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The Effect of Trade Liberalization on Economic Growth, Unemployment and Productivity: The Case of Jordan

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ABSTRACT

This study aims to investigate the impact of trade liberalization on Jordan's economic growth through examining improvement in employment and productivity in Jordan, during the period (1980-2014). Where Augmented Dickey- Fuller test was utilized to examine the stationary of the variables of this study. The results have indicated that the variables are non-stationary at their levels, but they become stationary at their first difference. Also Johansen cointegration test was applied, and it was found there is one cointegration vector exists among the variables in the model. Vector error correction model (VECM) found a long-run relationship between real gross domestic product per capita and other variables (trade openness, unemployment rate, labor productivity). And provide the Short-term deviations from the long-term equilibrium relationship are corrected at a rate (0.25). Furthermore VECM showed a positive and significant impact from the explanatory variables on economic growth of Jordan in the long run, and non-significant impact in the short run. On the other hand, the impulse response function and variance decomposition test indicated that a positive impact from trade liberalization on economic growth, labor productivity and unemployment rate.

Keywords: Trade Liberalization, Economic Growth, Productivity, Unemployment, Vector Error Correction Model
JEL Classifications: F4, O4, Q27

1. INTRODUCTION

The failure to integration with the global economy is difficult in the light of globalization, technological and technical development. However this does not imply that taking the advantage of this integration is imperative, due to the existence of many challenges to be faced. the most important challenge is the increased competition, which involved adoption several strategies to eliminate or at least mitigate this challenge such as; development of production structures; improvement of efficiency; enhancing the human element; and the development of technology and innovation.

In order to achieve trade liberalization gains, it is necessary to find a balance between the economic forces, by allowing the existence of a wider discrimination spaces in favor of countries with lower competencies. Hence, many countries have begun structural adjustment programs, so as to facilitate the transition from the bound development strategies toward openness and integration with the global markets. However, it must be pointed out that the developing countries must not be opened to markets and liberalization of trade if there is no structural development programs because in this case the potential benefits resulted from openness gains will not be achieved.

Jordan is a small economy which always tries to achieve sustainable growth, and eradication of poverty and unemployment problems. In this respect, it began in the early of nineties of the last century to move toward opening the trade with the outside world, through the reduction of customs restrictions of many commodities in the light of the application of the economic adjustment programs. Afterwards Jordan has joined the World Trade Organization (WTO) in 2000, and signed bilateral and multilateral agreements with some countries to keep up with globalization and to achieve commercial gains that might be obtained by openness with the outside world.

2. THE STUDY PROBLEM

Despite the positive role played by trade openness through overcoming the narrowness of the domestic market and taking

advantage of economies of scale, trade liberalization and integration with the global economy have increased the challenges faced by the economies of developing countries and promoted the concept of competition to achieve and sustain economic growth. Therefore, this study is an attempt to identify the role of trade openness in promoting economic growth through investigating the effect of openness on the productivity of the labor element and the unemployment rate in Jordan.

3. THE QUESTIONS OF THE STUDY

This study aims to answer the following questions:

- What is the potential impact of trade liberalization on economic growth?
- What is the potential impact of trade liberalization on productivity?
- What is the potential impact of trade liberalization on unemployment?

Answering these questions involve deploying descriptive and econometric analyses.

4. LITERATURE REVIEW

It is beneficial to consider the possible trends through which trade openness affects a country's growth rate to enrich our understanding of the relationship between trade openness and economic growth. The economic theory make a distinction between two sources of GDP-per-capita growth: The first source is capital accumulation (physical and human) and the second source is productivity growth. It is imperative to state that trade openness may affect both of these sources. Firstly, international flows of capital may increase the accumulation of physical and human capital locally due to trade openness (at least temporarily). Secondly, trade openness may boost productivity growth through faster technological advancements (Mkubwa, 2004).

4.1. Trade Openness and Unemployment Rate

There is a set of theoretical models that aim to analyze the effect of trade on aggregate unemployment. Although, there is still no consensus on whether an increase in trade will lead to a higher or lower aggregate unemployment rate. The negative association between trade and unemployment is based on the fact that trade improves the economy-wide value of the marginal product of labor (Banga, 2005). Dutt et al. (2009) argued that trade openness, which improves aggregate labor productivity, reduces unemployment because it leads to creating more jobs. Similarly, based on their search-unemployment model with heterogeneous firms, Felbermayr et al. (2011) argued that trade liberalization reduces unemployment as long as it improves aggregate productivity. This happens through crowding-out of the least productive firms and labor reallocation into more productive firms. Matusz (1996) also agrees with the fact that trade may improve economy-wide productivity and thereby reducesthe unemployment rate, since trade bring abouta greater division of labor due to an increase in the variety of available intermediates.

On the other hand, Helpman and Itskhoki (2010) postulated that an increased unemployment rate can occur as a result of lower trade barriers. This can be justified as reducing trade barriers between countries will improve the profitability of exporting firms and consequently, lead to an expansion in the trading sector. In addition, when workers reallocate towards the exporting sector, unemployment will increase if the sector is characterized by labor market frictions.

Additionally, Janiak (2006) argued that higher trade exposure is associated with a higher level of equilibrium unemployment. The reason is that larger high-productivity enterprises will attract more employees who already left their jobs in smaller, lower-productivity firms as large firms have the ability to extract higher rents by limiting the amount of job creation.

The literature in the field of trade has shown an unclear impact of trade on the on the aggregate unemployment. For instance, Sener (2001) and Moore and Ranjan (2005) revealed that liberalization of trade will result in an increase in the unemployment of unskilled workers although trade liberalization has an ambiguous effect on aggregate unemployment. This conclusion is based on the fact that trade liberalization increases the intense of innovation activities and therefore boosts profitability of the exporting firms, which in turn encourage these firms to be involved in research and development that requires more skilled workers to be empoyed. On the other hand, the increased innovation activities of exporting entities should increase the turnover rate of unskilled workers and result in an increased rate of frictional unemployment of unskilled workers. Similarly Moore and Ranjan (2005) and Kim (2011) showed that aggregate unemployment is likely to decrease in a skilled-labor abundant country and on the other side to increase in the abundant country of an unskilled-labor.

In his study, Kim (2011) investigated the impact of international trade on aggregate unemployment in the presence of labor market institutions by analyzing data of twenty OECD countries during the period (1961-2008). The major findings of the study were increased trade between the OECD countries led to higher aggregate unemployment with rigid labor market institutions, whereas flexible labor market may reduce aggregate unemployment. The one can conclude that with an average degree of labor market rigidity, an increase in trade will not significantly affect the unemployment rates.

4.2. Trade Openness and Productivity Growth

In the innovation-based growth literature, numerous studies have been conducted to empirically test the linkage between trade, productivity and growth (Grossman and Helpman, 1991; Rivera-Batiz and Romer, 1991). These studies combined productivity growth through increased product variety with intentional research and development (R&D) by profit-seeking firms where the outcome of research generates designs for new product varieties.

In this context, international trade may affect the growth rate of productivity through various perspectives: The diffusion of intermediate goods; enhanced innovation for market expansion;

and the diffusion of general knowledge (Laurence and Charles, 2008). Trade can enhance the ability of manufacturing firms to import intermediate product that are not locally produced and hence, improve firms productivity by utilizing their allocated resources more effectively (Bakhtiari, Azarbaeijani and Farzaneh, 2011).

If access to foreign intermediate products are used as input to research an increased productivity should occur in the research sector and hence, innovation rate will increase, which may guarantee a permanent increase in the growth rate. An expansion in the market size for new product varieties boosts profits from research and development, which yields greater incentives to engage in research activities (Krishna and Mitra ,1998). These incentives may result in a faster innovation and economic growth rates. Additionally international trade may affect the productivity growth rate if the former facilitates the diffusion of general knowledge. In this sense, the repository of available general knowledge increases due to trade as it raises the productivity in the research sector and as a result accelerates innovation rate (Andersen and Babula, 1998).

Tybout (2000) also argues that the increased access to foreign markets may affect firms' productivity through several channels that can be broadly summarized as: Increased competitive pressures, changes in market shares, increased access to technological improvements, and spillovers. Whether these effects are positive or negative depends, according to economic theory, on the market structure and the type of trade instruments applied. There are comprehensive empirical studies on the impact of trade on economic growth and productivity.

Yeboah et al. (2012) looked at the impact of trade liberalization in the productivity of African countries. The study used the Cobb-Douglas production function which was estimated using panel data. The continent on the whole exhibited a decreasing return to scale which is to be expected. The FDI/capita and capital-labor ratio coefficients showed negative signs implying no effects or reduction in GDP/capita with an increase in FDI or capital-labor ratio. However, exchange rate and trade-openness/capita exhibited positive and significant impacts on GDP/capita. Majority of the countries showed below average returns-to-scale with about 17 countries exhibiting above average growth.

Sun and Heshmati (2010) applied both qualitative and quantitative approaches to discuss the relationship between international trade and China's economic growth. The empirical results showed the static benefits from international trade result from importing capital goods which embody high technology. And the dynamic effects of trade refer to the improvement in the total factor productivity through learning by doing and accumulation of human capital.

Yan et al. (2007) examines the link between trade openness and sectoral productivity in China during 1980-2003. In the first part of this paper, they use the profit margin data to assess the effect of increased foreign competition as an underlying mechanism that stimulated productivity growth. The data shows that the profit margin in the tradable sector of China declined from around 17.04% in 1998 to around 5.95% in 2004, and declined from 17.15% to 8.09% in the non-tradable sector in the same period. This finding is consistent with the imports discipline theory, which suggests that the introduction of more foreign competition as a result of higher trade openness disciplines the market to shut down the inefficient firms and to reallocate the resources to the efficient firms, and hence spurs productivity growth on one hand and squeezes the profit margins of the local firms on the other hand. The same conclusion is reached when they use the Lerner index (which takes into account the market share) instead of the profit margin as an indicator of the extent of foreign competition (Thanh, 2015).

Licandro and Antonio (2010) develops an endogenous growth model with firm specific innovation, Cournot competition on a continuum of oligopolistic markets and free trade between identical economies. It shows that international trade induces growth in participant countries through an increase in competition; openness to trade generates a reduction in markups, inducing firms to innovate more to profit from the associated increase in market size. This research reinforces the view that at least for the case of developed countries trade openness enhances innovation and growth through a pro-competitive effect.

Wong (2006) Studied how productivity evolved in Ecuadorian manufacturing industries during the 1997-2003 period after trade reforms were fully implemented in Ecuador. The results suggest that trade openness has had a positive and significant effect on productivity in Ecuadorian export-oriented manufacturing industries. But this result has to be combined with other results, which suggest that economic events that affected all firms in the years under study also played an important role in affecting productivity performance in Ecuadorian industrial establishments. Economic events after 2000 are found to have had a negative impact on productivity, and in particular, a significantly negative impact on the productivity of establishments in export-oriented manufacturing industries.

A study for El-Anis (2013) conducted in the Jordanian economy to examine the overall levels of bilateral trade between Jordan and the United States before and after the Jordan-United States Free Trade Agreement(JUSFTA). Linear trend line projections are used to offer a comparison between experienced levels of trade and anticipated levels of trade based on pre-JUSFTA era data. It was found that bilateral trade between Jordan and the USA increased after the year 2001 with the implementation of the JUSFTA confirming a strong correlation between bilateral trade volume and the free trade agreement implementation. Furthermore, one can observe that Jordanian exports to the United States have grown more rapidly than imports. Furthermore, Jordan has benefitted from an overall trade surplus since the implementation of the JUSFTA compared to the trade deficit experienced in the pre-JUSFTA era. nevertheless, following the complete implementation of the JUSFTA, Jordanian imports from the United States exceeded exports and it most likely that Jordanian trade deficit will continue in the future.

Busse and Gröning (2012) assessed the impact of Jordan's trade liberalization over the last twenty years relying on the use of the

gravity model, a large country sample, and a long time-series to estimate the effects of various FTAs and the WTO accession on exports and imports of Jordan. The researchers found that there was no statistically significant impact on exports and imports due to multilateral or preferential trade liberalization. However, the JUSFTA was an exemption as it fostered Jordan's exports to the US to a large extent.

Malawi and Almansi (2015) investigated the impact of economic globalization on labor's productivity in Jordan, during the period (1980-2010). Granger causality test results demonstrated that there is a bidirectional causal relationship between economic globalization and real labor productivity. Two tools of analysis were employed: Impulse response function and variance decomposition by applying a vector auto-regression (VAR) model. The final results have shown that economic globalization explains most of the forecast error and has a positive impact on the Jordanian labor productivity.

Hosoe (2001) Used a Computable General Equilibrium (CGE) model, to simulate the impact of the Association Agreement with the EU on Jordan's output, exports, and imports. According to Hosoe's results, the three all are likely to be increased due to the agreement. For example, imports from the EU are expected to be increase by 12%, while exports to the EU are expected to rise by 8%. However, according to Hosoe, not all sectors would benefit from trade liberalization. While an expansion in Jordan's chemical and agricultural sectors are expected, the non-metal mineral sector is predicted to decline.

This study differs previous studies in that it is considered the first study applied in the Jordanian economy, which measures the effect of trade openness on economic growth through investigating the effect of this openness on the labor productivity and unemployment rate.

5. TRADE LIBERALIZATION IN JORDAN

In the early 1990s, Jordan began to move towards trade liberalization in the context of implementing structural adjustment programs. This was followed by signing of a series of bilateral and multilateral trade agreements.

Jordan joined the WTO on 11 April 2000, becoming the 136th member of the organization. Jordan complied with a broad range of obligations in areas such as tariff reductions, non-tariff barriers to trade, services liberalization, agriculture, and transparency. Since its accession to the WTO, Jordan has taken significant steps in fulfilling its commitments. During the Doha Development agenda (DDA), Jordan joined the group of recently-acceded member (RAM). In this context, Jordan supports the RAMs Group position referring to the exceptionally significant and extensive commitments made by the group members upon accession as compared to those made by members that joined the WTO during previous rounds of negotiations and reflecting the group's concerns on the current workflow of the negotiations within the DDA (WTO, 2015).

Jordan also made extensive liberalization undertakings under the General Agreement on Trade in Services (GATS); these undertakings would open some sectors that were previously closed or were restricted with regard to foreign investment and participation (Awad, 2012).

In line with the WTO commitments and in complementarily to the efforts in the WTO, Jordan is also engaged into strengthening its bilateral ties with several countries and economic blocs. Jordan has free trade agreements with Greater Arab Free Trade Area (GAFTA) and (U.S.A, EU, Canada, Turkey, Singapore, EFTA states). It is also part of the Agadir Agreement between Jordan, Egypt, Tunisia and Morocco (WTO, 2015).

On 1 March 2011, the Turkey - Jordan FTA came into force and thus initiated a gradual reduction of tariffs for Turkish products imported into Jordan, while Turkey grants immediate market access to Jordanian products (Awad, 2011). On 1 October 2012, the Agreement between Canada and Jordan came into effect, thus further expanding Jordan's access towards the North American continent. In this context, Jordan also embarked on negotiating a Free Trade Agreement with Mexico (WTO, 2015).

Accordingly, a reduction in (tariff and non-tariff) trade barriers is expected to lead to an increase in Jordan's trade flows as well as production and consumption efficiency is increased.

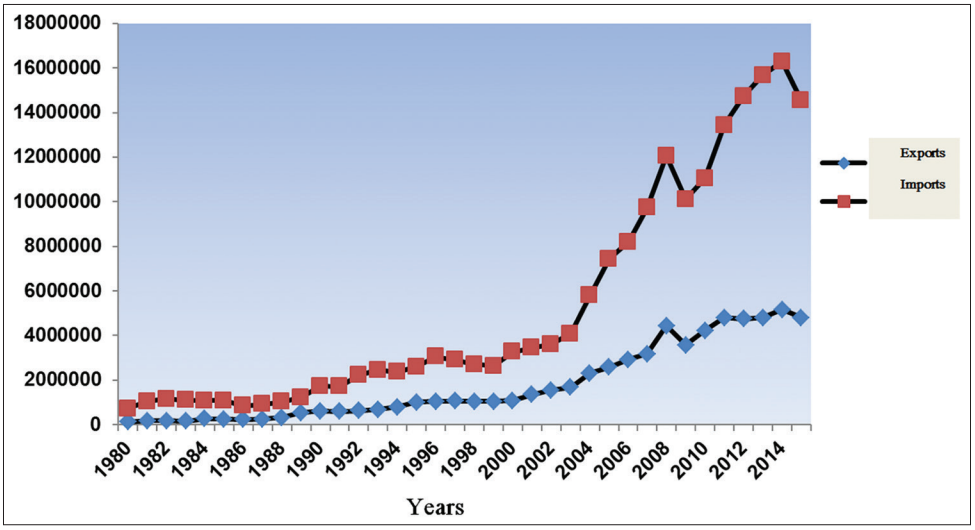
As shown in Figure 1, Jordan's international trade volume has grown fast in the last 20 years, indicating the increasing of openness of the Jordan economy, also the trade balance. The expansion of imported goods, however, has been much larger than the rise in exports, as shown in the graph below, which leads to a substantial increase in its trade deficit.

The structure of Jordan's trading has experienced evident changes with the foreign trade volume growth. Structural reform carried out by Jordan in recently have changed its global competitiveness and performance of trade. In 1980, primary goods accounted for 58.5% of total exports, while manufactured goods accounted for 42.5%. In 2009, the share of primary goods was only 28.7%, while manufactured goods expanded their share to a dominant level of 72.3% as shown in Figure 2.

The above analysis indicates that one of the most noticeable aspects of Jordan's trade performance was the change in the structure of exports from resource labor-intensive products to capital intensive products. The structure of Jordan's trading changed, its focus from primary products to manufacturing products in the early 1990s.

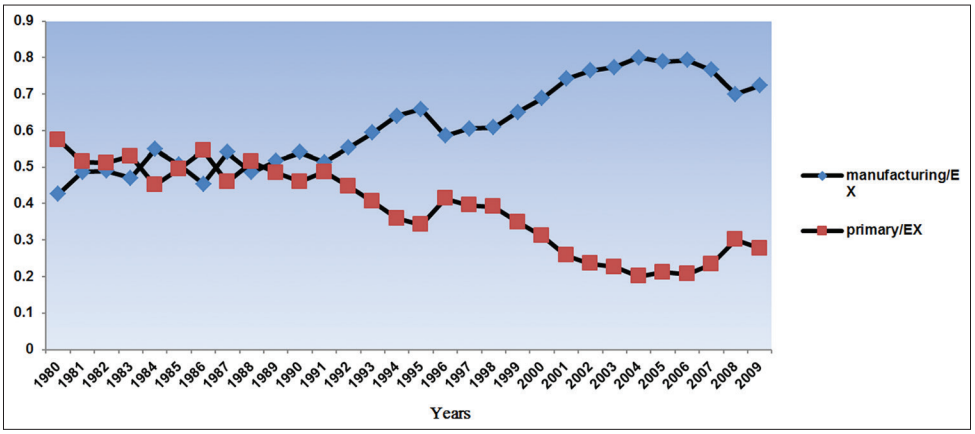
The leading sectors, which has achieved the shift in the trade balance from deficit to surplus during the period of trade openness is clothing and footwear sector, as the amounted rate of surplus%age to total trade in this sector is (56%) as an average of the trade openness period, compared to a deficit of (76%) as an average during the period preceded the trade opening, because of the qualified Industrial zones agreement in 1997. Statistics also indicate that fewer sectors were affected by trade openness such as: Raw materials sector, and machinery and equipment sector whose deficit ratio decreased to (2.5%) and (10%), respectively, through trade openness.

Figure 1: Jordan's trade statistics (1980-2014) J. D



Source: Central bank of Jordan, yearly statistical data (50th)

Figure 2: Primary and manufacturing export % age of total export from (1980-2009)



Source: Central bank of Jordan, yearly statistical data (50th)

6. DATA OF THE STUDY

To investigate the relationship among trade liberalization, unemployment rate, labor productivity and economic growth of Jordan, real time series data have been taken on annually covering the periods (1980 to 2014). All data were obtained from the Central Bank of Jordan, Jordanian department of statistics, ministry of labor and International Monetary Fund (IMF). The included variables in this study are trade openness (OP) which calculated by the index (export + import/real GDP), unemployment rate (UN), labor productivity (LP) which calculated by (real GDP/number of labor), real GDP per capita (RGDPP).

7. METHODOLOGY AND EMPIRICAL FINDINGS

To investigate the relationship between openness, economic growth, labor's productivity and unemployment rate in Jordan, the Vector Error Correction model (VECM) was applied using the yearly data from 1980 to 2014. VECM can lead to a better understanding of the nature of the data (stationary or non stationary) among different component series and used to identify equilibrium or a long-run relationship among the variables, and can also improve longer term forecasting (Green, 2003). VECM(p) forms with the co-integration rank r($\leq$ k) is written as

$$\Delta y_t = \delta + \prod y_{t-1} + \sum_{i=1}^{p-1} \Phi_i^* \Delta y_{t-i} + \varepsilon_t \quad (1)$$

Where Δ is the differencing , δ and Π are k $\times$ r matrices; Φ_i^* is a k $\times$ k matrix., and y: The variable matrices (trade openness [OP], Real gross domestic product per capita [RGDPP], labor productivity [LP], unemployment rate [UN]), εt: Error term. To estimate this model, the following tests must be performed.

7.1. Unit Root Test

To test for a unit root in each series, Augmented Dickey-Fuller (ADF) methodology was applied (see Dickey-Fuller, 1981). ADF test is estimated by the following regression:

$$\Delta Y_t = a_0 + zt + a_1 Y_{t-1} + + \sum_{i=1}^{p} a_i \Delta Y_{t-1} + \varepsilon_t \quad (2)$$

Where a_0 is a constant, z_t is a deterministic trend, and enough lagged differences are included to ensure that the error term becomes white noise. If the Autoregressive representation of Y_t contains a unit root, the t-ratio for a_1 should be consistent with the hypothesis a_1=0.

The results of ADF test are reported in Table 1 indicate that all variables are non stationary at levels and stationary at first differences. They show that the hypothesis of unit root is not rejected for all the variables at the 5% level of significance. Thus, all variables are integrated of the same degree I (1) order.

Secondly to check the appropriate lag length; an unrestricted VAR model has been estimated and the optimal lag length criteria. Table 2 indicated the optimal lag is one lag according to the majority.

7.2. Co-integration Test

As a rule of thump, If the series used become stationary at the same level I (1), then it would be possible to the linear combination of the variables to be stationary at the zero level I(0) which means that the data are co-integrated. If there is more than one linear combination, more than cointegration relationship between the variables exists. Johansen & Juselius (1990) provided two likelihood ratio tests to obtain the number of cointegrated vectors, which are insignificantly different from unity.

$$\lambda_{trace}(r) = -T \sum_{i=r+t}^{n} \ln(1-\hat{\lambda}_i) \quad (3)$$

$$\lambda_{max}(r, r+1) = -T \ln(1-\hat{\lambda}_{r+1}) \quad (4)$$

Where, $\hat{\lambda}_i$ equals the estimated eigenvalue of the characteristic roots, r = 0,1,2,..,T number of observations. The null hypothesis of the first test (trace) is to test if the number of distinct cointegrated vectors is less or equal r against the alternative. The null of the second (max) test is the number of cointegrating vectors r against the alternative of r+1 cointegrating vectors. The results obtained from this test are used in applying the VECM which measures the long – run relationship.

Table 1: The augmented Dickey-Fuller unit root test

Time series variable	T–calculated of ADF test		P-values of ADF test	
	Level	First deference	Level	First deference
OP	–2.39	–4.67*	0.15	0.000
UN	–0.60	–5.35*	0.85	0.000
LP	–2.58	–4.45*	0.105	0.001
RGDPP	4.98	–2.15**	0.99	0.03

*.**Refer to that the null hypotheses that the sires contains a unit root is rejected at 1%, and 5%, significance level, respectively. OP: Openness, UN: Unemployment rate LP: Labour productivity, RGDPP: Real GDP per capita

After selecting the appropriate number of lags, Johansen Cointegration test was applied to explore the long-term relationships among the variables. The results were illustrated in Table 3, that showed there is only one Cointegration equation (on the basis of (P = 0.00) of Maximum Eigenvalue and (P = 0.00) of Trace Test). This implies that long run movements of the variables are determined by one equilibrium relationship, which means that at least one cointegration vector exists among the variables.

The estimates of VECM with one Cointegration equation are illustrated here:

$$\begin{aligned} LnRGDPP &= -0.25\ LnRGDPP_{t-1} + 0.43\ LnOP_{t-1} + 0.78\ LnLP_{t-1} \\ t &= (-3.53) \quad (-2.16) \quad (-16.41) \\ &\quad + 0.15\ LnUN_{t-1} \\ &\quad (-2.21) \end{aligned} \quad (5)$$

The results indicate the negative value of coefficient of error correction (–0.25) and it is statistically significant. This is sufficient to reject any "no cointegration" hypothesis and confirm the presence of a stable long-run relationship between Real Gross Domestic Product per capita and other variables, and provide the correction terms that reflect influences of deviation of the relationship among the variables from long-run equilibrium and short-run parameters, where as the Short-term deviations from the long-term equilibrium relationship are corrected at a rate (0.25).

Furthermore the positive values of the coefficients of trade openness, labor productivity and unemployment rate indicates a positive impact from these variables on economic growth of Jordan in the long run. The Coefficient of the trade openness in the Co-integration equation above is (0.43). It indicates that if trade openness increases by one%, then value of RGDPP will increase by 0.43%. Similarly, if labor productivity and unemployment rate increase by one%, then value of RGDPP will increase by (0.78), (0.15)% respectively.

For the interpretation of the VECM model and how well the model is for forecasting purpose, impulse response functions (IRFs) and forecast error variance decompositions (FEVD) hav been used. Both computations are useful in assessing how shocks to economic variables reverberate through a system.

7.3. Forecast Error Variance Decompositions (FEVD)

Forecast error variance decompositions measure the contribution of each type of shock to the forecast error variance.

Table 4 presents the results of the variance decomposition, they are showing that there are significant role played by the shocks in all of variables in accounting for the fluctuations in the RGDPP in Jordan. Here we can see that the 91% variance of RGDPP second period is explained by the RGDPP itself and the rest of the 9% is divided between OP, LP and UN. But in period (10), 60% forecast error variance of RGDPP is explained by trade openness and 22% , and 3% by labor productivity and rate of unemployment respectively.

Table 2: Lag length criteria

Lag	LR	FPE	AIC	SC	HQ
0	NA	3.94e-06	−1.092655	−0.905829	−1.032887
1	196.5335*	4.47e-09*	−7.887328	−6.953196*	−7.588491*
2	21.22661	5.04e-09	−7.831452	−6.150015	−7.293546
3	16.83722	6.44e-09	−7.755210	−5.326468	−6.978235
4	9.781945	1.27e-08	−7.441001	−4.264954	−6.424956
5	13.78648	1.65e-08	−7.906165*	−3.982812	−6.651051

*Indicates lag order selected by the criterion (at 5% level). LR: Sequential modified LR test statistic, FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion

Table 3: Results of Johannes cointegration test

Hypothesized No. of CE (s)	Trace statistic	5% critical value	P-values
R=0	65.05*	47.85	0.00
R=1	28.95	29.79	0.06
R=2	9.23	15.49	0.34
R=3	0.11	3.84	0.73
Hypothesized No. of CE (s)	**Max-Eigen statistic**	**5% critical value**	**P-values**
R=0	36.09*	43.42	0.00
R=1	19.72	21.13	0.07
R=2	9.11	14.26	0.27
R=3	0.11	3.84	0.73

*Trace test indicates cointegration at 5% levels of significance *Max-eigenvalue test indicates cointegration at 5% levels of significance

Table 4: Variance decomposition analysis

Period	SE	RGDPP	OP	LP	UN
1	0.04	100.0	0.0	0.0	0.0
2	0.05	91.7	0.50	60.88	0.84
3	0.07	80.4	7.94	11.05	0.52
4	0.09	58.23	23.22	18.19	0.34
5	0.11	41.15	36.52	21.71	0.60
6	0.14	29.64	46.09	23.25	1.00
7	0.16	22.60	52.35	23.43	1.60
8	0.17	18.32	56.34	23.19	2.13
9	0.19	15.70	58.83	22.81	2.63
10	0.20	14.05	60.41	22.47	3.05

SE: Standard error, RGDPP: Real GDP per capita, OP: Openness, UN: Unemployment rate LP: Labour productivity

7.4. Impulse Response Functions (IRFs)

Impulse response functions show the effects of shocks on the adjustment path of the variables as shown in Figure 3. The response function presents the response of (RGDPP, OP, LP and UN) to each other. The multiple graphs show that all variables are responding to each other. It is actually the response of present value to the future value of one of the endogenous variables in the VAR to the rest of variables. By examining Figure 3, we can check whether a variable gives response to other variables or not. It can be seen that a positive shock in the short run trade openness leads a high increase in the RGDPP. Also a positive shock in the short run labor productivity leads a little increase in the RGDPP. On the other hand, initially RGDP gives a negative response to a positive shock in unemployment rate. But after four periods the response of RGDP will be positive. Labor productivity gives a positive response to a shock in the short run trade openness. Unemployment rate gives negative response to shock in the short run trade openness. As for the response of unemployment rate to the shock in the short run labor productivity, the result show that negative response. the same interpretation applied when we examine the response of labor productivity to the shock of unemployment rate.

The validity of the VAR/VECM results depends on whether the VAR/VECM model is stable or not. In an event such stability condition is not fulfilled, the results could be misleading and hence inaccurate inference. The stability test is given below (Figure 4).

It can be seen that none of the points lies outside the circle, suggesting that our VAR/VECM model is stable and the results obtained would be valid.

8. CONCLUSIONS AND RECOMMENDATIONS

This study examined the impact of trade Openness on the Jordanian's economic growth, through examining the improvement in employment and labor productivity by using Johansen's co-integration test and VECM framework. The study employed a time series data during the period of 1980–2014. The empirical results of Johansen co-integration test indicated that there is at least one co-integrating vector among the variables in Jordan. The findings of the study showed that the speed of adjustment in the VECM is significant and equal (0.25). This implies that on the long run, movements of the variables are determined by one equilibrium relationship. The results also indicate that there is a positive and significant effect of all explanatory variables on economic growth in the long run, while the effect in the short run are insignificant.

The results of impulse response function showed a positive effect of trade openness on labor productivity and economic growth, and a negative effect on unemployment rate. As for the analysis of variance decomposition, it gave great importance to trade openness in the interpretation of economic growth.

In addition, The results of the descriptive analysis indicated a change in the structure of exports after the opening of trade in favor of manufactured exports, instead of primary exports, which

Figure 3: Impulse response functions

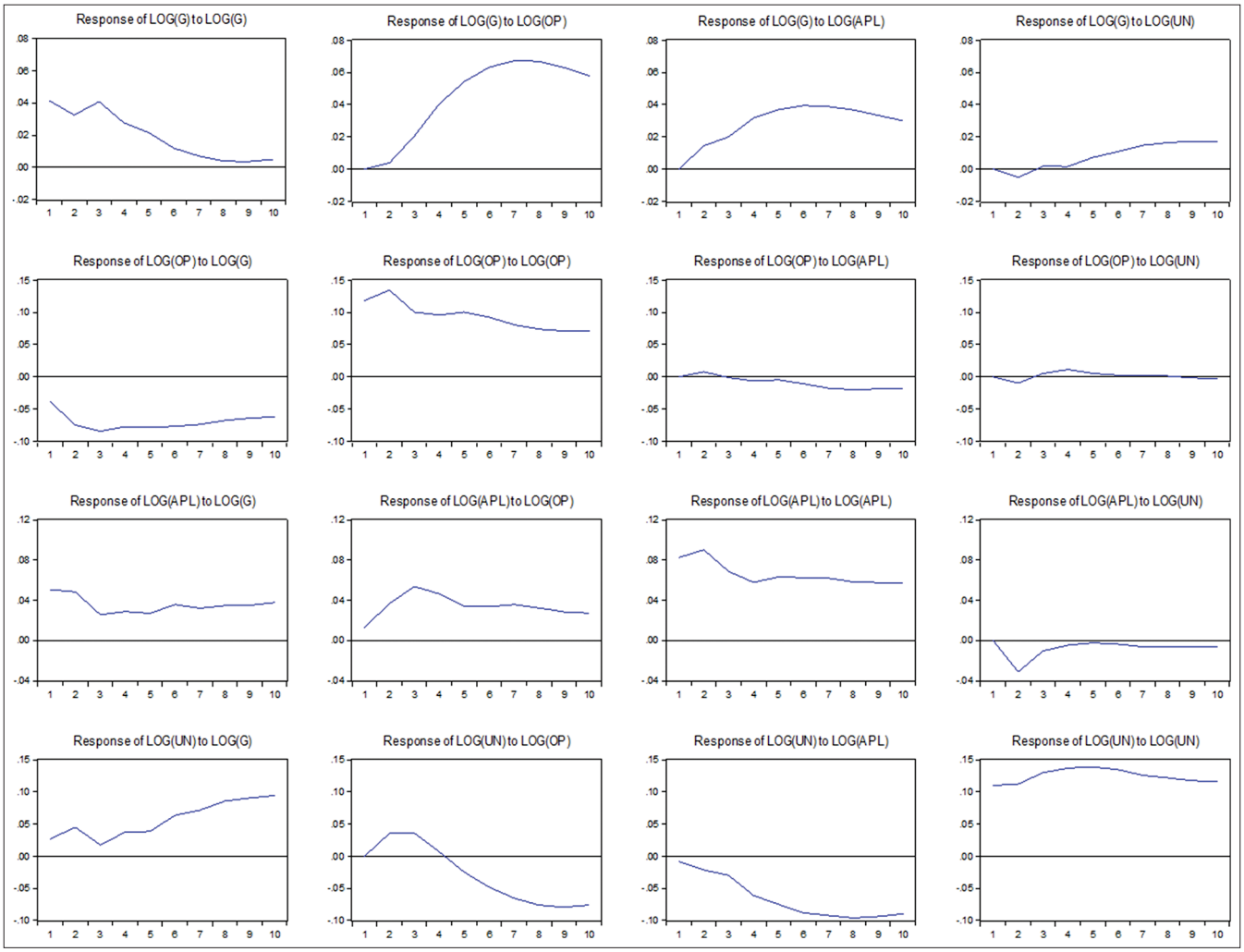
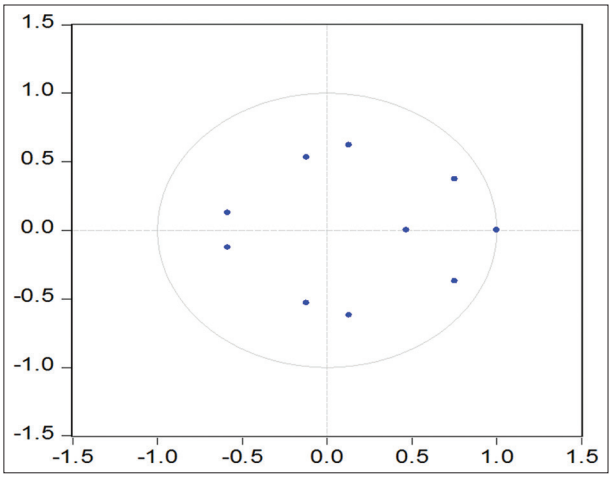


Figure 4: Inverse roots AR characteristic polynomial



leads to a change in the composition of exports from resource labor-intensive products to capital intensive products.

Based on the research results, trade openness has significant positive effect on economic growth in Jordan. However, the Jordan has been importing more than exporting which led to suffer continuous trade deficits. So in order to more benefit from trade liberalization, the study recommends the following:

- Working to raise the productivity of production elements (labor and capital) through education, training and attracting advanced technology. As productivity increases, the added value increases and on the other hand relative costs decrease, so that competiveness will be increased.
- There is a need for raising the competitiveness ability of local industry products through R & D.
- There is a need of imparting innovations and modern technology in production, to promote efficiency and competition.

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