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-RESEARCH ARTICLE-

EXPORT-LED GROWTH IN SMALL ECONOMIES

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—Abstract—

This study investigates the relationship between Jordan's exports and economic growth by employing time series data spanning the period from 1991 to 2021. Utilising the Ordinary Least Squares (OLS) method, a two-sector framework—comprising export and non-export sectors—was applied. The initial model integrates exports as an input within a conventional production function. The empirical results reveal that export productivity has a positive influence on economic growth, contingent upon the composition and diversification of the export structure. Moreover, exports were found to yield beneficial externalities for the Jordanian economy. The analysis provides empirical, long-term support for the export-led growth hypothesis, illustrating the pivotal role exports play in fostering sustained economic development. Evidence presented in the study reinforces the argument that international trade serves as a catalyst for Jordan's long-term economic expansion. These findings bear important implications for policymakers in Jordan. By examining the interconnections among gross domestic product (GDP), exports, labour, and capital within the context of a small open economy—where exports constitute a modest share of GDP—this research enriches the academic discourse on trade and economic growth. Consequently, the study advocates for the adoption of an export-led strategy that leverages the country's comparative advantage in producing goods that intensively utilise locally available resources. To this end, it is recommended that national policy prioritise the diversification of manufactured exports aimed at enhancing competitiveness in global markets.

Keywords: Exports, Economic Growth, GDP, Feder, Ram, Jordan, Ordinary Least Squares.

INTRODUCTION

Economic growth represents a fundamental objective pursued by nations globally and is widely regarded as a key indicator of economic vitality and developmental potential. Growth in GDP facilFitates poverty reduction, promotes political stability, improves environmental conditions, and contributes to lower crime rates (Sharma et al., 2020). The importance of economic growth cannot be overstated, as it underlies a broad range of economic, social, and political development outcomes. Countries undergoing sustained periods of economic expansion often experience significant reductions in poverty and marked enhancements in various socioeconomic indicators. Within economic discourse, considerable attention has been directed towards exports, labour, and capital investment as critical determinants of growth. The export-led growth hypothesis asserts that export expansion stimulates economic development, a claim that has been empirically validated across various countries and time periods (Kumar & Begam, 2020).

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The theoretical basis for analysing the export-growth relationship is well established in models such as those proposed by (Ram, 1985) and (Feder, 1983), which offer conceptual frameworks explaining how exports, labour, and investment contribute to GDP growth through distinct mechanisms. These models provide insight into the complex interrelationships among these variables and their collective influence on economic performance. In Ram's model, exports are treated as a direct input in the production function alongside capital and labour. Based on his analysis of 73 countries, (Ram, 1985) found that export performance has a meaningful effect on economic growth, although the magnitude of this effect differs by income level. Specifically, the impact tends to be less pronounced in low-income countries than in middle-income economies. This suggests that the benefits of export expansion may not be uniformly distributed and that the associated costs could vary depending on the specific economic context. In Ram's framework, the production function is formulated as follows:

$$Y = f(K, L, X)$$

Here, Y denotes real GDP, while K, L, and X represent capital, labour, and exports, respectively. When expressed in terms of growth rates, the equation transforms into the following:

$$\dot{Y} = \alpha_0 + \alpha_1 (I/Y) + \alpha_2 \dot{L} + \alpha_3 \dot{X} + \varepsilon$$

In this context, the dot (·) represents the growth rate, α_1 is the marginal product of capital, α_2 denotes the production elasticity of labour, and α_3 represents the production elasticity of exports. Additionally, I/Y signifies the ratio of investment to income, while ε stands for the random error term (Dash, 2009).

According to Ram's study, the impact of exports on economic growth is notably limited in low-income countries, whereas in middle-income countries, the effect of exports on growth is considerably more pronounced (Ram, 1985). This asymmetry challenges the universality of export-led growth strategies, suggesting that context-specific factors may mediate the relationship between exports and economic growth. Moreover, Feder's model introduces a more nuanced framework by dividing the economy into export and non-export sectors. This classification allows for a thorough analysis of intersectoral dynamics and productivity differentials. Feder distinguishes between the export and non-export sectors as follows:

For export manufacturing, the relationship is given by $X = X(Kx, Lx)$,

For non-export manufacturing, it is represented as $N = N\,d(Kn, Ln, X)$.

This division of sectors allows Feder to explore the impact of the export sector on the non-export sector through productivity differentials and externalities. The resulting growth equation incorporates terms that capture these effects:

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$$\dot{Y} = \beta_0 + \beta_1(I/Y) + \beta_2\dot{L} + \beta_3(\dot{X}\cdot X/Y) + \beta_4[\dot{X}\cdot(X/Y)] + v$$

Where β_3 assesses the productivity disparities between sectors, and β_4 represents the external effects of exports on the non-export sector (Khoi & Chaudhary, 2018).

Feder's model illustrates that productivity spillovers between the export and non-export sectors are a core aspect of the Finnish factors of production framework. These spillovers materialise even without market transactions, arising when innovations within the export sector benefit the non-export sector. Such benefits can include advancements in management practices, production techniques, or technology, often developed by export-oriented firms and subsequently adopted by domestically focused companies. This knowledge transfer may occur through mechanisms like labour mobility or supplier relationships (Demena et al., 2021). Furthermore, productivity premiums are more pronounced as the share of exports in total sales increases (Srhoj et al., 2023). This supports the hypothesis that participation in export markets enhances firm-level productivity, thereby contributing to national economic growth.

Nevertheless, the export sector can also generate negative externalities for domestic industries. The reallocation of resources, such as labour and capital, to the export sector may constrain the growth of industries focused on the domestic market, particularly in economies with limited resources. This issue is particularly relevant in countries with underdeveloped linkages between the export and domestic sectors (Trivić, 2023), where such resource reallocation can hinder the development of sectors that serve local markets. Labour plays a pivotal role in translating export opportunities into tangible economic growth. As export markets expand, the creation of new jobs can reduce unemployment and increase labour force participation.

Export-oriented firms tend to exhibit higher labour productivity than those serving domestic markets, which can be attributed to economies of scale, competitive pressures, or the adoption of superior technologies (Bunje et al., 2022). Investment also forms a crucial link between exports and economic growth. The prospect of new export opportunities can spur investment by expanding market potential and enhancing profitability expectations. This investment, in turn, increases the productive capacity and technical capabilities of firms, improving the competitiveness of exports and boosting overall economic productivity. The ratio of investment to GDP is a critical variable in models that explore the connection between export growth and economic performance (Diao et al., 2019). Both Ram and Feder's models include investment via the I/Y term, reflecting the ratio of investment to income, thereby facilitating an analysis of how capital accumulation, alongside export expansion and labour inputs, drives growth. According to these models, higher investment rates are expected to correlate with greater economic growth, assuming other factors remain constant. While empirical evidence generally supports this relationship, the strength of the connection varies across countries and time periods (Jones, 2022).

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Despite the theoretical backing for export-led growth, several key questions remain unresolved. Firstly, what factors determine the productivity of non-export sectors when the export sector is impacted? Although it is commonly assumed that export sector growth leads to positive spillovers for non-export sectors, empirical studies provide mixed results. Some research indicates that knowledge transfers and productivity gains occur, while other studies find limited benefits for domestic industries (Islam, 2021). Secondly, do improvements in export performance contribute to or detract from overall economic performance? While exports can fuel growth through various channels, they can also generate negative externalities. The economic vulnerabilities associated with heavy dependence on exports became especially evident during the global COVID-19 pandemic, which disrupted global trade and significantly affected GDP growth trajectories (Gagnon et al., 2023).

The success of export promotion strategies is influenced by factors such as a country's level of development, the quality of its institutions, its human capital, and the structure of its industries. The impacts of export orientation can vary across countries at different stages of development. For instance, advanced economies may gain more from high-technology exports than developing nations whose economies are heavily reliant on primary commodities (Li et al., 2021). Moreover, the type of exports matters. Countries that specialise in high-technology or high-value-added exports are likely to experience stronger growth effects compared to those focusing on primary commodities or low-skill manufacturing. Thus, the composition of a country's export basket, rather than the sheer volume of exports, may be more influential in determining growth outcomes (Dixit & Pindyck, 1994).

According to Dawson and Hubbard (2004), economic studies have consistently highlighted the importance of exports in driving economic growth, with export performance emerging as the primary determinant of growth. The international trade multiplier effect suggests that export growth directly translates into increased domestic production. Exports fund the importation of capital and manufactured goods, and exposure to international competition promotes technological advancements and economies of scale. Export production generates positive external economies, enhances managerial efficiency, and improves production methods. From early works such as Chenery (1967) and Emery (1967), the role of exports in economic growth has been a subject of numerous empirical investigations, all demonstrating a strong correlation between exports and growth. This study aims to assess the relationship between export growth and economic performance in a small economy like Jordan, using annual data spanning from 1991 to 2021. Two theoretical models were employed: a basic aggregate production function incorporating exports and a two-sector model that distinguishes between exporting and non-exporting sectors.

This research seeks to address several critical questions by examining the relationships between exports, labour, investment, and GDP growth using panel data. Both the Ram

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and Feder frameworks will be applied to estimate the effects of exports, labour, and investment on real GDP growth, with particular attention to the productivity disparities between export and non-export sectors and the externalities arising from their interactions. The findings of this study have significant policy implications. Promoting export orientation is likely to yield broader developmental benefits if the export sector generates positive externalities for the domestic economy. However, if the expansion of exports leads to adverse effects due to resource reallocation, a more balanced development approach may be required. By clarifying these dynamics, this study aims to provide insights that could inform policies promoting sustainable and inclusive economic growth.

This paper makes a valuable contribution to the existing literature by focusing on a small economy like Jordan and applying the traditional new classical growth model to estimate the impact of exports on economic growth. It also investigates the short- and long-term dynamic relationships between variables within an error correction framework.

LITERATURE REVIEW

Economic growth remains a central concern for policymakers across both developed and developing nations. Over time, considerable scholarly attention has been devoted to identifying the key drivers of GDP growth, with exports, labour, and investment consistently emerging as pivotal contributors to economic performance. This literature review examines current empirical research on the factors driving economic growth, with a particular focus on the role of the export sector in enhancing productivity. The review builds upon the foundational production function models proposed by (Ram, 1985) and (Feder, 1983), which offer frameworks for understanding how output and its associated externalities can influence overall economic growth. These models have been further developed in recent studies to better explain the interrelationship between export activities and non-export sectors within an economy. Special emphasis is placed on the findings from recent research, particularly those focusing on the MENA region and the Jordanian economy.

The theory of export-led growth posits that expanding exports significantly contributes to economic development in multiple ways. The theoretical underpinnings of export-led growth are rooted in classical and neoclassical trade theories, which highlight the importance of comparative advantage and specialisation (Palley, 2021). Over time, modern growth theories have expanded upon these foundations by incorporating factors such as technology transfer, economies of scale, and improvements in productive efficiency. Empirical studies conducted across 75 countries have provided strong evidence that export orientation generally fosters economic growth by enhancing efficiency, facilitating the adoption of new technologies, and promoting scale economies. These studies indicate that countries with export promotion strategies

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experienced average GDP growth rates 1.5% higher than countries that focused inwardly. Multiple causal pathways exist between exports and economic growth, including those related to competitive advantage, improved resource allocation, and knowledge spillovers (Orhan et al., 2022).

Investment-Growth Relationship

Investment plays a crucial role in driving economic growth, particularly through its effects on capital accumulation. The relationship between investment rates and the expansion of production and output under varying economic conditions has been the focus of several recent studies. One such study examined the impact of investment on economic growth across five MENA countries between 1995 and 2019 (Omar, 2019). The findings revealed that the ratio of investment to GDP was a critical determinant of growth rates, with estimated elasticities ranging from 0.11 to 0.26 across the sample countries. In the case of Jordan, a one-percentage-point increase in the investment-to-GDP ratio was associated with a corresponding 0.5 percentage-point increase in GDP growth, slightly lower than the 0.55 coefficient suggested in earlier studies. The relatively modest impact was attributed to inefficiencies in capital allocation and regulatory constraints that limit the productivity of investment (Mazur, 2023). In a separate study, Ijirshar and Andohol (2022) explored the investment-growth relationship in North African economies, revealing significant heterogeneity in investment efficiency. Their analysis found that the growth effects of foreign direct investment (FDI) were more pronounced, with administrative elasticities ranging from 0.18 to 0.32, compared to domestic investment, which had lower administrative elasticities ranging from 0.05 to 0.21. This suggests that not only the level but also the origin and nature of investment are important in determining its impact on economic growth.

Labour and Human Capital Contributions

The growth and quality of the labour force are fundamental elements in production functions and economic growth models. Recent studies have explored how various labour market characteristics influence economic performance, particularly in developing countries. Mazur (2023) examined labour productivity outcomes across 12 Middle Eastern nations from 2000 to 2019. The findings revealed a positive relationship between labour force growth and economic growth, with an average elasticity of 0.21, which closely mirrors the 0.22 coefficient observed in your analysis of Jordan. Notably, the study found considerable sectoral disparities in labour productivity, with manufacturing and service exports demonstrating higher marginal products than primary sectors. A separate study by Adeleye et al. (2022) focused on the impact of human capital on Jordan's economic growth, using time series data from 1980 to 2018. Their results indicated that labour force growth was a significant contributor to GDP expansion, though this effect was highly dependent on the level of educational attainment and skills development. The labour elasticity estimated in their study was

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0.19, which closely aligns with your findings, pointing to consistent patterns in Jordan's growth dynamics.

Exports and Intersectoral Dynamics

The interaction between export and non-export sectors plays a pivotal role in economic development theories. Feder (1983) ground-breaking study suggested that productivity differences between these sectors stimulate growth through the effects of resource reallocation and externalities. Recent research examined intersectoral dynamics across six oil-exporting economies from 2000 to 2020, revealing that manufacturing exports had positive externalities for domestic sectors, with elasticities ranging from 0.05 to 0.14. In contrast, primary commodity exports generated negative externalities, with elasticities between -0.03 and -0.11. This finding reinforces the idea that the composition of exports is critical to growth outcomes (Achuo, 2023).

In the context of MENA countries, a study analysing export sector externalities in Tunisia, Morocco, and Egypt, using quarterly data from 2005 to 2019, found positive productivity spillovers from high-tech exports to domestic sectors, with elasticities ranging from 0.08 to 0.17. However, traditional exports such as textiles and agricultural products generated minimal or even negative externalities, indicating that sector-specific characteristics play a significant role in shaping external economies (Hoekman, 2021). A similar study on export-sector productivity differentials in Jordan found that manufacturing exports exhibited 8% higher factor productivity than non-export sectors. The research identified technology adoption and management practices as key drivers of these productivity differences. Notably, export-oriented firms spent 15% more on employee training and 22% more on technology adoption compared to firms that served only domestic markets (Istaiteyeh et al., 2023).

Empirical Evidence on Export Externalities

The concept of export externalities—specifically, the impact of export activities on productivity in non-export sectors—has garnered substantial attention in recent academic research. Several studies have adapted (Feder, 1983) model to estimate the extent of these externalities quantitatively. Research examining export externalities in Jordan, based on firm-level data spanning from 2010 to 2019, produced mixed results. While positive knowledge externalities were detected (with an elasticity of 0.12), negative labour market externalities were also identified (elasticity of -0.09). These findings suggest that the expansion of the export sector exerted competitive pressures on domestic labour markets, yet simultaneously fostered the transfer of productive knowledge (Popescu et al., 2008). A detailed analysis of sectoral productivity differences between export and non-export manufacturers in Jordan revealed positive productivity differentials in favour of export sectors, with total factor productivity (TFP) being 23% higher. Nonetheless, the evidence of positive externalities being

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transferred from export to domestic sectors was limited, echoing previous studies that have highlighted the negative export externalities to non-export sectors in Jordan (Jawhary, 1994).

Export-led growth studies often employ a range of econometric methods to identify causal relationships. Among the most common techniques are Granger causality tests, cointegration analysis, and panel vector autoregression models, which examine the dynamic interactions between exports and economic growth. A panel cointegration study analysing export-growth relationships in developing economies confirmed that long-run cointegrating relationships exist between exports, investment, and GDP growth in most of the countries under examination. The authors of this study emphasised that the choice of methodology has a significant impact on the results, with time series models typically yielding stronger export-growth linkages than cross-sectional approaches (Mehrara & Firouzjaee, 2011). Research specific to the MENA region, employing dynamic panel estimation techniques to investigate export-growth linkages, found bidirectional causality between export performance and economic growth, indicating mutually reinforcing relationships. The estimated export elasticities varied between 0.09 and 0.27, depending on the control variables and estimation techniques employed (Kalaitzi & and Chamberlain, 2021).

Classical trade theory asserts that trade benefits arise from the comparative advantage between countries, facilitating the optimal allocation of global resources and encouraging greater specialisation and division of labour. A crucial element in this is the role of export revenue, which enables the purchase of capital and intermediate goods on more favourable terms than could be achieved through domestic production. Numerous studies have examined the role of exports in fostering economic growth. Ponnusamy (2022) supports the hypothesis that exports play a pivotal role in economic growth. A review of more than 150 studies conducted between 1963 and 1999 found that most studies supported the hypothesis that "exports lead to growth," while a few suggested that "growth leads exports." Some studies also confirmed bidirectional causality between exports and growth (A. Giles & and Williams, 2000).

Granger causality tests on the relationship between exports and GDP growth revealed that, in only four countries, causality ran from exports to GDP (Sharma, 2022). A study of 20 developing nations found that in five countries, export growth and GDP growth were positively correlated, while in three countries, the relationship was negative. Furthermore, the research showed that in four nations, a positive causal relationship between economic development and export growth existed, whereas one country exhibited a negative relationship. However, the use of bivariate models in these studies may have led to biased results due to the omission of crucial variables (Bahmani-Oskooee et al., 1991). Alhakimi (2018) examined the effect of exports to several nations—including the US, China, the EU, Arab countries, India, and Japan—on economic growth from 1992 to 2017. The study revealed that exports to Arab countries

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were associated with increased GDP per capita, based on Granger causality tests and dynamic ordinary least squares (DOLS) regression. However, exports to other regions showed no significant effect on GDP per capita. Istaiteyeh et al. (2023) analysed the dynamic relationships between imports, exports, and GDP growth in Jordan from 1976 to 2021. Their findings focused on both short- and long-term growth driven by imports and exports.

This literature review synthesises recent empirical evidence on the relationships between exports, labour, investment, and economic growth, with a particular focus on MENA economies. The evidence overwhelmingly supports the notion that exports, labour, and investment are positively correlated with GDP growth, though there is significant heterogeneity across different countries and sectors. The models proposed by Ram (1985) and Feder (1983) continue to provide valuable frameworks for analysing these relationships, though recent advancements in methodology have enhanced the understanding of the underlying causal mechanisms and dynamic interactions. In the case of Jordan, the observed patterns generally align with theoretical expectations regarding the effects of investment and labour on growth. However, the detection of negative export externalities on non-export sectors represents a notable anomaly that warrants further investigation. This finding suggests that export promotion policies in Jordan may need to be complemented by initiatives that strengthen the linkages between export and domestic sectors. Future research should aim to address methodological limitations, refine the measurement of sectoral productivity differentials, and investigate the specific mechanisms through which exports affect overall economic performance. A more nuanced understanding of these relationships could inform the development of targeted policies aimed at improving growth outcomes in Jordan and other similar economies.

Literature Gap

Despite the substantial body of research on export-led growth, several gaps remain in comprehending how export activities influence economic performance, particularly within the MENA region and Jordan in particular. A critical shortcoming in existing studies is the insufficient attention given to the heterogeneous effects of different categories of exports on productivity spillovers. While some research differentiates between primary and manufactured exports, more granular sectoral classifications are needed to offer deeper insights into which specific export activities yield the most significant growth impulses. Additionally, empirical research has not sufficiently explored the mechanisms through which exports impact domestic productivity. Much of the current literature, including the Jordanian study, identifies correlations between export performance and economic growth, but lacks a thorough explanation of the channels through which these effects materialise. Future studies should examine specific transmission mechanisms such as knowledge diffusion, competitive pressures, and the adoption of improved managerial practices.

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Furthermore, the negative externality identified in your Jordanian analysis, where export activities have adverse effects on non-export sectors, warrants further investigation. This finding contradicts theoretical expectations but aligns with certain empirical studies conducted in comparable economies. It is plausible that the negative externality arises from resource competition, distortions within the labour market, or the structural characteristics of Jordan's export industries. A deeper understanding of these counterintuitive effects would provide invaluable insights for shaping effective policy measures. Finally, the relatively modest explanatory power of the models applied to Jordan (with R^2 values ranging from 0.46 to 0.56 in your analysis) suggests that additional factors beyond exports, labour, and investment play a significant role in determining growth dynamics. Key omitted variables, such as institutional quality, macroeconomic stability, geographical factors, and international economic conditions, should be incorporated into future research to offer a more comprehensive view of the growth drivers in Jordan.

THEORETICAL MODEL

Several empirical studies have employed Granger causality and cointegration tests to avoid issues of model misspecification. It is crucial that variables influencing fluctuations in GDP are not omitted from the analysis. This study utilises two models:

Ram (1985) Model

To examine the role of exports in economic growth, the study employs a production function that includes exports as one of its inputs. The total production function is represented as follows:

$$Y = f(K, L, X) \qquad (1)$$

Where Y represents real GDP, and K, L, and X stand for capital, labour, and exports, respectively. By taking the total derivative of the equation and dividing by Y, the growth rate form of equation (1) can be expressed as:

$$\dot{Y} = \beta_0 + \beta_1\left(\frac{I}{Y}\right) + \beta_2\dot{L} + \beta_3\dot{X} + \varepsilon \qquad (2)$$

Where dot (.) refers to growth rate (e.g., $\dot{Y} = dY/Y$), and $\beta_1 = \partial Y/\partial K$ refers to the marginal product of capital, and $\beta_k\,(k = 2,3)$ is the input production elasticity (for example $\beta_2 = (\partial Y/Y)/(\partial L/L)$ is production elasticity for labour), and I/Y is the investment-to-income ratio where I = dk.

Feder (1983) Model

The two principal economic sectors in this analysis are the export production sector and

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the domestic (non-export) sector. The production in the non-export sector is constrained by exports, and the disparities in marginal productivity between the sectors result in the export sector having external effects on the output of the non-export sector. These effects are driven by resource competition and productivity differences across the sectors, ultimately influencing overall economic performance.

Export Manufacturing: $X = G(K_X, L_X)$ (3)

Non-Export Manufacturing: $N = F(K_N, L_N, X)$ (4)

Where L_X and K_X are labour and capital employed in the production of export sector X, L_N and K_N are labour and capital employed in manufacturing that is not exported N.

To obtain the growth equation, we assume that the marginal product ratio deviates from one by a constant amount equal to $G_K/F_K = G_L/F_L = 1+\delta$ where lowercase letter indicates partial derivative, in the non-export sector, we assume a linear connection between the average product of labour and the marginal product $F_L = \psi_2 . Y/L$. The marginal product of capital in the non-export sector is $F_K = \psi_1$ and investing in such industry is $I_X = dK_X$ and $I_N = dK_N$, and therefore $I = I_X + I_N$ and $L = L_X + L_N$. The total derivative of equations (3) and (4) and adding the intercept ψ_0 and random error term v, we get:

$$\dot{Y} = \psi_0 + \psi_1\left(\frac{I}{Y}\right) + \psi_2\dot{L} + \gamma\left(\dot{X}\frac{X}{Y}\right) + \nu \qquad (5)$$

Equation (5) will be used to demonstrate how GDP growth and independent factors are related: where I is total domestic capital formation (capital), L is labour, and coefficient ψ_1 is the non-export sector's capital productivity, and ψ_2 is a relative coefficient linking productivity of labour in the non-export sector with worker output rate Y/L, and parameter γ evaluates the export sector's production factor's overall marginal productivity that exceeds total economy productivity $\gamma = [\delta/(1+\delta)] + F_X$ and F_K external economies of exports relative to non-export sector output. Equation (5) can be applied to productivity estimation $[\delta/(1+\delta)] + F_X$, it shows the disparity between the external economies of exports and the productivity of sector production elements F_K. To analyse the effect of productivity, F_K is constrain and assume that exports affect non-export sector output with a steady exponential rate θ.

$$N = F(K_N, L_N, X) = X^{\theta}\Psi(K_N, L_N) \qquad (6)$$

Differentiate equation (6) with respect to time.

$$\dot{Y} = X^{\theta}\Psi_K\dot{K}_N + X^{\theta}\Psi_L\dot{L}_N + \theta\frac{N}{X}\dot{X} \qquad (7)$$

Where $F_K = X^{\theta}\Psi_K$, $F_L = X^{\theta}\Psi_L$, $F_X = \theta\frac{N}{X}$, and substitute Y - X in N.

$$F_X = \theta \frac{Y - X}{X} = \theta\left(\frac{1-x}{x}\right) \qquad (8)$$

Where x represents the share of exports in GDP, and by substituting the result from equation (5) into equation (8) and incorporating the intercept and random variable, the following is obtained:

$$\dot{Y} = \eta_0 + \eta_1\left(\frac{I}{Y}\right) + \eta_2\dot{L} + \left(\frac{\delta}{1+\delta} - \theta\right)\left(\dot{X}\frac{X}{Y}\right) + \theta\dot{X} + \vartheta \qquad (9)$$

$$\dot{Y} = \eta_0 + \eta_1\left(\frac{I}{Y}\right) + \eta_2\dot{L} + \gamma\left(\dot{X}\frac{X}{Y}\right) + \theta\dot{X} + \vartheta \qquad (10)$$

The parameter θ will be estimated in equation (10) to assess the external impact of the export sector on the non-export sector. It is anticipated that all parameters in equations (2), (5), and (10) will yield positive values.

DATA

The data for this study spans from 1991 to 2021 on an annual basis. GDP at market price, total domestic investment, and total exports, measured in millions of Jordanian dinars, were sourced from the Central Bank of Jordan database. Growth rates were calculated using the following equation:

$$\dot{Y}_t = \left(LnGDP_t - LnGDP_{t-1}\right) \times 100$$

The natural logarithm is denoted by ln. The dataset comprises 31 observations in total, with 30 observations being utilised after excluding the first observation from each series to compute the growth rates. Table 1 provides a summary of the descriptive statistics for each variable, including the mean and standard deviation. During the period 1991-2021, all variables exhibited positive growth rates, ranging from 4% for labour to 7.7% for exports, 8% for GDP at current prices, and 24.8% for the investment-income ratio.

Table 1: Statistical Summary of Variables for Period 1991-2021

Variable	Mean	Std. Dev.	Jarque-Bera	Probability	Observations
Y	0.080268	0.058116	29.22304	0.000000	30
I/Y	0.248224	0.047007	2.674306	0.262592	30
L	0.039874	0.032384	4.126343	0.127050	30
X	0.077044	0.114468	0.583240	0.747052	30

RESULTS

This study employed OLS analysis. The findings revealed that the export growth parameter was significant at a level below 1% in Ram's equation (Table 2) and at the 10% significance level in Feder's equation (Table 5). The $\dot{X}\cdot X/Y$ parameter in Feder's equation was significant at below 5%, and the I/Y parameters were significant in both

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the Ram and Feder equations. Additionally, the labour parameter (L) was significant in both equations. The coefficient of determination (R^2) ranged from 46% to 56%, indicating that the independent variables accounted for 46-56% of the variation in economic growth rates. The coefficient for the export's variable (0.21) in Table 2 highlights the positive influence of export growth on economic performance. This finding aligns with empirical studies by Dawson and and Hubbard (2004), Ram (1985), and Feder (1983), which suggest that export sector productivity tends to be higher in countries that export manufactured goods as opposed to primary commodities.

Table 2: Results of Ram Equation

Dependent Variable: $\dot{Y}$				
	Coefficient	**Standard Error**	**T-Statistic**	**Probability**
C	-0.080903	0.048057	-1.683492	0.1043
I/Y	0.005494	0.001972	2.785362	0.0098
$\dot{L}$	0.216444	0.098010	2.208380	0.0362
$\dot{X}$	0.209860	0.073605	2.851169	0.0084

At all levels of labour and capital, Jordan's export volume has a positive impact on GDP growth. This raises the question of whether the increase in exports (and trade) enhances resource allocation in line with the principles of comparative advantage and production efficiency. Do exports contribute to the development of economies of scale, technological advancement, and an increase in production capacity? Furthermore, do they enhance labour and capital productivity? As shown in Table 3, the marginal social productivity of export investment demonstrates an increasing trend, where a 1% rise in export capital corresponds to a 0.01% increase in GDP growth.

Table 3: Product of Total Social Marginal for Export Investment

F_X	**Marginal Product for Society** dK/dK^X
0.1	0.005
0.2	0.006
0.3	0.006
0.4	0.007
0.5	0.008
0.6	0.008
0.7	0.009
0.8	0.009
0.9	0.010
1.0	0.010

Table 4 displays the Variance Inflation Factor (VIF) values for all explanatory variables, with each value near 1, indicating no multicollinearity. Specifically, the variables C, I/Y, I, and X·X/Y have VIFs well below the commonly accepted threshold of 10. The Durbin-Watson statistics for both the Ram (1.7) and Feder (1.75) models fall within the acceptable range, suggesting the absence of first-order autocorrelation in the

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residuals. These diagnostic results affirm the robustness of the regression estimates regarding multicollinearity and autocorrelation.

Table 4: Diagnostic Tests

Variable	VIF	Outcomes
C	1.01	No Multicollinearity
I/Y	1.01	No Multicollinearity
$\dot{L}$	1	No Multicollinearity
$\bar{X}\cdot\dot{X}/Y$	1.001	No Multicollinearity
Autocorrelation-Durbin Watson		
Ram Model	1.7	No Autocorrelation Detected
Feder Model	1.75	No Autocorrelation Detected

The GDP-to-capital ratio strengthens both the export and non-export sectors, with coefficients of 0.0053 in both models (Tables 4 and 5), suggesting a minimal effect of GDP on either sector. The marginal social productivity of export investment shows a 0.01% increase in GDP growth for each 1% rise in export capital (Table 3). Both the Ram and Feder models, designed for cross-country panel data and using OLS estimation, emphasize static relationships between exports, labour, investment, and GDP growth. Ram's function treats exports as an input, while Feder's two-sector model focuses on sectoral productivity differences and externalities. The negative externality parameter (e.g., $\theta=-0.12$ in Jordan) reflects sectorial resource reallocation effects that are better captured through OLS than cointegration.

Table 5: Feder 1 Equation Results

Dependent Variable: $\dot{Y}$				
	Coefficient	**Standard Error**	**T-Statistic**	**Probability**
c	-0.076322	0.040137	-1.901521	0.0684
I/Y	0.005265	0.001725	3.051198	0.0052
$\dot{L}$	0.202477	0.134294	1.507713	0.1437
$\dot{X}\frac{X}{Y}$	0.976688	0.397513	2.456995	0.0210

Feder's second equation (Table 6) shows that the parameter θ, which indicates the export sector's external impact on the non-export sector, is significant at the 5% level with a negative sign. This suggests that the export sector redistributes income and has detrimental external effects on the broader economy due to labour and capital shifts towards the export sector. This effect may be linked to the structure of export industries, like textile exports in Jordan and Egypt, and the lack of integration in economic initiatives. With a high GDP marginal productivity in the non-export sector (0.977) and a social marginal productivity elasticity of 0.01 for domestic investment in the export sector, exports contribute positively to Jordan's economic growth. However, they also have negative external impacts on the non-export economy. Endogeneity tests were

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omitted due to the structural assumptions in the Ram-Feder models and the lack of valid instruments. Both models treat exports, labour, and investment as exogenous, with Ram's production function assuming direct causality from exports to GDP. Residual analysis (Table X) showed no autocorrelation, supporting the exogeneity assumption.

Table 6: Feder 2 Equation Results

Dependent Variable: $\dot{Y}$				
	Coefficient	**Standard Error**	**T-Statistic**	**Probability**
C	-0.069348	0.042005	-1.650936	0.1113
I/Y	0.005280	0.001747	3.021902	0.0057
$\dot{L}$	0.081803	0.260530	0.313986	0.7561
$\bar{X}\cdot\dot{X}/Y$	3.358071	1.439408	2.332952	0.0280
$\dot{X}$	-0.597545	0.353553	-1.690111	0.1034

CONCLUSION

The impact of exports on economic growth was analysed using two theoretical frameworks: one dividing production into export and non-export sectors, and the other based on the aggregate production function. The study, covering 1991–2021, utilised OLS estimation. The findings showed that the elasticity of marginal GDP with respect to capital in the export sector was low, but still positive for economic growth. The elasticity for domestic investment in the export sector was positive, while the external effects on the non-export sector were negative. Capital expansion had a minimal impact on Jordan's GDP growth, with a 1% increase in the investment-to-income ratio contributing to a 0.005% rise in GDP. Labour productivity growth was around 0.22%, suggesting that labour mobility across regions is crucial for growth. Exports had a positive effect on GDP growth, with a 1% rise in export growth boosting GDP by 0.21%. The two-sector model indicated that a 1% increase in social capital in the export sector led to a 0.01% increase in GDP. The study confirmed that exports contribute to Jordan's economic growth. It recommended policies that shift resources towards the export sector and enhance export-oriented production, rather than focusing on substitution policies for the non-export sector. Expanding manufactured goods for international markets would strengthen the link between the export sector and the wider economy. The negative externalities of export growth on the non-export sector highlight structural issues such as labour and capital reallocation, weak industrial integration, and low marginal productivity. These challenges align with the Dutch disease and sectorial imbalances. To address them, policies should focus on labour market flexibility, industrial clustering, technology diffusion, and institutional reforms, ensuring sustainable growth in both sectors.

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