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Effects of Exports and Investment on the Economic Growth in Syria

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Abstract

This study attempts to test the effect of exports and investment on the Syrian economy over the period 1960-2010. The cointegration test indicates that GDP is positively and significantly related to exports and investment. The Granger causality test indicates unidirectional causality relationship running from exports to GDP, and bidirectional causality relationships between investment and GDP in the short and long run. The study result indicates that the government's economic policy in enhancing exports and encouraging investment was a successful policy to improve the Syrian economy.

Keywords: Syria, economic development, growth, exports, investment, VAR

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Introduction

Exports can support the national economy by supplying the state budget with earnings and foreign currency that can be used for importing capital and intermediate goods, which help in increasing and improving output, and by motivating producers to increase and improve their production, and encouraging both local and foreign investment in the country. Investment also supports the local economy by creating new job opportunities, and producing goods and services for domestic consumption and exporting.

Based on the important role of exports and investment in supporting the national economy, the Syrian government has worked hard, since the beginning of the 21st century, to enhance exports and encourage investment in the country by diversification

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of exports, enhancing the competitiveness of the Syria production, liberalizing foreign trade, improving the production base, creating an attractive investment climate, improving the infrastructure, opening up the Syrian economy to foreign trade and investment, establish industrial cities, and using modern technology to develop production and trading with different countries. Figure 1 below shows a big rise in the value of exports, investment and GDP of Syria in the 21st century. Exports increased from USD 6839 million in 2000 to USD 20895 million in 2010, investment increased from USD 3337 million in 2000 to USD 11130 million in 2010, and GDP increased from USD 19326 million in 2000 to USD 59147 million in 2010 (see Figure 1).

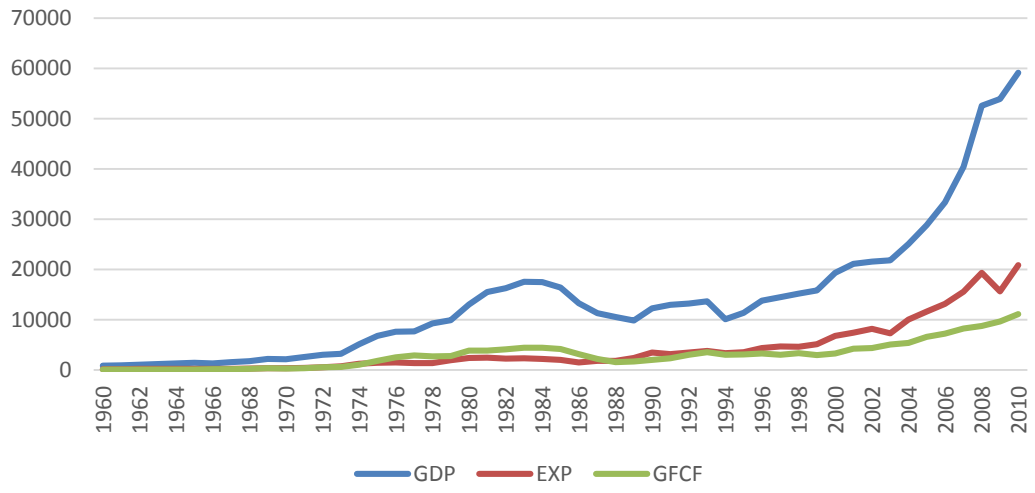

Figure 1. GDP, exports and gross fixed capital formation, at current price, in millions of USD, 1960-2010. (World Bank)

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

Given this backdrop, the aim of this study is to investigate the effect of exports and investment on the economic growth of Syria over the period 1960-2010, in order to know whether the government's economic policy in enhancing exports and encouraging investment was a successful policy, and if it is good for the Syrian government to still adopt the same policy after stopping the war. The dependent variable in this study is the GDP. While, exports and gross fixed capital formation are the independent variables. 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 that tested the effect of exports and investment on economic growth of different countries. A few studies have been taken for review:

Many empirical studies, including Tyler (1981), Balassa (1985), Ram (1987), Krueger (1990), Khan and Saqib (1993), and Sengupta and Espana (1994) have tested the role of exports in economic growth and found that there was a positive relationship between exports and economic growth. Al-Yousif (1997) also found that there is a positive and significant impact of exports on economic growth in four Arab Gulf countries. Al-Suwaidi and Al-Shamsi (1997) concluded that there is a long run relationship between exports and economic growth in Egypt, and there is a unidirectional causality relationship running from economic growth to export. However, Abou-Stait (2005) indicated that GDP, imports and exports are not cointegrated, and exports cause growth, but there is no causality relationship between exports and investment in Egypt. Alhajhoj (2007) showed that there is a significant and long run relationship between exports and economic growth in Saudi Arabia, and there is unidirectional causality relationship running from export to GDP in the short and long run. AL-Bawab (2009) found that both exports and imports are bringing up GDP in Jordan. Hamuda et al (2010) concluded that there is a long run bidirectional causality relationship between export and GDP in Libya during 1980-2007. Furthermore, many other researchers such as Shirazi and Abdul-Manap (2004), Aljarrah (2008), Hye and Boubaker (2011), and Saad (2012) found that there is a positive relationship between exports and economic growth.

Other researchers tested the effect of investment on economic growth such as Kormendi and Meguire (1985), Levine and Renelt (1992), Mankiw et al (1992), Islam (1995), and Caselli et al (1996) who found that investment has a positive effect on economic growth. Moreover, Ramirez and Nazmi (2003) found that investment supports the economic growth for nine major Latin American nations. Aka (2007) also found that investment affects positively the economic growth in Ivory Coast. Bukhari et al (2007) fund that investment has a long-term effect on economic growth in Korea, Singapore and Taiwan. Vo (2010) found that net private capital helps to improving economic growth in South Korea, Malaysia, Indonesia, Thailand and the Philippines. In addition, Kandenge (2010) found that economic growth in Namibia is affected positively and significantly by investment, economic freedom, exports, imports, human capital and labor. While, real exchange rate and terms of trade affect it negatively. Hammam (2010) also found that there is a significant and positive effect of investment in infrastructure, gross fixed capital formation, household consumption expenditure, foreign direct investment, taxes on international trade and exports on economic growth, while the government consumption expenditure has a significant and negative impact on the economic growth of Egypt. Furthermore, many other researchers such as Qine et al (2006), Loncan (2007), Tang et al. (2008), Merican (2009), Adams (2009), Adhikary (2011) and Soliu and Ibrahim (2014) found that investment has a positive effect on economic growth. However, Elboiashi et al. (2009), and Hooi and Wah (2010) concluded that increase of investment will depreciate GDP growth.

Methodology

The vector autoregression (VAR) model will be used in this study. Our model consists of three variables: the gross domestic product (GDP), exports, and gross fixed capital formation in Syria. GDP is the dependent variable. The model is presented as follows:

$$lnGDP = \alpha + \beta_1 lnEXP + \beta_2 lnGFCF + \varepsilon_t$$

where α is the intercept, β_1 and β_2 are the coefficients of the model, *lnGDP* is the natural log of gross domestic product in real value (millions of SYP), *lnEXP* is the natural log of export in real value (millions of SYP), *lnGFCF* is the natural log of gross fixed capital formation in real value (millions of SYP), 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 the GDP 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. Furthermore, the VECM will be subjected to the statistical diagnostic tests, namely, normality, serial correlation, heteroskedasticity and Ramsey RESET tests to ascertain its statistical adequacy. 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 GDP at short and long forecasting horizons.

This study uses annual time series data of Syria during the period from 1960 to 2010. This data collected from the World Bank. All variables in this study are in real value. Besides, all data will be expressed in the logarithmic form.

Empirical Results and Discussion

From the results of the ADF unit root test in Table 1, we can see that the three 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
lnGDP	-0.965873	-1.671718	2.865867	-5.319012***	-5.287074***	-4.129823***
lnEXP	-0.231398	-1.898244	4.235502	-6.765979***	-6.688559***	-5.165844***
lnGFCF	-1.593130	-1.851172	1.880108	-4.376817***	-4.432811***	-3.779701***

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

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. The maximum lag has been set to 5 in the lag length selection process. The optimal lag length selection is 1 lags.

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 lnGDP, lnEXP, and lnGFCF.

Table 2. Johansen cointegration test results

No. of CE(s)	Trace Statistic	Probability	Max-Eigen Statistic	Probability
r = 0	27.10429***	0.0000	17.22912**	0.0397
r ≤ 1	9.875169	0.6521	5.954900	0.7930
r ≤ 2	3.920269	0.4241	3.920269	0.4241

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, the cointegrating equation was normalized using the real GDP variable. Table 3 shows the normalized cointegrating vector.

Table 3. Cointegration equation normalized with respect to GDP

lnGDP	lnEXP	lnGFCF	C
1.000000	-0.531913	-0.375504	-5.956736
	(0.14421)	(0.14653)	(0.99086)

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

$$lnGDP = 5.956736 + 0.531913\ lnEXP + 0.375504\ lnGFCF$$

The cointegration equation above shows that the GDP is positively related to EXP and GFCF. The coefficient of EXP indicates that for every one percent increases in exports, the GDP will increase by 0.532 percent. This suggests that exports play an important role in promoting economic growth in the country. An increase in exports motivates producers to increase and improve their production. Exports also supply the state budget with earnings and foreign currency that can be used for creating an attractive investment climate, improving the production base, importing capital and intermediate goods, and using modern technology in the production activities, which encourage investment in the country, and that helps in increasing and improving output growth. Our finding is in line with Shirazi and Abdul-Manap (2004), Aljarrah (2008), Hye and Boubaker (2011), and Saad (2012)

The coefficient of lnGFCF indicates that for every one percent increases in investment, the GDP will increase by 0.376 percent. Investment can support the national economy by producing goods and services, creating new job opportunities, and enhancing exports and imports in the country. Besides, an increase in investments creates a high degree of competition in the local market, which motivates producers to use modern management and new technology in their production activities in order to increase the quality and quantity of their production, and that also helps in increasing and improving output growth in the country. This finding agrees with the results obtained by Qine et al (2006), Loncan (2007), Tang et al (2008), Merican (2009), Adhikary (2011) and Soliu and Ibrahim (2014).

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 that there are unidirectional causality relationship running from lnEXP to lnGDP, and bidirectional causality relationships between lnGFCF and lnGDP in the short and long run.

Table 4. Granger causality test results

	Independent variables			
	∑Δ lnGDP	∑Δ lnEXP	∑Δ lnGFCF	ect(-1)
Δ lnGDP	-	2.349577(6)*	2.074422(7)*	-2.559709**
Δ lnEXP	0.515957(7)	-	1.221798(7)	-1.527595
Δ lnGFCF	2.167365(3)*	7.202756(3)**	-	-2.075444**

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.

Statistical Diagnostic Tests Results

It is important to subject the VECM to a number of diagnostic tests, namely, the normality, serial correlation, heteroskedasticity (BPG and ARCH) and Ramsey RESET tests to ascertain its statistical adequacy. A 5% level of significance will be used in all these tests. The results of the diagnostic tests are reported in Table 5. The VECM with lnGDP, lnEXP, and lnGFCF as the dependent variables pass the normality, serial correlation, heteroskedasticity (BPG and ARCH) and Ramsey RESET tests.

Table 5. Results of the statistical diagnostic tests on the VECM

	Probability		
The Depended Variables	lnGDP	lnEXP	lnGFCF
Normality tests	0.445123	0.414234	0.408380
Serial correlation tests	0.597243	0.904438	0.281161
Heteroskedasticity (BPG) test	0.627311	0.925620	0.880175
Heteroskedasticity (ARCH) test	0.175303	0.894536	0.240775
Ramsey RESET tests	0.3219	0.6149	0.8502

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

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. There are many options for transforming the impulses. We will use the generalized impulse response functions (GIRF). Figure 2 shows that when there is a shock in lnEXP or lnGFCF, lnGDP will respond positively in the following years.

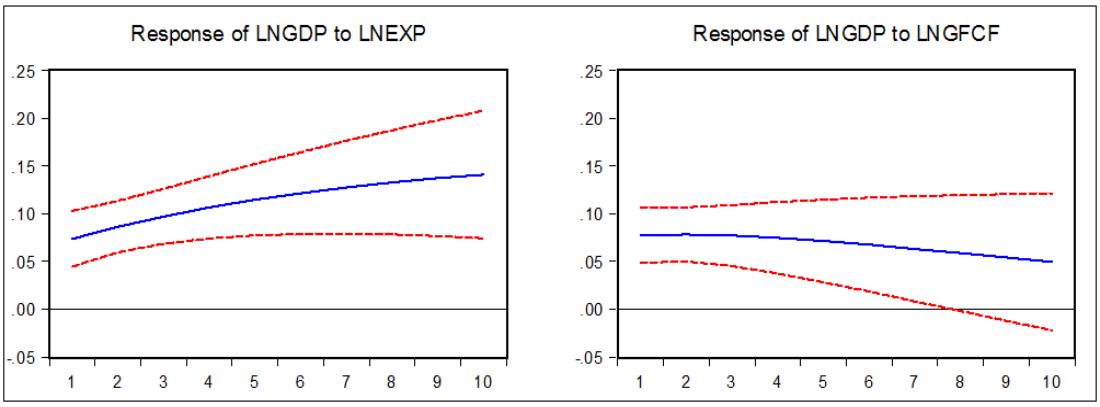

Figure 2. Generalized impulse response functions (GIRF) results

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 6. In the first year, the error variance of GDP 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, lnEXP and lnGFCF shocks explain 48% and 2% respectively of the forecast error variance of GDP. The contributions of lnEXP in

explaining lnGDP forecast error variance have increased during the 10-year forecast period, but there are no significant changes in the contribution of lnGFCF.

Table 6. Variance decomposition (VD) analysis results

Variance Decomposition of lnGDP:				
Period	S.E.	LNGDP	LNEXP	LNGFCF
1	0.118056	100.0000	0.000000	0.000000
2	0.161628	97.10510	2.402894	0.492004
3	0.195388	91.51671	7.249595	1.233698
4	0.225790	84.59089	13.50358	1.905526
5	0.254906	77.38648	20.25740	2.356123
6	0.283446	70.54385	26.89532	2.560833
7	0.311618	64.36495	33.07360	2.561445
8	0.339448	58.93917	38.63888	2.421950
9	0.366908	54.24387	43.55135	2.204774
10	0.393963	50.20746	47.83144	1.961091

Conclusion

This study investigated the effect of investment and exports on the economic growth of Syria using annual time series data from 1960 to 2010. The model has three variables, with the GDP 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 exports and investment have a positive and significant long-run relationship with GDP. Furthermore, from the Granger causality tests, we found that there are unidirectional causality relationship running from exports to GDP, and bidirectional causality relationships between investment and GDP in the short and long run. The impulse response functions (IRFs) indicated that when there when there is a shock to exports or investment, GDP will respond positively in the following years. The variance decomposition (VD) analysis showed that over a ten-year forecasting horizon, exports and investment shocks explain 48% and 2% respectively of the forecast error variance of GDP.

Based on the results of this study, it is vital for the Syrian government to enhance exports, encourage investment, create an attractive investment climate and improve the quality of the Syrian products in order to improve the Syrian economy. Finally, the government's economic policy in enhancing exports and encouraging investment was a successful policy to improve the Syrian economy. Hence, it is vital for the Syrian government to still adopt the same policy after stopping the war.

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