oil price and exports in the short and long run. The impulse response functions (IRFs) indicated that when there is a shock to trade openness or oil price, exports will respond positively in the following years, while when there is a shock to exchange rate, exports will respond negatively. The variance decomposition (VD) analysis showed that over a ten-year forecasting horizon, trade openness, exchange rate and oil price shocks explain 24%, 12% and 14% respectively of the forecast error variance of exports.

Based on the results of this study, trade openness makes the process of export much easier, which in turn motivates exporting in the country. Besides, depreciation of the Syrian pound increases the external demand for Syrian products, which in turn boosts the Syrian exports. Hence, it is vital for the Syrian government to open up the Syrian economy to foreign trade, improve the quality on the Syrian exports, and decline the Syrian pound exchange rate. Furthermore, fluctuation in the oil price may plays an important role in increasing or decreasing the total value of Syrian exports, because oil has a big percentage share of total Syrian exports. Therefore, it is vital for the Syrian government to decline the oil exports in order to reduce the impact of oil price fluctuations on the total Syrian exports.

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