

The Relationship between Export and Economic Growth in Libya Arab Jamahiriya

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Abstract. *This study investigates the relationships between export and economic growth in Libya. An econometric model has been developed and estimated in order to determine the direction of causality in both, short and long run. The annual time series used for the estimation cover the time period 1980 – 2007.*

The findings indicate that the income, exports and relative prices are cointegrated. The long run bidirectional causality between the exports and income growth has been also proved. The study result indicates that the export promotion policy contributes to the economic growth in Libya.

Keywords: export; economic growth; Libya; cointegration; Granger causality; export led growth.

JEL Codes: F43, C32.

REL Codes: 10G, 16E.

Introduction

This paper uses a theoretically consistent method to test validity of the export-led growth (ELG) hypothesis for Libya. The current discussion is focused on whether a developing country would be better served by trade policies oriented toward import substitution or export promotion (Irwin, 2002, Shafaeddin, Pizarro, 2007, Jayanthakumaran, 1994, etc).

The import substitution strategies seek to promote rapid industrialization of the local production in order to substitute the imports needed to further economic development. Therefore, the government involves import trade barriers as tariffs, import quotas, etc. On the other hand, outward-looking development (or export led growth – ETC) strategies involve strategies supporting manufacturing sectors with a potential comparative advantage. This framework argues that international trade promotes specialization in production of export products, which in turn boosts the productivity level (Helpman, Krugman, 1985, Boomstrom, 1986) and causes the general level of skills to rise in the export sector. Then, it leads to re-allocation of resources from the inefficient non-trade sector to the trade sector and disseminating of the new management styles and production techniques through the whole economy (Feder, 1982, Lucas, 1988, Edwards, 1992). Thus, the entire economy would benefit due to the dynamic spill over of the export sector growth (Giles, Williams, 2000a, 2000b). An increase in exports improves the balance of payment and enlarges the foreign monetary reserves, which consequently enables the increase of investment goods import and facilities necessary for the domestic production growth (Chenery, Strout, 1966). The empirical evidence tends to support the notion that those economies, which actively pursue export promotion policy, have been more successful than those that have pursued import substitution policies.

The validity of the ELG hypothesis has not been proved uniformly. Giles and Williams (2000a) provide a comprehensive survey of more than 150 papers dealing with ELG. It should be noted that their list includes mostly developing countries.

In Arabic countries, the empirical investigation was performed by Abu-Qarn and Abu-Bader (2004) who conducted research covering 9 Middle East and North Africa countries. This analysis did not lead to the clear evidence of ELG hypothesis validity as well. Pop-Silaghi (2009) carried out the analysis using 10 Central and East European countries.

In this paper, we provide a survey of the ELG hypothesis validity in conditions of the Libyan economy.

Overview of Libya exports

The growth of Libyan economy is primarily determined by the oil market development. The discovery of oil (in 1958) has changed the national economy from mostly agriculture oriented to the oil exporting country. Oil sources satisfy

approximately 95% of export earnings, 75% of the government receipts and 30-40% of the gross domestic product (Energy Information Administration, 2002). The nominal value of exports leapt from LD (Libyan dinars) 6489.2 million in 1980 to LD 40972.050 million in 2007.

As we mentioned earlier, most of the foreign currency comes mainly from the crude oil and the oil products export. As the result of this fact, the world oil price directly affects Libyan foreign trade development. The Libyan balance of payment will still be affected by the oil price movements and the overall economic development. Following this, the significant import increase in earlier 1980s (LD 4.3 billion) was induced by the oil price increase. Higher oil prices in 1999 and 2000 led to the export revenues increase that consequently improved macroeconomic conditions and stimulated the overall condition of the economy.

Libya export according to particular industrial branches is given in Table 1.

Table 1

Classification of Libyan export
(value in millions of Libyan dinars)

Item	2005		2006		2007	
	Value	%	Value	%	Value	%
Food products	2.3	0.0	1.0	0.0	0.1	0.0
Raw materials	3.5	0.0	2.5	0.0	1.4	0.0
Oil	30312.2	97.3	34891.2	96.0	39589.1	96.0
Chemicals	825.2	2.7	1224.0	3.4	1173.7	2.9
Manufactured goods	2.3	0.0	215.3	0.6	198.3	0.5
Machinery and transport equipments	2.5	0.0	0.3	0.0	0.1	0.0
Other exports	0.0	0.0	2	0.0	9.8	0.0
Total	31148.0	100.0	36336.3	100.0	40972.1	100.0

Source: Central Bank of Libya, Annual Reports, 2007.

The main trade partner of Libya is the European Union (83.8% of exports and 61.9% of imports). Italy imports approximately 30% of its oil needs from Libya. Libya dominant business partners come mostly from the European Union (particularly Italy, Germany, Spain and France), the United States, China and Turkey.

Model specification

Cointegration modelling jointly considered with the Granger causality methodology are commonly used by ELG hypothesis testing. According to this methodology, all considered time series are assumed to be integrated of order 1. Then, the integration order is tested in the first step. If this assumption is statistically rejected, then the estimation of the long term equilibrium relations among the

integrated time series is performed. Afterwards, the short run equations estimation according to the VECM theory is performed. In the final step of this analysis, the Granger causality test based on the multivariate framework is carrying out.

The short run system of equations is given as follows

$$\Delta \ln(Exp_t) = a_1 + \sum_{i=1}^{p1} b_{1i} \Delta \ln(Exp_{t-i}) + \sum_{i=1}^{p2} c_{1i} \Delta \ln(GDP_{t-i}) + \sum_{i=1}^{p3} d_{1i} \Delta \ln(Exr_{t-i}) + \alpha_1 \xi_{t-1} + u_{1t} \quad (1)$$

$$\Delta \ln(GDP_t) = a_2 + \sum_{i=1}^{q1} b_{2i} \Delta \ln(Exp_{t-i}) + \sum_{i=1}^{q2} c_{2i} \Delta \ln(GDP_{t-i}) + \sum_{i=1}^{q3} d_{2i} \Delta \ln(Exr_{t-i}) + \alpha_2 \xi_{t-1} + u_{2t} \quad (2)$$

$$\Delta \ln(Exr_t) = a_3 + \sum_{i=1}^{w1} b_{3i} \Delta \ln(Exp_{t-i}) + \sum_{i=1}^{w2} c_{3i} \Delta \ln(GDP_{t-i}) + \sum_{i=1}^{w3} d_{3i} \Delta \ln(Exr_{t-i}) + \alpha_3 \xi_{t-1} + u_{3t} \quad (3)$$

where the Exp_t denotes export, GDP_t denotes gross domestic product and variable Exr_t is exchange rate in time t . Coefficient α_j measures the sensivity of the j -th endogenous variable with respect to the deviation from the long-term equilibrium (error) ξ_t . If the estimated regression coefficients of the lagged export variables in (2) are significant, then the alternative hypothesis meaning that export Granger-causes economic growth is accepted. In other words, the ELG hypothesis is supported. Furthermore, if the export is involved in the long-term cointegrating relationship, the ELG hypothesis is supported only if the coefficient of the lagged error-correction term ξ_{t-1} is significant. Then, change of an independent variable may be interpreted as representing the short-run causal impact while the error-correction term provides the adjustment of export and economic growth toward their respective long-run equilibrium. Thus, the VECM representation allows us to differentiate between the short- and long-run dynamic relationships.

Data source

The empirical analysis is conducted using annual observations of GDP, exports, and exchange rate covering the periods 1980-2007. All data were obtained from the Secretariat of Economic and Planning, Central Bank of Libya, Research and Statistics Department Planning and Programming Department/Public Planning Council 1962-2000 and World Development Indicators 2003 CD-ROM. To stabilize heteroscedasticity, data were transformed into their logs.

Estimation and results

Table 2 summarizes the time series unit root test results. In all cases, the null hypotheses of the time series being integrated of order 1 cannot be rejected. However, in case of differenced time series, the null hypothesis is rejected in all

cases. Then, the variables are considered to be non-stationary in levels but stationary in their first differences.

Table 2

Univariate stationarity properties of the time series		
Variable	ADF Test (levels)	ADF test (first differences)
$\ln(Exp)$	-1.286	-5.137
$\ln(GDP)$	-0.007	-3.712
$\ln(Ext)$	-1.693	-3.101

The critical values for the variables in levels are -2.954 and -2.615 at 5% and 10% significance level, respectively. The number of lags used in the vector autoregression is chosen based on the Akaike's Information Criterion (AIC).

To investigate the existence of a long run equilibrium relationship between exports and economic growth, we have employed the maximum-likelihood test procedure established by Johansen and Juselius (1990) and Johansen (1991). Based on the Trace test and Max eigenvalue test, we have accepted hypothesis on existence of 1 cointegration equation (both tests at 1 percent significance level), see Table 3.

Table 3

Johansen cointegration test statistics				
Unrestricted cointegration rank test				
Hypothesized No. of CE(s)	Eigenvalue	Trace statistic	5 percent critical value	1 percent critical value
None **	0.779006	45.00930	29.68	35.65
At most 1	0.216891	8.778373	15.41	20.04
At most 2	0.114216	2.910782	3.76	6.65
*(**) denotes rejection of the hypothesis at the 5%(1%) level Trace test indicates 1 cointegrating equation at both 5% and 1% levels				
Hypothesized No. of CE(s)	Eigenvalue	Max-eigen statistic	5 percent critical value	1 percent critical value
None **	0.779006	36.23093	20.97	25.52
At most 1	0.216891	5.867591	14.07	18.63
At most 2	0.114216	2.910782	3.76	6.65

*(**) denotes rejection of the hypothesis at the 5%(1%) level

Max-eigenvalue test indicates 1 cointegrating equation at both 5% and 1% levels.

The error-correction term opens up an additional channel of Granger causality so far ignored by the standard Granger (1969) and Sims (1972) tests. The Granger causality can be evidenced through the statistical significance of the t-test of the lagged error correction term(s) or the F-test applied to the joint significance of the sum of the lags of each explanatory variable (Masih and Masih, 1996). Here, the Granger-causality conducted by the t-test of the lagged error-correction coefficient suggests statistically significant long-term bidirectional causation between two

variables, i.e. export causes economic growth and economic growth also causes export.

Table 4

Causality results based on vector error correction model (VECM)			
Error Correction:	$\Delta (\ln(\text{Exp}))$	$\Delta (\ln(\text{GDP}))$	$\Delta \ln(\text{Exr})$
ξ_{t-1}	-0.643 [-3.011]	-0.089 [-2.366]	0.001 [0.017]
$\Delta(\ln(\text{Exp}_{t-1}))$	-0.173 [-0.855]	0.060 [1.695]	0.023 [0.414]
$\Delta(\ln(\text{GDP}_{t-1}))$	0.194 [0.183]	0.223 [1.190]	0.054 [0.185]
$\Delta (\ln(\text{Exr}_{t-1}))$	-1.371 [-1.397]	0.082 [0.471]	0.205 [0.756]
A	0.159 [1.121]	0.063 [2.519]	0.039 [1.013]
R-squared	0.477	0.577	0.062
Adj. R-squared	0.373	0.492	-0.124
F-statistic	4.570	6.830	0.335

Figures in parentheses are t-values.

Conclusion and policy implications

Using annual data on Libya's exports and GDP over the time period 1980-2007, we have analyzed the time series properties of these variables in order to determine the appropriate functional form for testing the ELG hypothesis. The study finds that GDP, exports, and exchange rate are cointegrated. Based on the VECM results, the evidence suggests the strong support for long-run bidirectional causality between export and GDP. Moreover, we conclude that both export and economic growth are related to past deviations (error-correction terms) from the empirical long-run relationship. It implies that all variables in the system have a tendency to quickly revert back to their equilibrium relationship. This fact means that any rise in export growth would have a positive influence on economic development in both the long- and short-runs. The results of this study also suggest that promoting exports via export promotion policies will contribute to economic growth in Libya.

References

- Abu-Qarn, A.S., Abu-Bader, S., "The validity of the ELG hypothesis in the MENA region: cointegration and error correction model analysis", *Applied Economics*, Vol. 36 No.15, 2004, pp.1685-95
- Blomstrom, M., "Foreign Investment and Productivity Efficiency: The Case of Mexico", *Journal of Industrial Economics* 15, 1986, pp. 97-110
- Central Bank of Libya, Research and Statistics Department, Various issues
- Central Bank of Libya, Annual Reports, Various issues
- Energy information administration. „Libya Country Analysis Brief.” *Country Analysis Briefs*, available at <http://eia.doe.gov/>
- Chenery, H., B., Strout, A. M., "Foreign Assistance and Economic Development", *The American Economic Review*, Volume LVI, Number 4, Part I, September 1966
- Edwards, S., „Trade Orientation, Distortion and Growth in Developing Countries”, *Journal of Development Economics*, 39, 1992, pp. 31-57
- Engle, R.F., C.W.Granger, "Cointegration and Error Correction: Representation, Estimation, and Testing”, *Econometrica*, (55):1987, pp. 251-276
- Feder, G., „Exports and Economic Growth”, *Journal of Development Economics*, 12, 1982, pp. 59-73
- Helpman, E., Krugman, P.R. (1985). *Market Structure and Foreign Trade*. Cambridge: MIT Press
- Irwin, Douglas A., "Did Import Substitution Promote Growth in the Late Nineteenth Century?", *NBER Working Paper No. W8751*, February, 2002
- Jayanthakumaran, K. "Industrialisation: Import Substitution to Export Promotion”, University of Wollongong, Department of Economics, *Working Paper Series*, No 00-09, 2000, available at <http://www.uow.edu.au/content/groups/public/@web/@commerce/@econ/documents/doc/uow012101.pdf>
- Johansen, S., "Statistical Analysis of Cointegrating Vectors”, *Journal of Economic Dynamic and Control*, 12, 1988, pp. 231-54
- Johansen, S., "Estimation and Hypothesis Testing for Cointegration Vectors in Gaussian Vector Autoregressive Models”, *Econometrica*, 59, 1991, pp. 1551-1580
- Johansen, S., Juselius, K., "Maximum Likelihood Estimation and Inference on Cointegration - With Applications to the Demand for Money”, *Oxford Bulletin of Economics and Statistics*, 52, 1990, pp. 169-210
- Lucas, R. E. "On the Mechanics of the Economic Development”, *Journal of Monetary Economics*, 22, 1988, pp. 3-42
- Masih, R., Masih, A.M. "Macroeconomic Activity Dynamics and Granger Causality: New Evidence from a Small Developing Economy Based on a Vector Error-correction Modelling Analysis”, *Economic Modelling*, 13, 1996, pp. 407-426
- Moran, C. "Imports under a Foreign Exchange Constraint”, *The World Bank Economic Review*, 3 (2), 1989, pp. 279-295
- Planing and Programming Department/ Public Planning Council 1962-2000, Libya
- Pop-Silaghi, M., "Exports-Economic Growth Causality: Evidence from CEE Countries”, *Romanian Journal of Economic Forecasting*, 2, 2009, pp. 105-117
- Oskooee, M. B., Economidou, C., "Export Led Growth Hypothesis Revisited: A Panel Cointegration Approach”, *Scientific Journal of Administrative Development*, vol. 3. 2005, pp. 40-55
- Tang, T.C., Nair, M. "A Cointegration Analysis of Malaysian Import Demand Function: Reassessment from the Bounds Test”, *Applied Economics Letters*, 9, 2002, pp. 293-296

- Senhadji, A. "Time-series Analysis of Export Demand Equations: A Cross-Country Analysis", *IMF Staff Papers*, 45, 1998, pp. 236-268
- Shafaeddin, M., Pizarro, J., "From Export Promotion To Import Substitution; Comparative Experience of China and Mexico", University Library of Munich, Germany, 2007, available at <http://mpa.ub.uni-muenchen.de/6650/>
- Sims, C., "Money, Income and Causality", *American Economic Review*, 62, 1972, pp. 540-552
- Sudhakar, S.R., Kurien, J., "Exports and economic growth in India: cointegration, causality and error-correction modelling: a note", *Indian Journal of Economics and Business*, June, 2005, available at http://findarticles.com/p/articles/mi_m1TSD/is_1_4/ai_n25122014/
- World Bank, *World development indicators 2003*, CD-ROM.
- World Trade Indicators 2008 database available at <http://www.worldbank.org/wti2008>