

TRADE IN GOODS AND SERVICES AND ITS EFFECT ON ECONOMIC GROWTH –THE CASE OF JORDAN

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Abstract: International trade is steadily increasing and one of its recent trends is the increase in the volume of trade in services. Nevertheless, the growth effects of trade in services have been insufficiently explored. Therefore, the aim of this study is to investigate empirically the specific growth contribution of the trade in goods and services in Jordan for the period 1980-2014. The model is estimated using the Fully Modified Ordinary Least Squares approach, which corrects for endogeneity of data and serial correlation. The results of the estimated regression are in tune with the economic theory. In particular, it emerges that trade in goods has a negative effect on GDP in Jordan, whereas trade in services positively affects economic performance.

Keywords: Trade in services, international trade, Jordan, economic growth, Fully Modified OLS

JEL classification: F14

1. Introduction

There is much empirical evidence corroborating the fact that international trade fosters economic growth, both for industrialized and for developing countries. Liberalizing and striving towards the integration into the global markets has thus become a standard precept inspiring trade policy reforms. Further, a recent trend with international trade is the increased importance of the trade in services: in particular, internet and the development of IT techniques have facilitated cross-border trade in services. Better transportation and telecommunication techniques, liberalization of many financial transactions, but also increased demand for tourism related services and travel have much increased the scope of international trade in services.

The present study moves from these considerations and tries to compare the growth contribution of trade in goods and of trade in services for Jordan for the period from 1980 to 2014. The case of Jordan seems to be particularly interesting as it represents the case of a small country characterized by a chronic deficit in its balance of trade and, since 2005, by a positive services balance. Furthermore, like many developing countries, Jordan has implemented a comprehensive liberalization program since the beginning of the 1990s and has entered the World Trade Organization (WTO) in 2000. Therefore, the aim of this study is to provide an in-depth analysis of the growth implications of trade in goods and of trade in services for Jordan.

The present study is, at best of our knowledge, the first empirical contribution explicitly looking at the growth effect of trade in services and comparing it with that of

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trade in goods in Jordan. The analysis is based on a Solow model of growth, which considers GDP as a function of capital, labor, trade in goods and in services. The model is estimated using the Fully Modified Ordinary Least Square (FM-OLS) technique. The results show that trade in services has a significant positive impact on growth while a positive effect of trade in goods depends on its final positive contribution to domestic production: if imports are more substitutive than complementary to domestic production, the final effect may be null or even negative, leading to unsustainable current account balance.

The study is articulated as follows: Section 2 reviews important findings on the link between international trade and growth, with a specific attention to the contributions focusing on trade in services. Section 3, then, describes the trade environment in Jordan and analyzes the composition of trade in goods and services. Section 4 presents the empirical part of the study: it starts with explaining methodology, model specification and research hypotheses; data analysis and its main findings follow. The major implications of the empirical results and conclusions of the study are summarized in Section 5. An Annex includes supplementary results.

2. International Trade and Economic Growth

International trade is an indicator of openness and integration into the world economy and, as such, is regarded as one of the engines of economic growth. Trade can enhance economic growth via encouraging capital accumulation and technological progress, generating spillover effects, enabling industrial structure upgrading and the exploitation of economies of scale. The integration into global markets and exports typically increase competition and thus force to raise productivity (Wagner, 2007). Further, even imports of capital and intermediate products can enhance the productivity of manufacturing (Lee, 1995).

In general, there is much empirical evidence corroborating the positive association between trade in goods and economic performance (Barro, 1991; Dollar, 1992). This result seems to be robust to different indicators of international trade and trade openness (Stiglitz, 1998). The positive link between trade openness and economic growth is one of the pillars of mainstream economic theory, which inspired the economic reform programs of the 1980s and 90s (IMF, 1997). Accordingly, most of the developing countries have put efforts for opening up the economy and reducing barriers to trade.

Nevertheless, there is mixed evidence on the implications of reducing barriers to trade on growth (Rodriguez and Rodrik, 2000). The empirical literature has further pointed at some factors mitigating the growth effect of international trade: in particular, Fetahi-Vehapi et al. (2015) conclude that openness to trade has a larger effect on growth in countries with higher level of initial per capita income, higher level of foreign direct investment (FDI) and of gross fixed capital formation.

Further, over the past twenty years, “*trade in services has become the most dynamic segment of world trade, growing more quickly than trade in goods*“ (WTO, 2015), and developing countries play an important role as net exporters of services. So far, most of the studies analyzing the growth effect of trade in services have dedicated their attention to specific services sectors. E.g., Mattoo, Rathindran and Subramanian (2006) find a positive effect of open financial and telecommunications sectors. Eschenbach

and Hoekman (2006) provide evidence that liberalization in services policies is likely to stimulate the inflow of FDI. According to the study by Arnold, Javorcik and Mattoo (2007), services import seems to foster productivity of manufacturing.

Among the contributions focussing on the steps towards liberalizing trade in goods in Jordan, Busse and Grönig (2012) apply a gravity model and find no significance change into the volume and direction of trade after trade liberalization, except a significant increase in exports to the USA after the Free Trade Agreement (FTA). The authors interpret this result as due to the previous existence of numerous bilateral preferential agreements.

Further, several studies have then investigated the effect of specific trade agreements signed by Jordan: much has been done for assessing the effect of the FTA with the USA, both from institutional sources (United States International Trade Commission, 2000) and from academic researchers (Al Nasa'a et al., 2008; El Anis, 2013). Moreover, Awad (2011) tries to assess the effect of the trade agreement between Jordan and Turkey.

Feraboli (2007) develops, on the basis of a computable general equilibrium (CGE) model, predictions and scenarios of trade liberalization in Jordan with a specific focus on the Euro-Mediterranean Partnership. Feraboli (2007) builds on the contribution by Hosoe (2001), which also applies a CGE model and indicates that the impact of trade liberalization in Jordan differed per sector. In particular, it seemed to positively affect the chemical and agricultural sectors and to adversely affect the non-mineral mining sector. Hosoe (2001) is not the only contribution focussing on specific sectors of the Jordanian economy: Cordella (2006) has e.g. analyzed the impact of trade liberalization on agriculture.

Focussing on the case of Jordan, there is abundant evidence on trade in goods and on the effects of trade liberalization, both at case study and at cross-country level, but trade in services has been so far neglected. Actually, Muhtaseb (2015) is the only empirical contribution dealing with the implications of trade in services in Jordan. Specifically, Muhtaseb (2015) focuses just on the growth effect of imports in services and applies a FM-OLS. She finds evidence for their negative contribution to growth. Awad (2012) further investigates the implications of trade liberalization for different sectors of the Jordanian economy, including the services sector.

The present study is thus, at best of our knowledge, the first study developing and empirically testing the effect of volume of trade in services on economic growth in Jordan and comparing it to the effect of trade in goods. For doing that, we specify trade as volume of trade (import plus export) as ratio of GDP, both for goods and for services. In this way, we obtain two comparable indicators for trade and its importance for Jordan.

3. Patterns of Trade in Jordan

In the realm of its economic reform program, Jordan has done much to improve its integration into the global economy. Until the beginning of the 1990s, however, Jordan had a rather fiscalist approach to international trade, and tariffs revenues were one of the main sources of state revenues. After that, Jordan has taken important steps towards trade liberalization and, in 2000, has become a member of the World Trade

Organization (WTO). At present, Jordan is classified as “mostly free“ economy concerning the subindicator “trade freedom“ by the Heritage Foundation’s Index of Economic Freedom 2016.

Jordan has stipulated trade and economic agreements both at regional and at bilateral level with around 86 countries from all over the world (specifically, 19 agreements are with Arab countries and 67 with non-Arab countries). To mention are hereby the Greater Arab Free Trade Agreement (GAFTA), the Agadier Agreement, which is creating a free trade area between Jordan, Egypt, Tunisia, and Morocco, the Jordan-United States Free Trade Agreement, which entered into force in 2001, the Euro-Jordanian Association Agreement of 2002, the FTAs with Singapore, with Canada, and with Turkey.

As shown by Figure 1, the volume of trade in Jordan has exponentially increased over time, in particular after the accession of Jordan to the WTO in 2000.

Figure 1: Volume of trade between 1980 and 2014 in JD ml (data source: UNCTAD database, 2016)

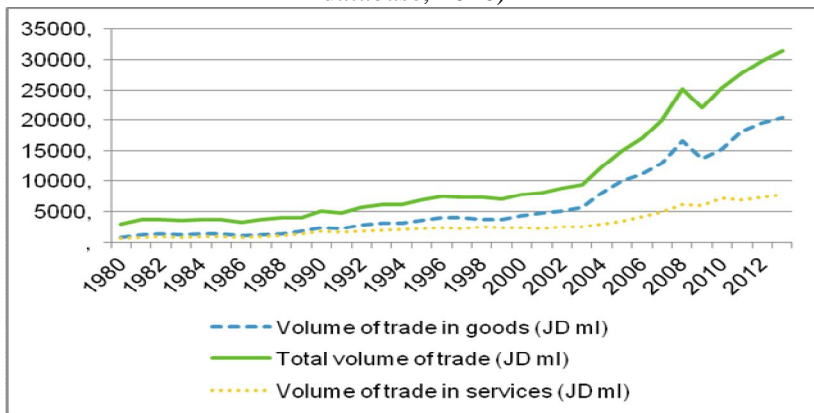
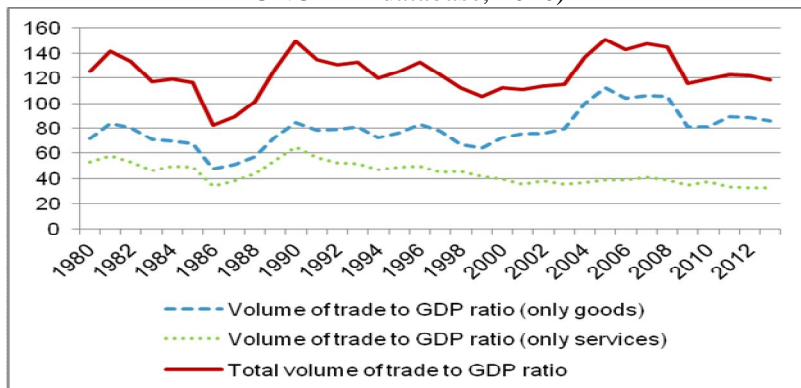


Figure 2: Volume of trade to GDP ratio between 1980 and 2014 (data source: UNCTAD database, 2016)



In terms of ratio to GDP, trade in goods has been fluctuating but always within a given range. On average for the whole period considered, the trade in goods to GDP ratio was 79.22%, with a standard deviation of 14.6. The trend in the trade in services ratio

is on the contrary decreasing: it was more than 50% at the beginning of the 80s and is at present around 32-33%. In the last years, total volume of trade (both in goods and in services) to GDP ratio has decreased from 125% in 2011 to 119.5% in 2013 and to 118% in 2014.

Overall, the net trade in goods and in services is clearly negative: total import in goods and services is significantly higher than total exports. In 2014, deficit of total trade in goods and in services was almost 34% of GDP, with total imports of goods and services being 57% of GDP and total exports 23%.

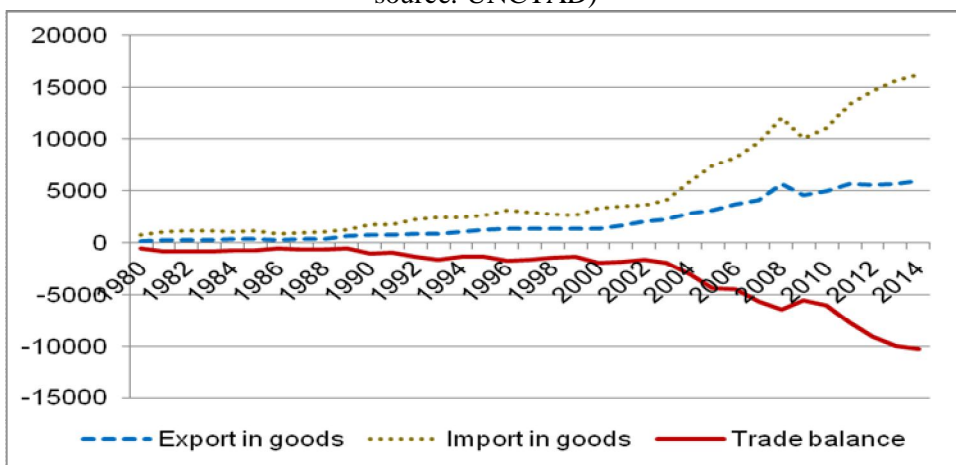
3.1 Trade in Goods (Composition and Direction)

The volume of trade and thus trade deficit jumped up (in absolute value) starting by the mid of the 1970s. In particular (Figure 3), imports started to gain importance as a consequence of the increase in workers' remittances and international aid, which summed up at the beginning of the 1980s to almost 50% of Jordanian GDP. A second jump in magnitude for trade deficit occurred then at the beginning of the 1990s, in concomitance with the IMF involvement in the country for the economic reform process. After the accession to the WTO in 2000, trade balance deficit increased again its overall size, becoming a very serious concern for the country.

In general, Jordan is not an export-oriented economy and, since 2000, exports have been assessed around 20% of GDP.

The chronic situation of Jordan with its trade balance is clearly depicted in Figure 3. In terms of share of GDP, trade balance deficit was almost 34% in 2014.

Figure 3: Jordanian balance of trade between 1980 and 2014 in JD million (data source: UNCTAD)



The composition of the Jordanian domestic exports by commodity has remained relatively stable over time. The most important categories of exports are miscellaneous (mainly clothes) and chemicals (mostly medical and pharmaceutical), which represented in 2014 51% of the Jordanian exports. Crude materials and inedible (thus mostly potash and phosphates) follow with a share of 18%. Food (which mostly consists of vegetables) and live animals represent then 14% of exports. Manufactured goods (the main item being papers and cardboards) and machineries play a marginal

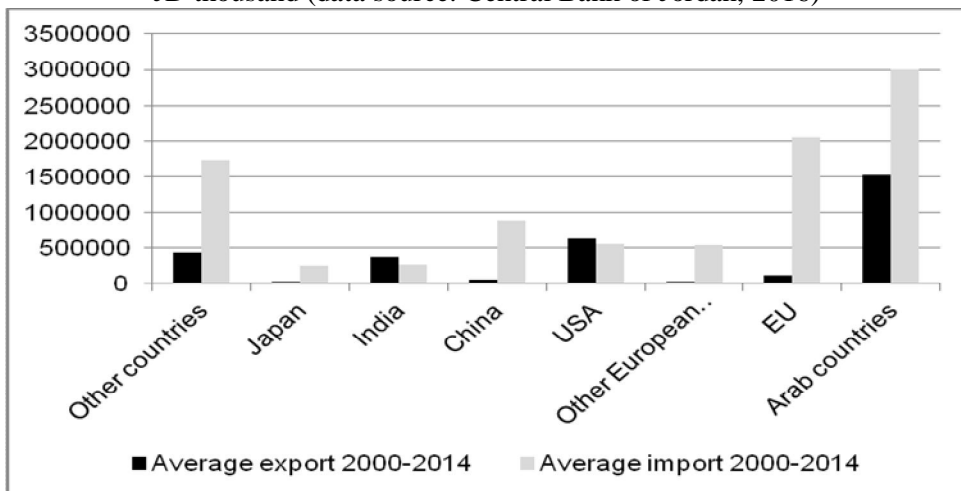
role with Jordanian exports, which clearly points at the weakness of these sectors in Jordan.

In 2014, the majority of imported goods were crude materials (mostly fuels) and intermediate goods. Consumer goods represented 27% of total imports and capital goods only 13%. Most important import products are mineral fuels, which represent 27% of total imports. The second major category in terms of share is machinery and transport equipment (18% of imports). Hereby, transport equipment and spare parts represented alone 6% of total imports in 2013 and have increased to 10% in 2014.

With a share of 16%, food and live animals are the third most important category of imports. In particular, import of food and live animals was JD ml 2545.1 in 2014, whereas export of food and live animals was only JD ml 966.8. Thus, Jordan had hereby a net deficit, as imported food exceeded exported food by JD ml 1578.2.

Concerning the main trading partners of Jordan, a prominent role is played by the Arab countries, which represent the main destinations of Jordanian exports and an important provenience of imports to Jordan (see Figure 4 for average data on the distribution of international trade in Jordan between 2000 and 2014).

Figure 4: Average import and export in goods from 2000 to 2014 by trading partner in JD thousand (data source: Central Bank of Jordan, 2016)

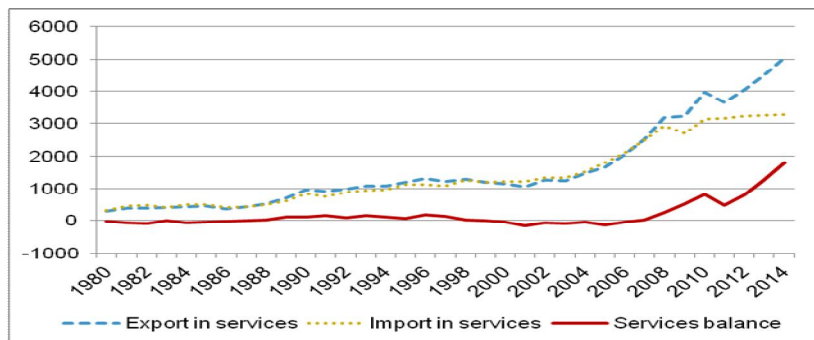


3.2 Trade in Services

Being a member of WTO, Jordan also adheres to the General Agreement of Trade in Services (GATS) and has done the corresponding steps to liberalize its services market. In general, trade in services is classified according to four modes: cross-border supply, consumption abroad, commercial presence, and movement of natural persons.

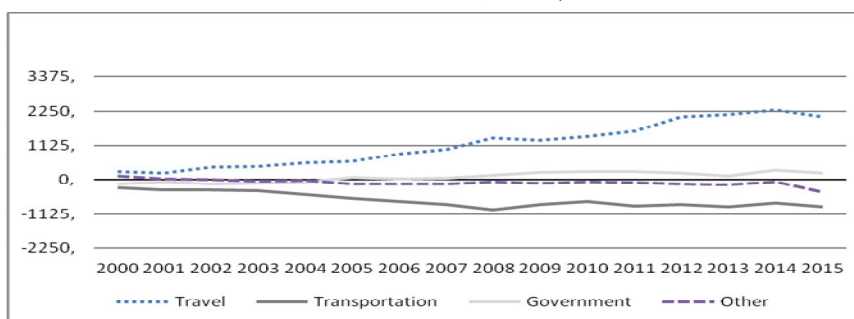
Over time, trade in services has improved its net position and has considerably expanded during the last years. As shown in Figure 5, since 2007, the balance of trade in services has remained positive and has increased in value. The services account increased from 5% of GDP in 2013 to 7% of GDP in 2014. In 2014, the Jordanian export in services represented 50% of its total exports (in both good and services), whereas import represented almost 17% of total import flows. The country can be thus defined as a net exporter of services.

Figure 5: Trade in services between 1980 and 2014 in JD ml (data source: UNCTAD)



Travel services are clearly the bulk of the services exported by Jordan (see Figure 6). In percentage terms, they represented in 2015 a share of almost 69% of total exports in services. Transportation, government services, and other services follow in order of size.

Figure 6: Net sector contribution to the services balance in JD ml (data source: Central Bank of Jordan, 2015)



Considering the composition of import in services to Jordan, which has remained pretty stable over the last years, transportation services clearly play the most important role. Government services play only a marginal role. In 2015, more than half of total imports in services were due to transportation services. Travel constituted a share of 26% of total imports and other services represented 16%. Government services made up the remaining 2%. In the Annex, Figure 7 and Figure 8 show the evolution of real GDP, import, and export in per capita real term (at 2010 prices).

4. Empirical Study

As follows, the empirical analysis is introduced and the methodology is specified. Next, the econometric techniques applied and the main findings are presented.

4.1 Methodology

The empirical analysis adopts a case study approach and concentrates on the specific case of Jordan. In general, we agree with Bhagwati and Srinivasan (1999) and believe that, dealing with trade, detailed country level case studies are a powerful tool of analysis and in many cases preferable to cross-country regressions. Specifically, we present a neoclassical supply side model of production and volumes of trade in goods and in services.

In designing our approach to the case of Jordan, we also pay much attention to the specification of the variables ‘trade in goods’ and ‘trade in services’, as we are aware of Rodriguez’s criticism concerning misspecification of openness to trade and methodological inaccuracy. Rodriguez (2006) has namely replicated some influential studies and found out that the positive evidence on the link between economic integration and growth “*either derived from the fact that the openness indicators used were not appropriately measuring openness (...) or that the papers in question had made questionable methodological choices*” (Rodriguez, 2006).

Guisan (2008) and (2015) points to the methodological problems that arise when rates, ratios and per capita terms are mixed in international comparisons and models. Mixing those types of indicators very often does not reveal adequately the existence of important causal relationships. Therefore, the Annex (estimations A1 to A4) presents the results of estimations with variables in real terms (at constant 2010 prices).

Further, Guisan’s findings provide evidence for a strong positive correlation and causal relationship between foreign trade and production, both in per capita term. Generally, higher levels of production increase trade (domestic and/or foreign), which, in the end, lead to an increase in export. According to Guisan, higher capacity to export usually allows an increase of imports. The export of goods and services usually then helps to increase the import of intermediate inputs, which may have, again, a positive effect on domestic product. Thus, a key to understand the interrelation between trade and economic growth is the understanding of the relationship between imports and exports. Hereby, we estimate an intersectoral model to capture the relationship between imports of goods and exports of goods and services and test the causal relationship between them (Annex, A5 and A6).

The shares of imports and/ or of export to GDP are related to the size of a country. These shares tend to be higher for small countries like Jordan. Small countries usually have little opportunity to increase domestic trade. As Guisan points out, domestic production of industry is, in particular for small countries, of uppermost importance for the sustainable development of non domestic products and foreign trade and is the key to avoid unsustainable trade deficits.

4.2 Model Specification: neoclassical model

Our specification of trade aims at capturing the importance of the volume of trade (import plus export) relative to the output’s level: we adopt the same specification for trade in goods and for trade in services. In doing that, our approach to trade in services differs from and goes beyond that of Muhtaseb (2015), who only considers the impact of services import on growth and disregards the growth contribution of export in services and thus the importance of this type of export for developing countries (WTO, 2015).

In order to capture the impact of trade in goods and in services on economic performance, the empirical analysis is based on a neoclassical growth model, assuming that output is determined by physical capital, labor force, and technology. This model was originally developed by Solow (1956) and further extended by Mankiw, Romer and Weil (1992).

Accordingly, this study considers a standard Cobb Douglas production function $[Q_t = f(A_t, L_t, K_t)]$ where Q_t : aggregate production (gross domestic product in year t , GDP_t), A_t : total factor productivity, L_t : labor force, K_t : capital.

To capture the impact of trade in goods and trade in services on gross domestic product, the term A_t becomes a function of trade in goods and trade in services: $[A_t = f(C, Trade_{gt}, Trades_t)]$.

Herewith, the production function $Q_t = f(C, Trade_{gt}, Trades_t, L_t, K_t)$ becomes:

$$Q_t = (C)(Trade_{gt}^{\beta_0})(Trades_t^{\beta_1})(L_t^{\beta_2})(K_t^{\beta_3}) \quad (1)$$

By taking the natural logarithm for both sides of equation (1) and by adding the term 'Trend' as a proxy for technological changes, the following model specification will be estimated:

$$LnQ_t = \alpha + \beta_0 LnTrade_{gt} + \beta_1 LnTrades_t + \beta_2 LnL_t + \beta_3 LnK_t + \beta_4 Trend + \varepsilon_t \quad (2)$$

Here, the dependent variable LnQ_t stands for natural logarithm of nominal GDP and the independent variables are

LnK_t , the natural logarithm of capital accumulation,

LnL_t , the natural logarithm of compensation of employees (proxy for labor force)

$LnTrade_{gt}$, the natural logarithm of trade in goods,

$LnTrades_t$, the natural logarithm of trade in services

$Trend$, represents the technology and is measured by a simple time trend

Further, ε_t is the error term and the index t indicates the year of reference.

In this setting, we expect capital and labor to have a significant positive contribution to output. With respect to trade, then, we expect trade in goods to have a significant, but negative, effect on output while we expect trade in services to positively affect output in Jordan.

We motivate the expected negative effect of trade in goods on growth with the chronic balance of trade deficit and the strong import dependency of Jordan. Further, as shown in Section 2, a large share of imports to Jordan is represented by consumption goods, whereas previous cross-country evidence reveals the possibility of imports of capital and intermediate products to enhance the productivity of manufacturing (Lee, 1995).

This also reflects into the idea that the export of goods is the main driver of trade for economic growth. A further interesting line of explanation to motivate the negative effect of trade on growth considers balance of payment as an important constraint to growth (Thirlwall, 2011). Finally, the effect of trade on growth is mitigated by the ability of developing countries to gain productivity growth through openness (Andersen and Babula, 2008).

Since Jordan is a net exporter of trade in services, we expect a positive effect of trade in services; income gains from trade in services have been alleged to be even more beneficial for developing countries than trade liberalization with goods (World Bank, 2016).

Data Set

The empirical analysis is based on annual data referred to the period 1980-2014. The dependent variable is gross domestic product at current market prices and is expressed in JD millions. Annual data series for GDP have been taken from publications of the Central Bank of Jordan.

As independent variable, compensation of employees has been considered as a proxy for labor. Data entries for compensation of employees have been taken from the Yearly Statistical Book of the Jordan Department of Statistics (DOS).

Capital accumulation is then considered as proxy for capital. Capital accumulation has been calculated relying on the incremental capital-output ratio approach (Adelman and Chenery, 1966) based on gross capital formation data published by the Central Bank of Jordan.

Further independent variables are export plus import as ratio of GDP, which is a typical indicator for openness to trade, and export plus import of services as ratio of GDP. Data on trade have been taken from the United Nations Conference on Development and Trade (UNCTAD) database.

4.3 Data Analysis and Empirical Findings

For data analysis and model estimation, the software E-Views has been used. As preliminary step of analysis, a unit root test has been run applying an Augmented Dickey-Fuller (ADF) test. This is a necessary step in dealing with time series analysis to avoid the spurious regression problem and to identify the most appropriate econometric technique. The unit root test reveals that all variables (in logarithms) are stationary at the first difference, except trade in goods, which is stationary at the level. Table 1 reports the results of the ADF test.

Table 1: Augmented Dickey-Fuller (ADF) Unit Root test

Variables	Stationary Level	t-statistics	Critical value	Lag	Significant at
$Ln(Q)$	First difference	-2.81	2.62	1	10%
$Ln(K)$	First difference	-1.96	-1.95	0	5%
$Ln(L)$	First difference	-7.73	-3.66	0	1%
$Ln(Tra\ deg / GDP)$	Level	-3.61	-3.55	1	5%
$Ln(Trades / GDP)$	First difference	-3.72	-3.67	3	1%

Notes: -the null hypothesis of non-stationary cannot be rejected whenever the t-statistics is larger than the critical value, -the test equation for the ADF was determined based on the graph of each variable

In order to make sure that the model relies on an empirically meaningful relation, we have tested for co-integration. For this purpose, the Johansen co-integration test (Johansen, 1988), which detects the number of co-integration vectors and tests the long-run relationship between the variables, has been applied. The results of Trace and Maximum Eigenvalue test show that the null hypothesis of non co-integration is rejected. Specifically, the Trace test indicates at the 5% level that there are at least two

co-integration equations and the Max-Eigenvalue indicates at the 5% level that there is at least one co-integration equation. The results of the Johansen co-integration test indicate thus that there is a valid and stable long-run relationship between dependent and independent variables.

Table 2: Unrestricted co-integration Rank test Trace and Maximum Eigenvalue

	Trace test		Maximum Eigenvalue Test	
Null hypothesis	Trace statistics	Critical value	Max- E Statistic	Critical
$r = 0$	148.4122	88.80380	80.87588	38.33101
$r \leq 1$	67.20205	63.87610	30.33431	32.11832
$r \leq 2$	37.95332	42.91525	23.24873	25.82321

Notes: Trace test indicates 2 co-integration equation(s) at the 0.05 level Max-Eigenvalue test indicates 1 co-integration equation(s) at the 0.05 level

The regression model has been estimated via the Fully Modified Ordinary Least Squares (FM-OLS) approach. The FM-OLS has been chosen as it relies on a single equation estimation technique, which seems to be the optimal method of estimation if time series are not stationary at the same level and if there is a co-integration between variables, so that there is no need to take the first difference.

In particular, the FM-OLS, which has been originally suggested by Phillips and Hansen (1990), provides optimal estimates of co-integrating regressions, taking into account both serial correlation effect and endogeneity in the regressors. This method namely consists of an OLS estimation added by an FM estimator, which corrects for these two problems, so that the t-test for long-run estimates is valid. More specifically, endogeneity is corrected via the transformations of the dependent variable and the error term as following $\hat{y}_{1t}^* = y_{1t} - \hat{\omega}_{12}\hat{\Omega}_{11}\Delta X_{2t}$ and $\hat{u}_{1t}^* = u_{1t} - \hat{\omega}_{12}\hat{\Omega}_{11}\Delta X_{2t}$ while the

$$\hat{\sigma}^+ = \sum_{k=0}^{\infty} (u_{1k}^+ u_{2k}^+)$$

remedy for the serial correlation between errors is corrected by (Phillips, 1995). It follows that the corrected estimated ordinary least square parameters are $\hat{\beta} = (X_2'X_3)'^{-1} (X_2'\hat{y}_{1t}^* - T\hat{\sigma}^+)$ (Maddala and Kim, 1998; Hong and Wagner, 2011; Vogelsang and Wagner, 2014).

Accordingly, the results of the estimated regression using the FM-OLS is reported as follows:

$$\begin{aligned} \ln Q_t = & -0.89 - 0.22\ln Trade_g_t + 0.28\ln Trade_s_t + 0.59\ln L_t + 0.45\ln K_t + 0.03Trend \\ SE = & (1.236) \quad (0.076) \quad (0.121) \quad (0.058) \quad (0.116) \quad (0.012) \end{aligned}$$

The results of the estimated regression show that all coefficients of the explanatory variables (which represent the elasticities) are highly significant. In particular, trade in goods is shown to have a negative impact on real GDP: an increase in trade in goods by 1% namely decreases output by 0.22%. This can be explained through the chronic

trade balance deficit in the country as well as the high share of imported consumption goods to total imported goods. Actually, 27% of total imports to Jordan is represented by consumption goods, whereas the share of capital goods, which may be expected to have positive effects on the productivity of the manufacturing sector, is 13%. Accordingly, the estimation of (1) by OLS in real terms included in the Annex, shows no significant effect of trade and trades. The results of the intersectoral model and of Granger causality (in Annex) corroborate the idea that an increase in imports, especially if of intermediate inputs, can stimulate exports of goods and services.

Trade in services has a significant positive impact on GDP: an increase in trade in services by 1% namely increases GDP by 0.28%. We interpret this positive impact due to the positive service account in Jordan in the last years. This is an important result as the development of the services sector is also typically associated with the creation of qualified job opportunities. Educational level and human capital are high in Jordan, while wages and income level are lower than in industrialized countries, so that trade in services may represent a chance for the country to create a comparative advantage and expand its market. The positive growth effect of trade in services is thus a call to strengthen and facilitate export in services and to increase their size and importance for the economy. It is a fact that *“the performance in the services sector can make the difference between rapid and sluggish growth”* (World Bank, 2016).

5. Conclusion

There is much empirical evidence corroborating the positive effect of trade on economic performance, but at the same time there are several studies showing more mixed results and pointing at some factors mitigating this effect, as e.g. productivity, gross capital formation, initial income level, and balance of payment. The recent trend with international trade shows an increase in trade in services faster than trade in goods. This reflects the importance of trade in services in particular for developing countries.

Focusing on the case of Jordan, this study investigates and compares in a neoclassical growth model the effects of trade in goods with those of trade in services. The model has been estimated for the period from 1980 to 2014 relying on a FM-OLS regression, specifying trade as the volume of trade ratio to GDP, both for goods and for services.

Overall, the results of the analysis corroborate the idea that, for the case of Jordan, trade in services seems to positively stimulate economic performance, whereas the effect of trade in goods is more critical. Specifically, we found that an increase in trade in services by 1% improves output by 0.28%. Therefore, trade in services may represent a chance for the country to create a comparative advantage and expand its market. It gives a clear sign for the need to strengthen and facilitate export in services, so to increase their size and importance for the economy.

Based on these findings, we recommend Jordanian policy makers to try to reduce the deficit of the trade balance by supporting the export sector through encouraging domestic production. In particular, we see potential in fostering the industrial sectors, especially concerning pharmaceutical and chemical products, as well as agriculture. Considering the Jordanian business environment, this can be achieved via encouraging

small and medium-sized enterprises (SMEs) to become exporters of competitive products and services.

Further, considering the bilateral flows of trade, it emerges that trade agreements are very important elements and should be framed to really address the specific needs of the Jordanian exporting sectors.

Based on the composition of trade in services, precise policy recommendations should be developed, too: in particular, the government has to invest more to foster the service sector in Jordan. Travels play a central role and should be encouraged: the authorities should invest into the touristic sector to revive “*Jordan’s position as a competitive tourist destination*“ (MoIT and UNCTAD, 2006) and find some mechanisms to train the necessary manpower.

Jordan is a net importer of transportation-related services and also in this sector efforts should be done to increase the share of Jordanian companies. An important constraint is hereby represented by the poor infrastructure. Other transportation-related services and insurance may constitute, on the contrary, a promising market for domestic companies.

Actually, insurance, banking, and financial services may disclose a vast potential for the Jordanian export: to grasp it, more streamlining procedures by the Central Bank and by supervising authorities are needed, also in order to facilitate regional and international investment.

If appropriately supported, also the information and communication sector may play an important role for the export of services and for attracting capital to Jordan.

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Annex 1. Evolution of production and trade and relationships at constant prices.

The Annex 1 presents in Figures 7 and 8 an analysis, in per capita terms, of production and trade in Jordan at constant 2010 prices. The Annex further compares the results of the estimation of equation (1) (with variables in current prices) with other estimations (A1 to A4) with variables in real terms (at constant 2010 prices). Finally, estimation A5 is a mixed dynamic intersectoral model exploring the relationship between imports and exports in real terms.

Figure 7 shows the evolution, in per capita terms, of real GDP, imports and exports of goods in Jordan for the period 1980-2014, at 2010 prices. There is a high degree of positive correlation between the variables, particularly between real GDP per head (QH10JO), and real imports of goods per head (MHG10JO). There are also high positive correlations between exports of goods and the other variables included in the graph.

Although the level of imports of goods per head is moderate, in comparison with many developed countries, the level of exports of goods per head is very low, as a consequence of a low level of industrial production per head.

Figure 7. Evolution of real GDP, Imports of goods and Export of goods per head (real values in Jordan Dinars per head at 2010 prices)

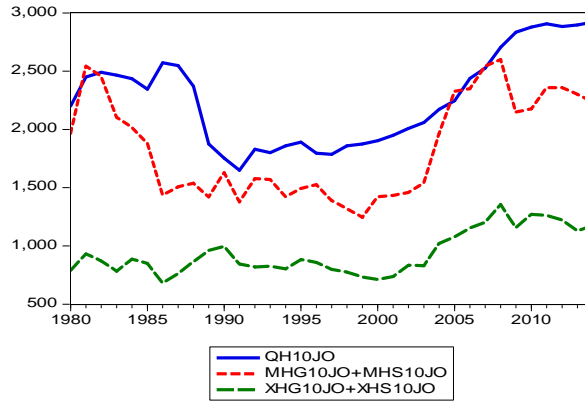
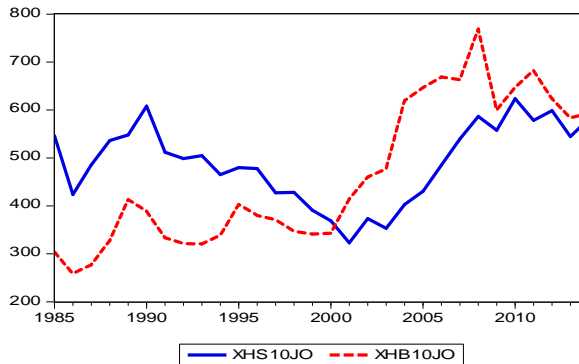


Figure 8 shows the evolution of real values of export of goods per head (XHB10JO) and exports of services per head(XHS10JO). We notice a positive evolution of exports of services per head in the period 2000-2008, which was however not enough to compensate the high gap between Imports and Exports of goods per head.

Figure 8. Evolution Imports of services and Export of services per head (real values in Jordan Dinars per head at 2010 prices)



A general recommendation in order to avoid strong current account deficit is to increase not only the exports of services but also the industrial capacity of the country, which would help to reduce the gap between exports and imports per head.

In this Annex 2 (tables A1 to A4) we compare the results of the estimation of equation (1), with variables at current prices, included in section 4.3, with other estimations with variables in real terms (at constant prices).

Annex 2 on line at the journal Website: <http://www.usc.es/economet/eaat.htm>

Annex 2.

The main results of the estimations A1 to A4, show that the final effect of an increase in both exports and imports of goods, has a positive effect on real production. Exports, both of goods and services, increase the capacity to import intermediate goods with positive effect on real production.

Finally, the estimation A5 shows the important impact of the exports of goods and services to increase the capacity to import.

FM-DOLS estimation of equation (1), at current prices, in section 4.3.

$$LnQ_t = -0.89 - 0.22LnTrade_{g,t} + 0.28LnTrade_{s,t} + 0.59LnL_t + 0.45LnK_t + 0.03Trend$$

SE= (1.236) (0.076) (0.121) (0.058) (0.116)
(0.012)

Estimation of relationships A1 to A4 in real terms

Estimation A1. Equation 1, in logs, at constant prices with trend

Dependent Variable: LOG(Q10JO)

Method: Least Squares

Sample (adjusted): 1980 2014

Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.305403	2.729589	0.111886	0.9117
LOG(TRADEG10JO)	0.133032	0.124842	1.065598	0.2954
LOG(TRADES10JO)	0.126174	0.164712	0.766025	0.4499
LOG(K10JO)	0.342207	0.419171	0.816389	0.4209
LOG(LJO)	0.667275	0.094296	7.076351	0.0000
TI	-0.010175	0.017321	-0.587440	0.5615
R-squared	0.977707	Mean dependent var		9.154264
Adjusted R-squared	0.973863	S.D. dependent var		0.434118
S.E. of regression	0.070183	Akaike info criterion		-2.320612
Sum squared resid	0.142845	Schwarz criterion		-2.053980
Log likelihood	46.61070	Hannan-Quinn criter.		-2.228571
F-statistic	254.3705	Durbin-Watson stat		1.594529
Prob(F-statistic)	0.000000			

Estimation A2. Equation 1 in logs, at constant prices without trend
 Dependent Variable: LOG(QJO)
 Method: Least Squares
 Sample (adjusted): 1980 2014
 Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.865292	0.382944	-7.482270	0.0000
LOG(TRADEGJO)	0.096158	0.084854	1.133211	0.2661
LOG(TRADESJO)	0.184896	0.116969	1.580733	0.1244
LOG(KJO)	0.470460	0.069221	6.796487	0.0000
LOG(LJO)	0.580326	0.069197	8.386545	0.0000
R-squared	0.995746	Mean dependent var		8.578518
Adjusted R-squared	0.995179	S.D. dependent var		0.888749
S.E. of regression	0.061711	Akaike info criterion		-2.601152
Sum squared resid	0.114247	Schwarz criterion		-2.378959
Log likelihood	50.52016	Hannan-Quinn criter.		-2.524451
F-statistic	1755.508	Durbin-Watson stat		1.639488
Prob(F-statistic)	0.000000			

Estimation A3. Equation 1. Linear mixed dynamic model of production and trade, without trend
 Dependent Variable: Q10JO
 Method: Least Squares
 Sample (adjusted): 1981 2014
 Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Q10JO(-1)	0.986398	0.024992	39.46852	0.0000
D(TRADEG10JO)	1.438765	8.704186	0.165296	0.8699
D(TRADES10JO)	5.936772	24.72639	0.240099	0.8119
D(K10JO)	0.325191	0.152274	2.135571	0.0413
D(LJO)	0.763388	0.319028	2.392859	0.0234
R-squared	0.993612	Mean dependent var		10588.26
Adjusted R-squared	0.992731	S.D. dependent var		5025.287
S.E. of regression	428.4419	Akaike info criterion		15.09324
Sum squared resid	5323312.	Schwarz criterion		15.31771
Log likelihood	-251.5851	Hannan-Quinn criter.		15.16979
Durbin-Watson stat	1.607087			

Estimation A4. Real terms and Imports and Exports instead of trade and trades

Dependent Variable: LOG(Q10JO)

Method: Least Squares

Sample (adjusted): 1980 2014

Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.806150	2.260475	-0.799013	0.4308
LOG(IMPB10JO)	0.253764	0.067633	3.752073	0.0008
LOG(EXPB10JO)	-0.158159	0.090805	-1.741747	0.0922
LOG(K10JO)	0.570675	0.325317	1.754215	0.0900
LOG(LJO)	0.601415	0.092291	6.516544	0.0000
TI	-0.007801	0.013943	-0.559480	0.5801
R-squared	0.980829	Mean dependent var		9.154264
Adjusted R-squared	0.977524	S.D. dependent var		0.434118
S.E. of regression	0.065083	Akaike info criterion		-2.471490
Sum squared resid	0.122840	Schwarz criterion		-2.204859
Log likelihood	49.25108	Hannan-Quinn criter.		-2.379449
F-statistic	296.7408	Durbin-Watson stat		1.608136
Prob(F-statistic)	0.000000			

Relationship between Imports and Exports: mixed dynamic model

Dependent variable: Imports of goods at 2010 prices in Jordan (IMPG10JO)

Explanatory Variable: lagged value of the dependent variable and increase of the capacity to import given by exports of goods and the balance of exports and imports of services.

A5. Relationship between imports of goods and exports of goods and services

Dependent Variable: IMPB10JO

Method: Least Squares

Sample: 1985 2014

Included observations: 30

$IMPG10JO = IMPG10JO(-1) + C(1) * D(EXPG10JO + EXPS10JO - IMPS10JO)$

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	1.339721	0.322373	4.155808	0.0003
R-squared	0.966967	Mean dependent var		6905.395
Adjusted R-squared	0.966967	S.D. dependent var		3887.725
S.E. of regression	706.5947	Akaike info criterion		15.99156
Sum squared resid	14479007	Schwarz criterion		16.03826
Log likelihood	-238.8734	Hannan-Quinn criter.		16.00650
Durbin-Watson stat	1.806389			

The hypothesis of coefficient equal to unity is not rejected:

$$t = (1.3397 - 1) / 0.3224 = 1.05 < \text{critical level of t-Student at 5\% significance level.}$$

Increasing domestic industrial production would diminish, at some extent, the coefficient of this equation (in some cases diminishing the dependency of imports for development), and, at the same time, it would increase the level of real exports of goods and services, avoiding the high current account deficit and favouring growth of real GDP and real GDP per head.

A6 presents the results of a pairwise Granger causality test between import of goods and exports of goods and services. The test shows the existence of unidirectional causality from imports of goods to exports of goods and services.

A6. Pairwise Granger Causality Tests

Sample: 1980 2014

Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
XG+XS-MS does not Granger Cause MG	34	0.10644	0.7464
MG does not Granger Cause XG+XS-MS		5.57901	0.0246