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Structural Change In Exports and Economic Growth: Evidence From Jordan (1964-2004)

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ABSTRACT

This paper analyzes the effects of the growth of exports, manufactured and primary exports on the growth of GDP for Jordan between 1964 and 2004. This contribution shows that structural changes have such an impact on the sources of growth, which in turn will affect the export-growth relationship. A VAR analysis of Jordanian yearly trade and GDP growth has been used; causality tests are applied to the entire period as well as two subperiods. Statistical tests confirm export-led growth for the full period and for the first subperiod, but tests on the recent subperiod 1989-2004, show growth causing primary exports. In addition, there is a bidirectional causal relationship between primary exports and manufactured exports. Therefore, policies in Jordan should not discriminate against the export of primary products. Instead, they should conform to policies that aim at export promotion.

Keywords: Structural Change, Exports, Economic growth, VAR Model.

1. INTRODUCTION

The links between trade expansion and economic growth have received considerable attention from development economists over the last three decades. The basic hypothesis about export-led growth suggests that the expansion of aggregate exports has a favorable impact on economic growth[(1)]. The structural change in export composition has also been frequently considered as an important factor in a country's economic growth (Amin Gutierrez and Ferrantino, 1997). Yet, there have been little systematic empirical investigations into the implied links between export composition and long-run growth. Traditional models of development suggest that sustained economic growth requires a shift from dependence on primary exports to manufactured exports (Chenery, 1979 and Syrquin, 1989). The argument in support of such a shift has been referred to as the Prebisch-Singer thesis on the deterioration of the terms-of-trade for primary commodities (Prebisch, 1950 and 1959 and Singer, 1950 and 1975).

The above arguments suggest that the industrialization process requires an increase in exports of manufactured goods of the developing countries over time. A few papers address the change in export structure in the economic growth-export nexus (Ghatak et al., 1997; Amin Gutiérrez de Piñeres and Ferrantino, 1997; Al-Marhubi, 2000; Xu, 2000; Khalafalla and Webb, 2001; Balaguer and Cantavella-Jordá, 2004 and Hossain and Karunaratne, 2004). Few studies suggest that the positive effects of exports on economic growth may exist only for exports of manufactured products, but not for primary products. A recent study by Herzer and Lehnmann (2006) which examines the diversification-led growth hypothesis on the basis of time series data from Chile, shows that orienting further sectors toward exporting is more important for growth than increasing the share of industrial exports in total exports. If the growth of the primary exports has insignificant or negative effects on economic growth, it would call for a different prescription for economic development in the developing countries, even if they have a comparative advantage in primary exports. There are many reasons to believe that growth in primary exports could enhance GDP growth. At the very least, the revenues from primary exports can relax the binding foreign exchange constraint to allow increases in imports of capital goods and intermediate goods (Chenery and Strout, 1966). Primary exports would help building a base for industrial production and export diversification, only when an

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economy can effectively use its foreign exchange earning from primary exports. On the other hand, there are also concerns about the beneficial effects of primary export growth. The growth of the primary export sector stimulates the growth of other industries through its demand for domestic inputs and services, thus raising domestic income and consumption demand. In addition, primary exports can create opportunities for formerly unemployed and underemployed resources, to produce greater output for export to foreign markets. Hirschman (1958, 1977) called that a "linkage effect". The argument that exports have positive externalities on the domestic economy can apply to primary export growth as well. Thus, primary export can stimulate manufacturing products and hence lead to the exportation of manufactured goods and, ultimately, to economic development (Xu, 2000).

Historically, almost all economies have attempted to follow the path of development through primary export growth. Some have succeeded, like USA, Canada, Australia and Denmark. Others have not succeeded, and so, they are not industrialized yet. In addition, many Asian economics proceeded to export manufactured goods as a result of their primary exports. Their export-promotion efforts are a logical outcome of improved price, incentive structures, financial systems and fiscal environment, which consequently attracted foreign investment (World Bank, 1993). Such structural changes are important signs of the economic development (Choi and Beladi, 1996).

While Jordan is a small non-oil producing country, a distinctive feature of its economy has been the rapid growth of exports during the last decade. Jordan pursued policies favoring import substitution during the 1960s to the mid of 1980s, and gradually shifted to a more outward oriented strategy in the late of 1980s up to now. It has focused on a private sector export oriented growth strategy. It has established several free zones in order to enhance foreign direct investment and domestic investment, which was encouraged through investment tax incentives. In addition, licenses to operate within a free zone area given to private enterprises provided that they would: (i) have the potential to bring new industries and technology; (ii) utilize local raw materials and components in the process of production; (iii) improve labor skill of the Jordanian labor force; (iv) lower the country's imports(2). In general, Jordan has gone from focusing on exports based on county's materials (mainly Phosphate and Potash) to focus on consumer and Simi-manufactured products. Specifically, as it can be seen in Table 1, the share of consumer product exports as share of the total exports has fluctuated deeply during the last 40 years, but according to the policy incentives in the last decade, its share increased from 45 % in 1980 to about 61% of total exports in 2004. On the other hand, the share of the primary exports fluctuated also over time; its share reached about 74% in 1990, and declined since then to reach about 36% in 2004.

Table (1): Foreign trade in present age of GDP, and sectoral structure of exports in present age.

Sector	1964	1970	1980	1990	2000	2004
% of exports to GDP	3.5	4.1	10.3	22.2	18.1	29.4
% of imports to GDP	25.1	28.8	61.5	62.5	54.4	72.6
Consumption goods	58.5	65.5	45.2	23.6	41.7	61.0
Capital goods	2.40	3.33	1.40	2.00	4.80	2.50
Primary Products	40.0	32.5	53.5	74.4	53.5	36.5

Source: Own calculations from several Central Bank of Jordan yearly issues.

The critical questions concerning the effect of primary exports or manufactured exports in promoting economic growth for Jordan are: 1. do the manufacturing exports (primary exports) have any positive effects on the growth of GDP and primary exports (manufactured exports)? 2. If so, are such effects sustainable in the long-run? 3. Does the effect of primary exports changes when government policy and economic environment change toward manufactured product exports? The answers to these questions require empirical evidence.

In this paper, I adopt a multivariate vector-autoregression (VAR) framework to investigate the effect of export growth and its components on the growth of GDP. To my knowledge, this methodology has not previously been applied to study the export composition for Jordan. A country case study approach is used focusing on Jordan, a small economy, which has had a strong trade orientation throughout its history(3). To facilitate further integration into the world economy, Jordan made the following steps: (i) joined the world trade organization in 2000; (ii) signed several trade and investment agreements, which included the Association Agreement with the European Union in 1999, and the Free Trade Agreement with the USA in 2001. (iii) made noticeable environment, which include adopting appropriate legislation to reform customs laws, passing by-law for regulating foreign investments and protecting intellectual property rights laws.

The remainder of this paper is structured as follows: Section 2 explains the suggested models. Section 3 provides the methodology and the time series properties of the variables. The empirical results are presented in section 4. Section 5 presents the summary and concluding remarks.

2. SUGGESTED MODELS AND EXPLANATIONS OF THE VARIABLES

The empirical approaches to the export-led growth hypothesis have used a wide variety of definitions of the "economic growth" and the "export" variables. The most common definitions used are: the real GDP, real exports, real primary or manufacturing exports or the growth rates of these variables. An obvious problem with these studies is that the findings may be "spurious" because exports are a component of GDP. Some researchers have circumvented this "accounting identity" effect by considering GDP net of exports (Heller and Porter, 1978 and Islam, 1998) or export GDP ratio (Islam, 1998). This study will define the growth variable as GDP net of exports while using the traditional definitions for export variables. Thus, the growth variable considered here is real non-export GDP(Y), and the export variables are real total exports (EX), real manufactured exports (MEX) which includes the consumer and capital goods together, and real primary exports (PEX).

Empirical studies often carry out Granger causality test and cointegration in a two-variable framework. However, to avoid possible misspecification bias, it is important not to exclude other variables that may influence GDP. This study uses imports as a third factor; this is in accordance to some recent studies which suggest that imports may contribute to the establishment of cointegration and thus, should be accounted for when testing for long-run equilibrium between economic growth and exports (Riezman et al., 1996). The inclusion of imports in the system allows capture of the rule of promoting exports in the accumulation of foreign exchange, which makes it easier for the economy to finance the importation of capital goods, and in turn, it boosts economic growth. As I mentioned before, I adopt a VAR framework to investigate the effect of export variables on growth of GDP for Jordan. Focusing on a multivariate dynamic analysis provides us with the following advantages over the existing studies in the literature (Sims', 1980): First, the VAR approach focuses on causality as it incorporates the possible existence of short-term relations between primary or manufactured exports and the other variables. In addition, it permits to investigate the long-run cumulative effects of primary or manufactured exports on the growth of GDP by allowing for interactions among variables. Second, it can deal with the simultaneity problem among GDP, manufactured exports and primary exports.

3. METHODOLOGY AND TIME SERIES PROPERTIES OF THE VARIABLES

The study covers the sample period 1964-2004. It considers five variables: real GDP net of exports (Y), real total exports (EX), real total imports (M), real manufactured good exports (MEX), and real primary good exports (PEX). All values are in millions of current Jordanian Dinars, and converted to real terms using the consumer price index, the unit price of imports (1995=100) and the unit price of exports (1994=100). The data is obtained from various monthly issues of the Central Bank of Jordan. Plots of the key series are shown in Figures (1a), (1b), (1c) and (1d). The investigation of the relationship between Jordanian export variables and economic growth begins with and examination of the integration properties of the data, undertaking a system cointegrating analysis and examining Granger causality tests based on vector error correction models. In order to check the stability of the GDP, exports and imports relationships, the analysis is performed over two subsamples in addition to the full sample. The first sample covers the period 1964-1988 during which the government policy was considering import substitution. The second sample covers the period 1989-2004, which is considered a period of export promotion strategy. The stationarity of the series was investigated by employing the unit root tests developed by Dickey and Fuller (1979, 1981), and Phillips and Perron (1988). The joint use of both tests tries to overcome the common criticism, that unit root tests have limited power in finite samples to reject the null hypothesis of nonstationarity. By combining the growth of GDP and the trade variables, and letting the lower case letters denote natural logarithms, we construct the following multivariate models:

Model 1: U_1 (y_t, ex_t, m_t), for the full sample period 1964-2004.

Model 2: U_2 (y_t, m_t, mex_t, pex), for the full sample period 1964-2004.

Model 3: U_3 (y_t, ex_t, m_t), for the subsample period 1964-1988.

Model 4: U_4 (y_t, ex_t, m_t), for the subsample period 1989-2004.

Model 5: U_5 (y_t, mex_t, pex_t), for the subsample period 1964-1988.

Model 6: U_6 (y_t, mex_t, pex_t), for the subsample period 1989-2004.

where

y_t = natural logarithm of real GDP;

ex_t = natural logarithm of real total exports;

m_t = natural logarithm of real imports;

mex_t = natural logarithm of real manufactured good exports (sum of consumer and capital good exports);

pex_t = natural logarithm of real primary product exports.

The Augmented Dickey-Fuller (ADF) and the Pillips-Perron (PP) test for unit roots suggest that the variables considered in this study, for all three time periods are individually nonstationary in their levels but stationary in first the difference(4). The test results are reported in Table (2). The order of the VAR for each model has been selected on the basis of the AIC and SBC criteria. Lag order of 2 for vector (y_t, ex_t, m_t)' and (y_t, mex_t, pex_t)' have been found to satisfy the diagnostic test for the residual serial correlation, functional form and normality of the individual equations in the unrestricted VAR.

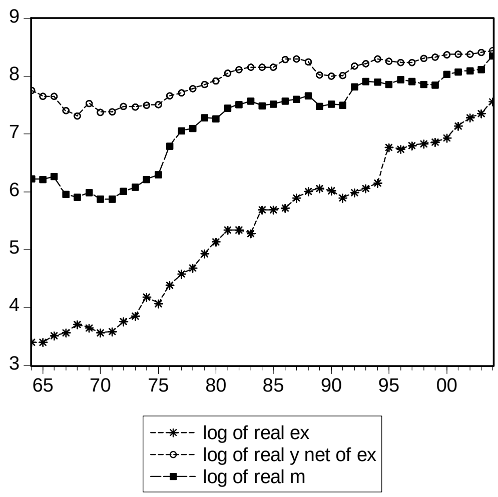

Figure 1a.

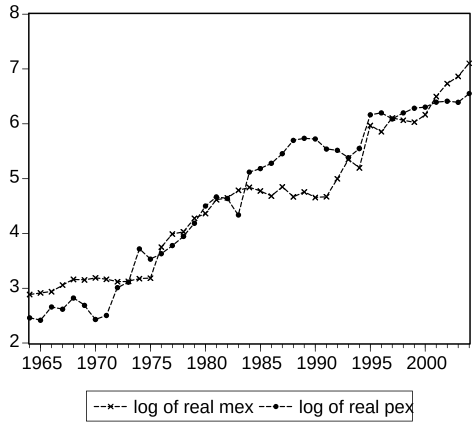

Figure 1b.

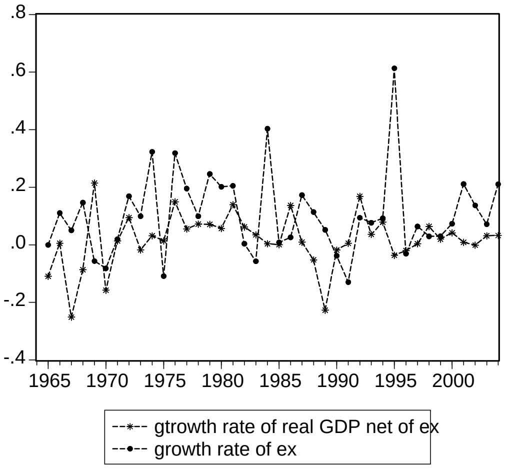

Figure 1c.

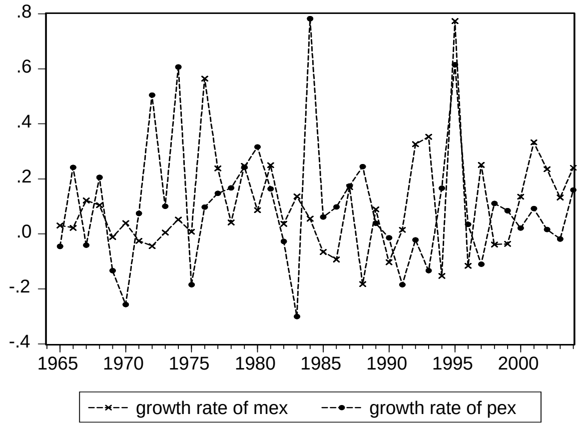

Figure 1d.

Figure 1: Plots of the key series (GDP, total exports, imports, manufactured and primary exports.

Table (2): The ADF and PP Tests for unit roots.

Test statistic	y	ex	m	mex	pex	Comment
Panel A:	**Level[a]. Variable t = 1964-2004**					
ADF	1.247(1)	3.999(1)	1.91(1)	3.81(1)	2.40(1)	Not I(0)
PP	1.07(3)	4.82(3)	2.04(3)	3.81(3)	2.81(3)	Not I(0)
	First difference[a]					
ADF	**- 3.83(1)*****	**- 2.62(1)*****	**- 2.87(1)*****	**- 2.45(1)*****	**- 3.74(1)*****	**I(1)**
PP	**- 5.65(3)*****	**- 4.81(3)*****	**- 4.40(3)*****	**- 5.75(3)*****	**- 5.74(3)*****	**I(1)**
Panel B:	**Level. Variable t = 1964-1988.**					
ADF	1.22(1)	3.83(1)	1.38(1)	1.55(1)	2.92(1)	Not I(0)
PP[b]	0.92(2)	4.95(2)	1.64(2)	2.00(2)	3.39(2)	Not I(0)
	First difference					
ADF	**- 2.96(1)****	**- 1.76(1)***	**- 1.99(1)***	**- 1.95(1)***	**- 2.48(1)****	**I(1)**
PP[b]	**- 4.64(2)*****	**- 3.50(2)****	**- 3.08(2)****	**- 3.27(2)****	**- 4.48(2)*****	**I(1)**
Panel C:	**Level. Variable t = 1989-2004.**					
ADF	0.49(1)	2.13(1)	1.36(1)	3.14(1)	0.90(1)	Not I(0)
PP[b]	0.54(2)	2.57(2)	1.52(2)	3.48(2)	1.19(2)	Not I(0)
	First difference					
ADF	**- 2.27(1)****	**- 1.83(1)***	**- 2.87(1)*****	**- 2.69(1)***	**- 3.34(1)*****	**I(1)**
PP[b]	**- 2.93(2)*****	**- 2.98(2)*****	**- 3.24(2)*****	**- 3.97(2)*****	**- 3.23(2)*****	**I(1)**

Notes

ADF stands for Augmented Dickey-Fuller; PP for Phillips-Perrone. Numbers in brackets are number of lags used in the ADF test in order to remove serial correlation in the residuals, these lag lengths are chosen based on Akaike's Information Criterion (AIC) and Schwartz Bayesian Criterion (BIC). The truncated lag for PP tests was obtained based on a Newey-West adjustment with lag three for the sample period 1964-2004.

[a] with intercept and no trend.

[b] The truncated lag are robust with lag length two.

****, **, * denote significance at the 1%, 5%, and 10% levels respectively.*

4. COINTEGRATION AND ERROR CORRECTION MODELS

The second step is to test for cointegration among the variables using the Johansen's (1988) methodology. That is, the trace (λ_{trace}) and the maximum eigen value (λ_{max}) statistics. In general, if two series are found to be cointegrated, then the inference of a long-run equilibrium relation between them is sufficiently robust, except for a stationary disturbance with finite variance. Moreover, in the presence of cointegration the long-run elasticity of GDP with respect to export (or vice versa) can be estimated without specifying any dynamics, and without a priori determination of causality, since both variables are endogenous and can be treated symmetrically (Ahmad, 2001).

Since the results derived from these tests are sensitive to the selection of the lag length, a several criterion for lag order selection are used, such as FPE (Final Prediction Error), AIC (Akaik Information Criterion), SC (Schwarz Information Criterion), and HQ (Hannan-Quinn Information Criterion). The test results suggest using a lag length (which has white noise residuals) of two for Models 1-6[(5)]. Subsequent analysis therefore, proceeds with the use of VAR with lag lengths k=2. Given that there are three variables in models 1, 3, 4, 5 and 6, (n=3), there can be a maximum of two cointegrating vectors, so that r could be equal to 0,1, or 2. For model 2, r could be equal to 0, 1, 2 or 3, since there are four variables in the model specification.

Results of cointegration rank tests, presented for the six models in Table (3). The values of the trace test (λ_{trace}) and Max-eigenvalue indicates that the null hypothesis of no (r=0) cointegrating vectors can be rejected at the 1% level for Models 1 and 2, and at the 5% level for the rest of the Models[(6)]. That is, it suggests the presence of a unique cointegrating vector between growth in GDP, exports and imports. Consequently, Jordanian economic growth, exports and imports are cointegrated. The estimated normalized coefficients of these cointegrating relationships (the β_s) are significantly different from zero for all the variables. These results indicate that a long-run relationship between GDP and trade variables, but they do not indicate the direction of this relationship

Table (3): Tests for cointegration using the Johansen procedure.

Model 1: y = f(ex, m) Full period sample 1964-2004 p=2[a]

Test statistics hypothesis	r=0[b]	r≤1	r≤ 2	r≤ 3
Trace test	33.128*	9.827	0.017	
λ max test	23.30*	9.810	0.0172	

Cointegrating equation[c]: y = - 0.062ex – 0.349m – 5.109
(-1.51) (-5.20)

Model 2: y = f(mex, pex, m) Full period sample 1964-2004 p=2[a]

Test statistics hypothesis	r=0[b]	r≤1	r≤ 2	r≤ 3
Trace test	47.72*	22.949	3.351	0.420
λ max test	24.77	19.598	2.931	0.420

Cointegrating equation[c]: - 0.022mex – 0.066pex – 0.310m – 5.322
(-0.511) (-1.283) (-4.355)

Model 3: y = f(ex, m) Sub sample period 1964-1988 p=2[a]

Test statistics hypothesis	r=0[b]	r≤1	r≤ 2	r≤ 3
Trace test	57.215**	13.451	0.106	
λ max test	43.764**	13.346	0.106	

Cointegrating equation[c]: y = - 0.328ex – 0.114m – 5.50
(-7.59) (-2.25)

Model 4: y = f(ex, m) Sub sample period 1989-2004 p=2[a]

Test statistics hypothesis	r=0[d]	r≤1	r≤ 2	r≤ 3
Trace test	31.534**	7.201	1.114	
λ max test	24.332**	6.087	1.114	

Cointegrating equation[c]: y = 0.154ex – 1.193m
(5.774) (-53.72)

Model 5: y = f(mex, pex) Sub sample period 1964-1988 p=2[a]

Test statistics hypothesis	r=0[c]	r≤1	r≤ 2	r≤ 3
Trace test	51.466**	8.890	0.028	
λ max test	42.577**	8.860	0.028	

Cointegrating equation[c]: y = - 0.274mex – 0.162pex – 6.088
(-5.369) (-3.988)

Model 6: y = f(mex, pex) Sub sample period 1989-2004 p=2[a]

Test statistics hypothesis	r=0[d]	r≤1	r≤ 2	r≤ 3
Trace test	31.439**	6.377	0.733	
λ max test	25.063**	5.643	0.733	

Cointegrating equation[c]: y = 1.116mex – 2.403pex
(13.24) (30.9)

Notes:

[a] *The lag length p was chosen based on FPE (Final prediction error), AIC (Akaik information criterion), SC (Schwarz information criterion), and HQ (Hannan-Quinn information criterion).*

[b] *r is the number of cointegrating vectors, critical values are taken under the assumption that there is a linear deterministic trend in the data. The Max eigen value test for model 2 indicates no cointegration at both 5% and 1% levels.*

[c] *The coefficients of the cointegrating equation are β_s, the estimated coefficients of the cointegrating vectors normalized on y_t level measures. Numbers in parentheses below β_s are t-statistics for H_0: $\beta_i = 0$.*

*, ** *Indicates statistical significance at 1% and 5% critical levels.*

[d] *Critical values for choosing the number of cointegrating vectors are taken under the assumption that there is no deterministic trend in the data.*

In this section, the short-run dynamics, or the direction of causality between the variables in the cointegration equation is examined by estimating an error correction model. The critical questions concerning the effect of exports and its components in promoting economic growth are: 1. Is an export-led growth or growth driven export or both hold true in the case of Jordan? 2. Do the manufactured exports or/and the primary exports have any positive effects on growth of GDP and other components of trade? 3. If so, are such effects sustainable in the long-run? The answers to these questions require empirical evidence.

Given the presence of one cointegrating relationship, the Engle and Granger (1987) error correction specification can be used to test for Granger causality. The error correction representation for Model 1 for three variable cases is written as:

$$\Delta y_t = \alpha_0 + \sum_{K=1}^{m}[\alpha_{1K}\Delta y_{t-K} + \alpha_{2K}\Delta ex_{t-K} + \alpha_{3K}\Delta m_{t-K}] + \alpha_4 EC_{t-1} + \varepsilon_1 \quad (1)$$

$$\Delta ex_t = \beta_0 + \sum_{K=1}^{m}[\beta_{1K}\Delta y_{t-K} + \beta_{2K}\Delta ex_{t-K} + \beta_{3K}\Delta m_{t-K}] + \beta_4 EC_{t-1} + \varepsilon_2 \quad (2)$$

$$\Delta m_t = \delta_0 + \sum_{K=1}^{m}[\delta_{1K}\Delta y_{t-K} + \delta_{2K}\Delta ex_{t-K} + \delta_{3K}\Delta m_{t-K}] + \delta_4 EC_{t-1} + \varepsilon_3 \quad (3)$$

where Δ is the first difference operator, ε_t's, are white noise terms, m is the lag length and EC_{ti-1} is the error-correction term (lagged one period) derived from long-run cointegrating relationship to capture the long-run dynamics. Similar specification holds for Models 2-6. In order to make valid inferences on causality, all the variables must be stationary. Thus, the first differences of the variables (y_t, ex_t, m_t), and (mex_t, pex_t) and the residuals (EC's) obtained from the cointegrating vector are included in the Granger causality test structure. The above structure of the model focuses on the short-run dynamics among GDP, exports and imports and at the same time the long-run information, which is contained in the error correction vector (EC). The t-statistics on EC indicate the existence of long-run causality, while the significance of the F-statistics on the lagged independent variables indicates the presence of short-run causality. To test the significance of the estimated coefficient on the lagged values of the independent variables, the following F-test is conducted

$$F_{r,\, n-k} = [(ESSr - ESSu)/r]/\, [ESSu/n-k]$$

where r refers to the number of restrictions imposed, ESSr and ESSu refer to the sum squares of residuals of restricted and unrestricted models, and (n-k) is the number of degrees of freedom.

For each variable in the system, at least one channel of Granger causality is active: either in the short-run through the joint tests of lagged-differences or a statistically significant EC. The negative and statistically significant EC coefficient term in each equation, suggests the existence of a short-run adjustment mechanism that leads to the long-run equilibrium between the independent variables and dependent variables. The short-run dynamics are captured by the individual coefficients of the differenced terms. Even if the coefficients of the lagged changes in the dependent variables are not statistically significant, Granger causality can still exist as long as the coefficient of EC is statistically different from zero (Choudry, 1995).

The size of the coefficient of the error correction term in each error correction model measures the tendencies of each variable to return to equilibrium. For example, if α_4 in equation 1 is negative and significant, it could be concluded that y responds to disequilibria in its relationship with the independent variables.

Causality Results

Table (4) presents the results of the error correction models. The significance of the error correction coefficient is determined by the t-ratio given below the coefficient for EC_{t-1}. In each specification, the magnitude of the error correction coefficient indicates the speed of adjustment of any disequilibrium toward a long-run equilibrium state. The results show that the error correction term in the GDP growth specification for Model 1 is negative and statistically significant at 1% level, which implies that GDP growth in Jordan for the entire period (1964-2004) adjusts to changes in growth of exports and growth of imports. This implies that exports and imports growth did Granger cause the growth in real GDP (but not vice versa) in the long run. The coefficient of (-0.996) in the GDP growth equation indicates that adjustment toward the long-run relationship is about 100% per annum. This suggests that 99.6% of any deviation from the long-run equilibrium is corrected substantially in the same year. Also, in Model 1, the EC of the import growth equation indicates that import growth adjusts to changes in GDP and export growth in the long-run. It is clear that there is a bidirectional relationship between GDP and imports, but there is a unidirectional relationship between exports, GDP and imports. The direction of this causality runs from exports to GDP and from exports to imports.

Disaggregating of exports into manufactured and primary components adds another piece of information. Model 2 shows the same information as Model 1, since the EC for the import growth is statistically significant at 1% level and the probability of the F-statistics is significant at 1% for manufactured exports- this suggests that there is a bidirectional causal relationship between manufactured exports and imports. Altogether, the results for Models 1 and 2 indicate that the Jordanian economy has a strong trade linkage in short and long run, and give a strong support for the export-led growth hypothesis.

When we test the causal relationships in the two subperiods for the aggregate trade variables (Models 3 and 4), the direction of long-run relationship remain the same as Model 1. The difference is that there are bidirectional relations between GDP and exports and between imports and exports for the subperiod 1964-1988. The bidirectional relation between exports and imports do not exist for the subperiod 1989-2004.

A clearer picture of how these relationships have changed over time is evident when disaggregating of exports is examined in Models 5 and 6. The significant levels of both the short and long-run relationships for Model 5, indicate that manufactured and primary exports affect GDP growth in the long-run, and there is a bidirectional causal relationship between primary exports and GDP growth. On the other hand, these causal relations are changed substantially for the recent subperiod 1989-2004. The results for Model 6 indicate that there are a long-run and short-run relationships between manufactured and primary exports (statistically significant at 1%). In addition, there is a bidirectional causal relationship between manufactured exports and primary exports. However, there is a weak causal relationship from primary exports to GDP growth. This result supports the growth-driven export hypothesis over the recent period 1989-2004.

The results of the first five Models show that the variables support the export-led growth hypothesis. They show considerable interaction among the exports, imports and GDP growth, but for Model 4 for the subperiod 1989-2004, the bidirectional causal relationship between exports and imports (shown in Model 3), decreased to a unidirectional short-run relation which goes from exports to imports (shown in Model 4). Analysis of the role of manufactured and primary exports for the two subperiods in Models 5 and 6, reinforce the export-led growth hypothesis in the first subperiod in Model 5. The role of primary exports was very important in long and short-run, while the role of primary exports for the recent period 1989-2004 had changed. There is a bidirectional causal relationship between manufactured and primary exports, and there are a growth-driven primary exports and not vice versa. Thus, the evidence suggests that while Jordan broadened its export base to include a growing proportion of manufactured exports through adapting policies favoring private sector exports, there is a weakening of the export-led growth linkage.

Table (4): Granger results based on vector error correction model.

Dependent variable	$\sum\Delta y$	$\sum\Delta ex$	$\sum\Delta m$	$\sum\Delta mex$	$\sum\Delta pex$	EC_{t-1}
Model 1: y = f(ex, m) Full sample period 1964-2004				(p=2)		
Δy	0.897^{**}	0.091	0.515^{**}			-0.996 $(4.960)^{***}$
Δex	0.386	0.288	0.287			0.088 (0.222)
Δm	1.024	0.133	0.390			-1.026 $(-2.94)^{**}$
Model 2: y = f(mex, pex, m) Full sample period 1964-2004				(p=2)		
Δy	0.890^{*}		0.448^{*}	0.063	0.025	-0.967 $(4.49)^{***}$
Δmex	0.614		0.207	0.215	0.181	-0.524 (-0.974)
Δpex	0.167		0.399	0.279	0.224	0.377 (0.554)
Δm	0.350		0.261	0.270*	0.063	-1.220 $(-3.62)^{***}$

Model 3: y = f(ex, m) Sub sample period 1964-1988 (p=2)						
Δy	0.331**	0.411***	0.056			-1.239 (-9.17)***
Δex	0.327	0.860	0.617			-0.423 (-0.89)
Δm	0.335	0.732*	0.441			-1.424 (-3.80)***
Model 4: y = f(ex, m) Sub sample period 1989-2004 (p=2)						
Δy	0.259	0.656**	1.197**			-1.054 (-3.20)***
Δex	1.21	0.117	0.504			-0.676 (-0.75)
Δm	0.405	0.639	1.673			-1.252 (-1.73)*
Model 5: y = f(mex, pex) Sub sample period 1964-1988 (p=2)						
Δy	0.226*			0.10	0.123*	-1.082 (-7.97)***
Δmex	0.110			0.341	0.036	0.131 (0.28)
Δpex	0.226			0.436	0.414	-0.463 (-0.57)
Model 6: y = f(mex, pex) Sub sample period 1989-2004 (p=2)						
Δy	**0.212**			**0.172**	0.270**	**-0.013 (-0.134)**
Δmex	0.193			0.955	1.433	0.540 (1.384)
Δpex	1.146			1.140***	0.932***	-0.652 (-4.50)***

Notes:
[a]*The F-statistics tests the joint significance of lagged values of the independent variables. The stars *,**,*** denotes significance at 1% , 5% and 10% significance level respectively.*
[b]*EC_{t-1} is the one period lagged error correction term from the cointegrating equation. Numbers in parentheses below EC_{t-1} are t-statistics for H0: $\alpha_i = 0$.*

The explanation of the present result lies on the structural changes associated with the effort process to shift to a more outward oriented strategy in the late 1980s up to now. Unlike primary exports, for which value-added is derived primarily from domestic sources, manufactured exports for Jordan rely heavily on imported raw materials and equipments. As shown from the results in Model 2, there is a bidirectional causal relationship between manufactured exports and imports. Obviously, there is a strong empirical result for the first period, which indicates the dominance of primary-commodity export driven growth. The weakening empirical support for the export-led growth hypothesis may not imply the failure of export-oriented policies. When the economy experiences development process, this leads to a growing complexity and variety of economic activities which in turn, changes the sources of a nation's economic growth.

5. SUMMARY AND CONCLUDING REMARKS

The objective of the present study is to test empirically the relationship between the expansion of exports and the economic growth in Jordan during the period 1964-2004. The existence of this relationship has been analysed using a VAR approach. The paper has reviewed the nature and direction of the causal relationships between total exports and GDP, and between manufacturing and primary exports and GDP. The motivation of this paper aims to examine whether the impact of exports and its components on growth has changed according to recent government efforts, to enhance and support the exports of manufactured products.

The Granger causality results from the error correction analysis indicate that the export-led growth hypothesis do hold for Jordan. Total, manufactured and primary exports appear as long-run determinants of GDP growth for the full four-decade period and subperiods. For the first period (1964-1988), when policy emphasis was on import substitution, there was a strong evidence of bidirectional causal relationship between total exports and GDP. More specifically, there was a bidirectional causal relationship between primary exports and GDP, and a unidirectional causal relationship runs from manufactured exports to GDP. For the second subperiod (1989-2004), when policies favored manufactured good export-led growth, the results still indicate that total exports led to GDP growth and vice versa. Nevertheless, the disaggregated figures of exports show that growth of GDP led to the growth of primary exports and not vice versa. There exists a bidirectional causal relationship between primary and manufactured exports. Thus, the evidence suggests that as Jordan broadened its export base to include a growing proportion of manufactures, there is a weakening of the export-led growth linkage.

Analysis of the role of primary and manufactured exports for the full period and the first subperiod reinforce the aggregate results. Primary exports have significant growth generation effects in the long and short-term. In addition, the results for Models 1-4 show considerable interaction between imports and the GDP growth, and the other trade variables. Apparently, that imports are an engine of growth for Jordan. The empirical results found in this study about the role of primary exports, have important theoretical and policy implications. These results support the findings of Xu (2000) for a group of less developed countries. Specifically, they provide empirical support for the comparative advantage theory of international trade. Primary exports contribute positively to GDP growth and the growth of manufactured exports. Therefore, the government policies should not discriminate against primary exports. Instead, they should hold on to policies that aim at export promotion.

NOTES

(1) The link between exports and economic growth has been the subject of considerable research. An excellent review about those studies can be seen in Giles and Williams, 2000a, b and Ahmad, 2001.

(2) See Jordan Investment Board (2000).

(3) In Dollar's (1992) empirical study for 95 countries, Dollar defined outward-orientation as a combination of two factors: a low level of protection, especially for inputs into the production process, and relatively little variability in the real exchange rate, so that incentives are consistent over time. Jordan was classified within the most open economies.

(4) Before conducting the ADF and the PP tests for the presence of unit roots, the time series are tested for the possible structural break(s) or jump(s) in the time series, since the conventional unit root and cointegration tests break down in the presence of such jumps or breaks in the data (Zivot and Andrews, 1992). We could check for these breaks by estimating the following equation for each of the variables: Yt = yt-1 + D1 + D2 + D3 +D4. Where D1, D2, D3 and D4 are pulse dummies for the years 1967, 1988, 1991 and 2000, respectively, which represent the three most distinct phases of economic reforms in Jordan. None of the "t" values corresponding to the coefficients of the above dummy values are significant at any level of significance, which confirms that the (ADF) and (PP) tests can be applied to the variables considered in the study.

(5) Results are not reported but are available on request from the author.

(6) Using 5% and 1% critical values from Johansen test, it is observed that for Model 2, (λtrace) and (λmax) statistics give conflicting results. Johansen (1991) argues that such conflicting results arise from the low power of the test in cases when the cointegration relationship is quite close to nonstationary boundary. It is also argued that since the trace test takes account of all (4-1) of the smallest eigenvalues, it tends to have more power than the λmax test. Hence, in the conflicting cases the decision is made based on the trace statistic. In addition, I conduct a VAR stability condition check for Model 2, which confirms that there is no root lies outside the unit circle. That is to say that the VAR satisfies the stability condition. Results are available on request.

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التغيرات الهيكلية في الصادرات وأثرها على النمو الاقتصادي: دلائل من الأردن (1964-2004)

*زكية مشعل**

ملخـص

تهدف هذه الدراسة إلى اختبار العلاقة السببية بين المتغيرات بتحليل أثر النمو في الصادرات الصناعية والصادرات الأولية في النمو في الإنتاج المحلي الإجمالي للاقتصاد الأردني للفترة الزمنية ما بين 1964-2004، باستخدام أسلوب متجه الانحدار الذاتي ونموذج تصحيح الخطأ لبيانات سنوية عن التجارة الخارجية والإنتاج المحلي الإجمالي. أجريت الاختبارات السابقة للفترة الزمنية كاملة بعد تقسيمها إلى فترتين زمنيتين؛ لبيان أثر السياسة الاقتصادية على هيكل التجارة الخارجية.

لقد أثبتت النتائج الإحصائية فرضية دفع الصادرات للنمو؛ وذلك لكامل الفترة الزمنية وللفترة الأولى (1964-1988)، أما الفترة الثانية (1989-2004) فقد تبين أن النمو الاقتصادي يسبب النمو في الصادرات الأولية، وبالتالي، يتوجب على السياسات الاقتصادية في الأردن أن لا تنحاز لتنمية الصادرات الصناعية على حساب الصادرات الأولية؛ وذلك للأهمية البالغة لهذه الصادرات على الاقتصاد الأردني.

الكلمـات الدالـة: التغيرات الهيكلية، الصادرات، النمو الاقتصادي، نموذج VAR.

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