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A study of the impact of exports on economic growth in the Middle East and North Africa (MENA) countries using panel data for the period (1987-2022)

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Abstract---Through this study, we attempt to address the challenges facing the economies of the Middle East and North Africa countries, despite the multiple attempts to increase the volume of exports, especially exports outside the oil sector, and contribute to achieving economic growth and controlling the stability of the price level or the inflation rate and reducing it to the lowest levels to maintain the purchasing power of individuals and encourage local investment, and adopting policies and programs in line with the requirements of the economic situation during the period (1987-2022), but they failed compared to emerging countries. Therefore, this study aims to measure the impact of exports on the economic growth of the countries of the Middle East and North Africa (7 countries: Algeria, Egypt, Iran, Sudan, Tunisia, Turkey, and Syria). To achieve this goal, we apply the Panel ARDL cross-sectional time series data methodology. The results of the dynamic analysis in the long run indicate the existence of a direct relationship between the variables of exports and local investment as independent variables and economic growth. It also becomes clear that the overall causality of the Panel data is a two-way relationship from economic growth to exports and local investment.
Keywords---Exports; Domestic Investment; Economic Growth of MENA Countries; Panel Data.

Introduction

The Middle East and North Africa region continues to face wide-ranging economic challenges, despite possessing substantial reserves of oil and natural gas. Oil-exporting countries in particular have benefited from relatively higher energy prices following the persistent effects of the COVID-19 pandemic, as well as from the repercussions of the wars in Ukraine and Gaza. Political and economic challenges, along with ongoing volatility in oil prices, have affected international trade dynamics and global investment flows, while reducing the ability to forecast and anticipate future prospects for economic growth. In this context, gains generated from exports can contribute to stimulating economic growth and improving the business environment in Middle East and North Africa countries.

According to the International Monetary Fund, restoring price stability, addressing food insecurity, easing the cost-of-living crisis, and protecting vulnerable groups constitute key economic policy priorities in the region in 2024, despite elevated global prices and rising domestic inflation in food and energy, alongside declining income levels. These conditions have required government intervention through the promotion of domestic investment and the broad implementation of wage increases and subsidy policies. Exports, particularly non-oil exports, can be leveraged through export-promoting policies, improved access to external markets, and a shift from traditional export structures toward non-traditional, manufacturing-based exports oriented toward export-led industrialization. Consequently, export development strategies rely on a set of fiscal, tax, customs, and trade policies, as well as the establishment of an

institutional framework to support and incentivize local firms to engage in exporting activities.

Based on the above, the following main research question is formulated:

- Do exports have an effect on economic growth in the Middle East and North Africa region?

To address this main question, several sub-questions are posed:

- How can the effects of exports and domestic investment on economic growth in the Middle East and North Africa region be explained?
- How have oil production cuts, fiscal adjustment measures adopted by governments, and regional conflicts contributed to lower economic growth rates in the Middle East and North Africa?
- How do economic stability and improvements in export promotion translate into economic performance in the Middle East and North Africa region?

Research Hypothesis

- Exports have a positive effect on economic growth, which in turn stimulates domestic investment in Middle East and North Africa countries under current developments.

Importance of the Study

This study highlights exports, particularly non-oil exports, as a key determinant of economic growth in economies endowed with abundant natural resources. Many of these economies have failed to achieve economic development through the effective use of resource revenues and their allocation toward domestic investment, especially in Middle East and North Africa countries. Economic growth determinants are diverse, and many influence the relationship between exports and income, as well as the degree of economic stability reflected in inflation rates. Exports also play a role in supporting economic development and achieving macroeconomic balance. However, many countries, particularly developing ones, have experienced a decline in their terms of trade, despite the positive role played by exports.

Objectives of the Study

This study aims to:

- Assess the effects of exports on economic growth.
- Examine the extent to which exports contribute to economic stability and improved economic growth performance.
- Highlight the role of policies adopted by Middle East and North Africa countries, particularly generalized wage increases, subsidy measures, and the utilization of gains from domestic investment.

Previous Studies

- Ismail and Mahmoud (2021) examined the impact of the manufacturing sector on economic growth in Arab countries using panel time-series data for 14 Arab countries over the period 2004–2018. The results revealed a positive relationship between labor productivity in the manufacturing sector, its share of total merchandise exports, and economic growth rates in Arab countries. The study also found that money supply and domestic credit to the private sector were statistically significant (Ismail Mohammed; Mahmoud Jamal Qassem, 2021).
- Oboro Oghenero Godday (2021), in a study entitled *"Non-Oil Exports and the Growth of the Nigerian Economy"*, investigated the impact of agricultural, industrial, and solid mineral exports on Nigeria's economic growth. The study employed econometric methods, including Johansen cointegration and causality tests, over the period 1990–2020. The findings indicated that the impact of non-oil export indicators on Nigerian economic growth was statistically significant and substantial, with the exception of agricultural and industrial product exports (Oboro, O. G., 2021).
- **Al-Talawi and Makhlouf (2019)** examined the impact of exports and imports on economic growth in Libya over the period 1975–2014. The study employed the Johansen cointegration test to analyze the long-run relationship among the study variables and the Vector Error Correction Model (VECM) to identify causal relationships. The results indicated the existence of a long-run cointegrating relationship between exports, imports, and economic growth in Libya during the study period. In the short run, economic growth was found to be negatively affected by imports and lagged exports (Abdulrazzaq Mohammed Al-Talawi; Makhlouf Muftah Ali, 2019).
- **Oyedokun Godwin Emmanuel and Ajose Kehinde (2018)** analyzed the relationship between domestic investment and economic growth in Nigeria over the period 1980–2016. An econometric model was estimated in which gross domestic product was specified as the dependent variable, while domestic investment and government expenditure were included as independent variables. The study found a statistically significant positive effect of domestic investment on economic growth during the study period (Emmanuel, 2018).
- **Arnold, Mike, Kee, and Hanley (2018)** focused on the role of export and services diversification as a means of achieving economic growth in low-income countries. The study used a sample of 33 countries, including upper-middle-income, lower-middle-income, and low-income countries. Applying the Solow growth model, the authors examined the impact of diversification on growth volatility, measured by the standard deviation of real growth over a three-year period. The Hirschman Index was used to measure export flows at the country level as an indicator of diversification. The data covered two sub-

periods (1990–2004 and 2005–2015). The fixed-effects estimation results showed that lack of diversification, as reflected in exports concentrated in specific product categories, has a negative effect on economic growth. The study also found that economic growth volatility increases with higher exports of non-diversified products (McIntyre, 2018).

- **Mohammed Qadri and Mohammed Dawoudi (2018)**, in their study entitled *"The Causal Relationship between Foreign Direct Investment, Exports, and Economic Growth in MENA Countries"*, aimed to test the causal relationship between foreign direct investment and exports on the one hand, and economic growth on the other, over the period 2000–2016 for 15 Middle East and North Africa countries. Using the Vector Error Correction Model (VECM), the results revealed bidirectional long-run causality among foreign direct investment, exports, and economic growth. In the short run, bidirectional causality was found between exports and economic growth, along with unidirectional short-run causality running from exports to foreign direct investment. The Fully Modified Ordinary Least Squares (FMOLS) estimates indicated that both foreign direct investment and exports have a positive effect on economic growth in the MENA region (Mohammed Qadri; Mohammed Dawoudi, 2018).
- **Belloumi and Alshehry (2018)** investigated the causal relationships between domestic investment, foreign direct investment, and economic growth in Saudi Arabia over the period 1970–2015 using the Autoregressive Distributed Lag (ARDL) approach, supported by FMOLS, DOLS, and CCR estimations. The findings indicated statistically significant effects of foreign direct investment, domestic investment, credit to the private sector, and trade openness on gross domestic product growth. The results also showed a bidirectional negative long-run relationship between non-oil GDP growth and foreign direct investment, as well as between non-oil GDP growth and domestic investment (Belloumi, 2018).
- **Sayef Bakari (2017)** examined the relationship between exports, imports, domestic investment, and economic growth in Egypt over the period 1965–2015. The results revealed a statistically significant negative long-run effect of domestic investment and exports on economic growth, along with a statistically significant positive effect of imports on economic growth in Egypt (Bakari, S., 2017).

Study Plan

To achieve the objectives of the study, the research paper is structured as follows:

The role of exports in promoting economic growth.

An econometric analysis of the effects of exports and domestic investment on economic growth in Middle East and North Africa countries.

2. The Role of Exports in Promoting Economic Growth

The trade sector represents an integral component of the national economic structure, as it constitutes one stage of the production process, namely the exchange stage. Through exports and imports, trade contributes to raising the level of economic welfare of countries participating in international trade (Ariqat Harbi Mohammed Mousa, 2006, pp. 235–236). However, many countries, particularly developing ones, have experienced a decline in their terms of trade. Achieving economic growth requires growth in exports, which constitutes a necessary condition, and in some cases a sufficient one, for increasing output and income.

The impact of trade is not limited to technological progress, as reflected in the efficiency of advanced export-oriented industries and their role in reducing production costs (Al-Sawaei Khaled Mohammed, 2008). Trade also enhances economic growth, which in turn improves a country's capacity to import goods used in export-oriented production, thereby reinforcing export expansion and accelerating growth (Chamberlain, 2021, pp. 224–245). In developing countries, several authors, including Ronald I. McKinnon (1964), have emphasized the positive effect of exports on economic growth through the expansion of imports and increased investment, particularly government investment across different economic sectors (Thorvaldur Gylfason, 1999, pp. 31–57). This process strengthens investor confidence in the economy.

Governments continuously seek to develop their exports and gain access to global markets. The disparities observed between developed and developing countries in terms of welfare levels are largely attributed to the substantial income gap between them (Cleeve, 2017, pp. 341–365). Consequently, many countries have formulated export development strategies aimed at diversification and reducing reliance on export concentration and traditional exports. While several growth-promoting strategies exist, a set of strategies is closely linked to exports, most notably import-substitution industrialization, export-oriented industrialization, export promotion strategies, and hybrid strategies combining import substitution with export promotion.

When an economy relies predominantly on a single natural resource export, such as fossil fuels, national income rises due to revenues generated from exporting that resource. However, other economic sectors may approach stagnation, as higher factor prices hinder investment in these sectors. Economies dependent on revenues from a single export commodity often face difficulties in diversifying their productive base and are subject to recurrent economic setbacks (Abdulrazzaq Ben Hani, 2015, p. 52). The Dutch disease refers to the negative effects that arise in an economy characterized by excessive reliance on the extractive sector or natural resources,

leading to its expansion at the expense of other economic sectors (Hani, 2020, p. 292).

Resource-rich economies experiencing development challenges often fail to benefit effectively from their natural endowments, which are easily converted into substantial financial flows. These economies tend to exhibit weak performance across various sectors, limited export diversification, unstable revenues, high unemployment and debt levels, and poor performance in inflation control and savings, especially when compared to resource-poor economies. Addressing these challenges requires the adoption of strategies that enable sectoral allocation of investment and foster economic diversification (Nankani, 1979).

1.2. Indicators for Measuring Export Competitiveness

The indicators used to measure export competitiveness across countries include the following (Al-Arabi, 2012, p. 171):

a. Concentration Index (Concentration Index):

Also known as the Herfindahl–Hirschman Index, this indicator measures the degree of market concentration of a country's share of global exports or imports. Its values range between 0 and 1, where lower values indicate lower levels of concentration for exports and imports, while higher values reflect greater concentration. This index is calculated as follows:

$$H_j = \frac{\sqrt{\sum_{i=1}^{n}\left(\frac{Xij}{X_j}\right) - \sqrt{\frac{1}{n}}}}{1 - \sqrt{1/n}}$$

where (Hj) denotes the concentration index, Xij represents the value of exports of commodity (i) by country (j), (Xi) denotes the total exports of the country, and (n) is the number of exportable commodities.

b. Diversification Index

This index measures the deviation of a country's share of major commodity exports in its total exports from the share of national exports of those major commodities in global exports. The index ranges between 0 and 1. The closer the index value is to zero, the higher the degree of export diversification. When the index equals zero, the structure of national exports fully coincides with the structure of global exports. The index is calculated as follows:

$$S_j = \frac{\sum_{i=1}^{n} /hij - hi/}{2}$$

where (S_j) denotes the diversification index, (h_{ij}) represents the share of commodity (i) in the total exports of country (j), and the share of commodity (i) in total world exports.

c. Trade Performance Index

This is a composite index calculated on the basis of several sub-indicators reflecting the competitiveness of national exports in global markets, such as exports per capita, market share, and product diversification, covering exporting countries within a sample of 184 countries.

d. Revealed Comparative Advantage Index

This index was introduced by B. Balassa in 1965. It is based on the assumption that international trade arises from cost differentials across countries, which reflect their comparative advantages. The higher a country's relative performance in exporting a specific product, the greater its revealed comparative advantage in that product. The index ranges from zero to large positive values. Products with an index value below one indicate the absence of a comparative advantage, while values above one indicate the presence of a comparative advantage in exporting that product. The index is applied at the level of individual products and is expressed as follows:

$$RCA_{ij} = \frac{xij/xi}{xwj/xw}$$

3. The Evolution of Exports and Domestic Investment and Their Impact on Economic Growth in Middle East and North Africa Countries

Middle East and North Africa countries have adopted effective measures to enhance economic diversification by utilizing revenues from natural resources, alongside developing other sectors and promoting investment. These measures can contribute to job creation and support long-term economic growth. The average gross domestic product reached approximately 587 billion over the period 1987–2022. Over the same period, Iran recorded an average output of about 321 billion, while Syria achieved an average of around 20 billion.

With regard to average exports and domestic investment, Turkey recorded approximately 128 billion in average exports and 141 billion in average domestic investment over the period 1987–2022, representing the highest values among the countries included in the study. Iran followed with an average of 69 billion in exports and 93 billion in domestic investment. Tunisia recorded about 12 billion in average exports and 6 billion in average domestic investment, representing the lowest values among the countries covered by the study during the same period. The following figures illustrate these trends.

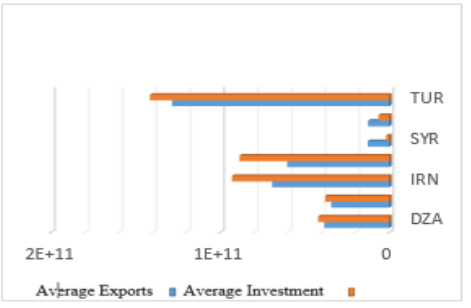

Figure (2): Average Exports and Domestic Investment of Middle East and North Africa Countries (1987–2022)

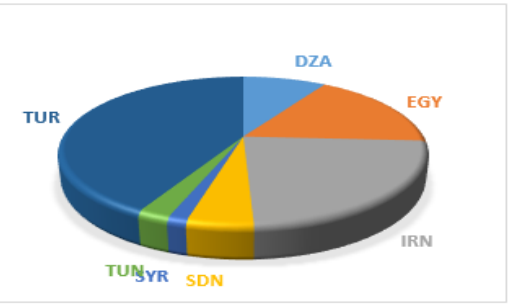

Figure (1): Average Gross Domestic Product of Middle East and North Africa Countries (1987–2022)

4. Econometric Analysis of the Effects of Exports and Domestic Investment on Economic Growth in Middle East and North Africa Countries

The relationship between non-oil exports and economic growth has exhibited different patterns. This section aims to measure the effects of exports and domestic investment on economic growth in Middle East and North Africa countries. Based on the previous studies, the model is specified with independent variables representing exports and domestic investment, while the dependent variable is gross domestic product over the period 1987–2022.

The study covers seven Middle East and North Africa countries: Algeria, Egypt, Iran, Sudan, Tunisia, Turkey, and Syria. The data were obtained from the World Bank and the Organization of Arab Petroleum Exporting Countries (OAPEC). Some outlier observations were adjusted using statistical methods. The econometric model is specified as follows:

$$lpib_{it} = \alpha_{0t} + \alpha_{1t} l\exp_{it} + \alpha_{2t} \ln v_{it} + \mu_i + \varepsilon_{it}$$

where pib_{it} *represents the gross domestic product of country (i) in period (t);*

exp_{it} denotes exportsof country (i) in period (t);

inv_{it} *denotes domestic investment of country (i) in period (t);*

ε_{IT} represents the error term.

- **Model Specification:**

Table 01
Model Specification

	lexp	***lpib***	***linv***
Obs	***252***	***252***	***252***
Mean	*25.38*	*24.11*	*23.94*
Std.Dev	*1.18*	***1.09***	***1.56***
Minimum	***23.12***	***21.41***	***20.38***
Maximum	***27.80***	***26.47***	***26.38***

Based on the table, the average value of household consumption reached 25.38 over the period 1987–2022, while the independent variables recorded mean values ranging between 23.94 and 24.11. The standard deviation of household consumption amounted to 1.18 for the same period, whereas the standard deviations of the independent variables ranged from 1.09 to 1.56. The coefficient of variation indicates the presence of homogeneity among the observations.

- **Correlation Matrix**

Table 02
Correlation Matrix

	lpib	***lexp***	***linv***
lpib	**1**		
lexp	0.852	**1**	
linv	0.767	0.81	1

Based on the table, a strong correlation is observed between exports and gross domestic product, reaching 85%.

4.1. Correlation and Homogeneity Tests

- **Homogeneity Test:**

  To verify the homogeneity of regression coefficients across all cross-ectional units (Middle East and North Africa countries), the test proposed by Pesaran and Yamagata (2008) is applied. The following table presents the results.

Table 03
Results of the Slope Coefficient Homogeneity Test

	Delta	p-value
Δ	13.715	**0.000**
$\Delta_{adj.}$	14.547	**0.000**

Based on the results reported in the table above, the homogeneity test using the calculated values of Delta and Delta Adj, together with the associated probability values, leads to the rejection of the null hypothesis of homogeneous slope

coefficients at the 5% significance level. Accordingly, heterogeneity is present across all variables of the study.

- **Cross-Sectional Dependence Test**

Table04
Results of the Dependence Test

variables	Test CD	probability
$lpib$	22.11	0.00
$lexp$	9.34	0.00
$linv$	13.37	0.00
Test de Pesaran: CD = 25.03 Pr =0.0000		

Based on Table (4), the probability value of the CD test is less than 5%, indicating the presence of cross-sectional dependence among the countries.

2.4. Estimation of the Model Using Static Panel Data Models

To obtain results that allow interpretation of the relationship between resource dependence and economic growth, panel data methodology combining time-series and cross-sectional dimensions is employed. The estimation relies on static panel models, specifically the Fixed Effects Model and the Random Effects Model.

a. Model Estimation

To achieve this objective, the model is estimated using Stata 17, and the following results are obtained.

Table 05

Model Estimation (Fixed Effects or Random Effects)

The dependent variable: economic growth		
Period 2001-2022 N=7 T=21 Total Panel Views: 252		
Random Effects Model	**The fixed effects model**	**Variables**
0.15 (0.037)	0.15 (0.036)	*lexp*
0.213 (0.04)	0.186 (0.04)	*linv*
16.67 (0.75)	17.18 (0.73)	Constant
282	282	Observations
	0.34	R-squared
7	7	Number of crossid

The table above shows that most of the probability values of the partial and overall coefficients in both the Fixed Effects Model (FEM) and the Random Effects Model (REM) are below 0.05, indicating statistical significance. The coefficients of the explanatory variables display negative signs across all models, which is consistent with economic theory.

b. Model Selection between Fixed Effects and Random Effects

To determine which of the two models is more appropriate, the Hausman test is applied to assess whether fixed or random effects provide a more suitable specification for estimating the model. The following table presents the obtained results.

Table 06

Model Selection between the Fixed Effects Model and the Random Effects Model

Test de Hausman	
Prob	chi2(4)
0.00	62.86

Based on Table (06), the probability value equals 0.00, which is below 0.05. Therefore, the alternative hypothesis (H_1) is accepted, and the fixed effects specification is selected for the group of Middle East and North Africa countries. Accordingly, the Fixed Effects Model is considered the appropriate framework for analyzing the relationship among the study variables.

Based on the model selection results, and given that the Fixed Effects Model provides the best specification for examining the effects of exports and domestic

investment on economic growth in Middle East and North Africa countries over the period 1987–2022, the model can be expressed as follows:

$$lpib = 17.18 + 0.15lexp + 0.18linv$$
$$(0.03) \quad (0.04) \quad (0.73)$$
$$+ \quad + \quad +$$

- **Analysis of the Estimation Results of the Random Effects Model**

Based on the estimation results of this model, the following observations can be made:

Model adequacy is assessed by examining the statistical results in light of economic theory and verifying their consistency. The findings indicate a satisfactory relationship between the dependent variable and the explanatory variables, as reflected by the coefficient of determination (R^2), which is approximately 34%. The intercept term (a) is statistically significant and has a positive effect on economic growth, with its magnitude differing across countries.

The estimated explanatory variables in the model are all statistically significant. From an economic interpretation perspective, the estimated coefficient of export growth is 0.15, indicating that a one-unit increase in exports leads to an increase of 15 units in gross domestic product (GDP). The coefficient of domestic investment is estimated at 0.18, implying that a one-unit increase in domestic investment results in an increase of 18 units in GDP.

This analysis reveals the nature of the relationship between the dependent variable and the independent variables, showing a positive relationship among all variables. These results are consistent with economic theory and support the findings of previous studies, particularly with regard to the effects of exports and domestic investment on economic growth.

Given that the preferred specification is the Fixed Effects Model, the variation in the impact of exports and domestic investment on economic growth is captured through the country-specific intercepts included in the model.

4.3. Estimation of the Model Using Dynamic Panel Data

a. Stationarity Analysis of the Model Variables

Stationarity testing for the time-series and cross-sectional data is conducted using the most widely applied first- and second-generation panel unit root tests, namely LLC, IPS, and Fisher-ADF, in order to examine the time-series properties of the variables included in the panel model. Given the evidence of slope heterogeneity and cross-sectional dependence, second-generation tests, specifically the Cross-Sectionally Augmented IPS (CIPS) test, are also applied. These tests are

implemented for each variable separately. The results obtained are reported in the following table:

Table 07

Probability Results of Panel Unit Root Tests

Variables	At the level		At the differences	
	CIPS	Critical value	CIPS	Critical value
$lpib$	-1.51	-2.19	-5.02	-2.16
$lexp$	-1.53	-2.19	-4.80	-2.16
$linv$	-1.62	-2.19	-5.12	-2.16

It is evident from the table above that the study variables are non-stationary at level (I(0)) over the study period according to the majority of the tests. After taking first differences, the variables become stationary and integrated of order one (I(1)).

b. Cointegration Test for the Study Variables

Following the stationarity tests and the finding that the variables are non-stationary but integrated of the same order and evolve along a common long-run trend, it becomes necessary to test for cointegration relationships among these variables. Accordingly, the Pedroni cointegration test is applied, and the results are reported in the following table.

Pedroni and Westerlund Cointegration Tests

The Pedroni test is among the most important methods used to detect the presence of cointegration among variables integrated of the same order. Pedroni (2002) proposed seven test statistics to examine the existence of cointegration in long-panel data. These statistics can be classified into two groups: within-dimension statistics and between-dimension statistics. The test statistics approximately follow the standard normal distribution. The following table presents the results of this test.

Table 08

Cointegration Test

Pedroni test for cointegration		
Test	Statistic	p-value
Modified Phillips-Perron t	1.6826	0.0462**
Phillips-Perron t	1.0374	0.1498
Augmented Dickey-Fuller t	1.2362	0.1082
Westerlund test for cointegration		
Test	Statistic	p-value
Variance ratio	1.4727	0.0704*

Based on the results reported in the table, most of the Pedroni test statistics are significant at the 5% level, with the exception of the group rho-statistic.

Consequently, the null hypothesis is rejected and the alternative hypothesis (H_1), which states that cointegration exists among the study variables, is accepted.

4.4. Selecting the Appropriate Dynamic Panel Model(Estimating the model using PMG, MG, and DFE)

After examining the integration properties of the dependent and explanatory variables, which indicate a mixed order of integration, the Panel ARDL model of economic growth is estimated using the Mean Group (MG) estimator, the Pooled Mean Group (PMG) estimator, and the Dynamic Fixed Effects (DFE) estimator. To select among these estimators, the Hausman test is applied, and the results are reported in the following tables.

Table 09

Estimation Results of the Model Using the PMG, MG, and DFE Methods

long term						**Variables**
DFE		**MG**		**PMG**		
t-Student	Coefficient	t-Student	Coefficient	t-Student	Coefficient	
3.06	0.67	1.95	0.91	10.93	0.373	$lexp$
0.05	0.00	0.93	0.23	9.29	0.434	$linv$
Short term						**Variables**
DFE		**MG**		**PMG**		
t-Student	Coefficient	t-Student	Coefficient	t-Student	Coefficient	
-3.83	-0.03	-2.21	-0.13	-2.03	-0.130	ECT
5.05	0.05	2.48	0.08	2.86	080	$\Delta lexp_t$
4.31	0.07	2.14	0.08	2.39	090	$\Delta linv_t$
2.05	0.36	1.06	0.59	2.10	960	c

Table 10

Model Selection Tests for Choosing the Appropriate Panel ARDL Specification

Hausman mg PMG, Sigmamore		Hausman PMG DFE, Sigmamore	
chi2(2)	Prob	chi2(2)	Prob
1.34	0.51	0.985	0.03

The Hausman test results comparing the Mean Group (MG) model and the Dynamic Fixed Effects (DFE) model indicate that the probability value is (\text{prob} > \chi^2 = 0.51), which exceeds the 5% significance level. Accordingly, the alternative hypothesis that the fixed effects model is more appropriate is rejected.

In contrast, the Hausman test results comparing the Mean Group (MG) model and the Pooled Mean Group (PMG) model show a probability value of (\text{prob} > \chi^2 = 0.03), which is below the 5% significance level. Therefore, the alternative hypothesis that the Mean Group model is more appropriate is accepted, and the null hypothesis that the Pooled Mean Group model is more suitable is rejected.

Based on the comparison among the three models, it is concluded that the Pooled Mean Group (PMG) model, also referred to as the Panel ARDL approach, provides the most appropriate and preferred specification for estimating the relationship among the study variables.

a. Analysis of the Estimation Results of the ARDL/PMG Model

- **Long run:** The ARDL/PMG estimation results indicate that the explanatory variables are not statistically significant and therefore do not exert a significant effect in the long run.
- **Short run:** The ARDL/PMG estimation results also show that the explanatory variables are not statistically significant in the short run.
- **Error Correction Term (ECT):** The ECT obtained from the ARDL/PMG estimation is statistically significant at the 5% level and carries the expected negative sign (–0.13).

The dynamic long-run results reveal a positive relationship between the independent variables, exports and domestic investment. A one-unit increase in either variable leads to an increase in economic growth by approximately 0.37 and 0.43 units, respectively. In the short run, the variables are statistically insignificant, indicating that they do not exert a significant effect on economic growth in Middle East and North Africa countries.

b. Diagnostic Tests for Model Adequacy

- **LM and Wald tests for homoskedasticity**

Table 11
Results of the LM and Wald Tests

Panel data Heteroscedasticity Breusch-Pagan (LM) Test		
Test	**Statistic**	**p-value**
Lagrange Multiplier Test	28883	0.00
Panel Data Heteroscedasticity Wald Test		
Wald Test	**11904**	0.00

Based on the results reported in the table, the probability values of both the LM and Wald tests are below 5%, which confirms the presence of homoskedasticity.

- **Multicollinearity and correlation among variables**

Table 12
Results of the LM and Wald Tests

a test (VIFLinear duality		
1/VIF	VIF	Variables
0.33	3.00	$lexp$
0.33	3.00	$linv$
	3.00	Mean VIF
Wooldridge Test		
Test	Statistic	p-value
Wooldridge test	164.00	0.00

The Variance Inflation Factor (VIF) test indicates that the values are below the 10% threshold, confirming the absence of multicollinearity. Regarding the correlation test among variables, the probability values are also below 10%, indicating no correlation among the variables.

5.4. Causality Test for Heterogeneous Panel Data

The non-causality Granger test developed by Dumitrescu and Hurlin (2012) accounts for heterogeneity in panel data and performs separate regressions for each cross-sectional unit to detect causality. The null hypothesis states that no homogeneous causal relationship exists across any cross-sectional unit, while the alternative hypothesis indicates the presence of a heterogeneous causal relationship in at least one cross-sectional unit. The results are presented in the following table.

Table 13
Dumitrescu–Hurlin Granger Causality Test for Heterogeneous Panel Data of the Independent Variables

Causality test forDumitrescu & Hurlin (2012)		
p-value	Statistic	a test
	3.6631	W bar
0.0000	4.9823	Z bar
0.0001	4.3280	Z bar tilde
Causality test for Juodis, Karavias and Sarafidis(2021)		
0.00	12.0852	HPJ Wald test

Based on the table, the overall panel causality results indicate a bidirectional relationship running from economic growth to exports and domestic investment. The findings also reveal the presence of causal relationships that explain the effects of exports and domestic investment for the majority of Middle East and North Africa countries.

5. Conclusion

Despite the substantial natural resources owned by Middle East and North Africa countries, their adverse effects include hindering economic diversification and excessive reliance on the oil sector. This dependence makes these economies vulnerable to fluctuations in oil prices, which strongly affect gross domestic product due to the sector's significant weight at the domestic level. Most of these countries have failed to achieve economic development by effectively utilizing resource revenues and channeling them toward domestic investment. This situation has required government intervention and a strategic shift toward the use of exports, particularly non-oil exports, through export-promoting policies, improved access to external markets, and a transition from traditional export structures to non-traditional, manufacturing-based exports oriented toward export-led industrialization.

The average gross domestic product reached approximately 587 billion over the period 1987–2022. Over the same period, Iran recorded an average GDP of about 321 billion, while Syria achieved approximately 20 billion.

Regarding average exports and domestic investment, Turkey recorded around 128 billion in average exports and 141 billion in average domestic investment over the period 1987–2022, representing the highest levels among the countries included in the study. Iran followed with an average of 69 billion in exports and 93 billion in domestic investment. Tunisia recorded about 12 billion in average exports and 6 billion in average domestic investment, representing the lowest values among the countries covered during the same period.

These findings are consistent with the empirical results of the study based on panel data analysis for the period 1987–2022. The analysis reveals a positive relationship between the dependent variable and the independent variables, which is consistent with economic theory and supports the results of previous studies, particularly with regard to the effects of exports and domestic investment on economic growth.

Main Findings

The main results of the study can be summarized as follows:

- Weak economic growth in Middle East and North Africa countries that rely heavily on oil revenues, along with a decline in domestic investment.
- The dynamic long-run analysis indicates a positive relationship between the independent variables, exports and domestic investment. A one-unit increase in either variable leads to an increase in economic growth by approximately 0.37 and 0.43 units, respectively. In the short run, the variables are

statistically insignificant and do not exert a measurable effect on economic growth in Middle East and North Africa countries.

- The overall panel causality results indicate a bidirectional relationship running from economic growth to exports and domestic investment. The findings also reveal the existence of causal relationships that explain the effects of exports and domestic investment for the majority of Middle East and North Africa countries.

Recommendations

- Middle East and North Africa countries should adopt effective measures to enhance economic diversification by utilizing revenues from natural resources while developing other sectors such as industry, agriculture, and tourism. Investment in education and research and development should be encouraged to strengthen innovation and entrepreneurship, which can contribute to job creation and support long-term economic growth.

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