# The Impact of Exchange Rate and Inflation on Economic Growth: Empirical Evidence from the MENA region using Panel Data Analysis

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#### Abstract

The volatility of exchange rates and inflation represents a critical challenge to economic stability in the MENA (Middle East and North Africa) region. This study delves into the complex relationship between these macroeconomic factors and economic growth from 2000 to 2023, with a focus on providing actionable insights for policymakers. Using a panel dataset of nine MENA countries, the research employs Feasible Generalized Least Squares (FGLS) to address issues of heteroskedasticity, serial correlation, and cross-sectional dependence, offering a robust analysis of the dynamic interactions. The findings reveal that inflation significantly hampers GDP growth, confirming that rising inflation undermines investment and creates economic uncertainty. In contrast, a more competitive Real Effective Exchange Rate (REER) fosters economic growth by improving export competitiveness, especially in non-oil sectors. Interestingly, the analysis also highlights that imports have a positive effect on GDP growth, emphasizing their role in supporting domestic production through the provision of essential goods and technologies. This study calls for targeted policy measures in the MENA region to stabilize inflation, enhance exchange rate competitiveness, and diversify exports. Such strategies are essential for sustaining economic growth and ensuring long-term economic stability.

### Introduction

Economic growth is a fundamental objective for any nation, as it directly impacts the prosperity of its citizens and the overall stability of its economy. In an increasingly globalized world, characterized by growing international trade, countries aim to sustain robust economic growth, which serves as a key indicator of their development and their standing on the global stage(Artana et al., 2006; Berg, 2016; Bloom et al., 2020; Ranis, 2004). The rise of free trade, driven by globalization, has expanded access to international markets. However, this has also intensified competition, making price competitiveness a decisive factor. Indeed, a nation's ability to thrive in the global marketplace hinges largely on its capacity to offer goods and services at competitive prices, a critical driver of its growth trajectory (Hanafi et al., 2017; Baccaro & Tober, 2017; C. Fischer, 2007).

The economies of the MENA region, often heavily reliant on the export of raw materials such as oil, gas, and phosphate, as well as services like telecommunications and tourism, and on the import of goods such as machinery, technology, and consumer products, are particularly vulnerable to exchange rate fluctuations and inflation. These countries face limited economic diversification and significant volatility in commodity prices, making the management of price competitiveness even more complex. In this context, the price competitiveness of MENA countries depends on numerous economic factors, two of which are particularly decisive: the exchange rate and inflation. These variables have direct effects on production costs and export performance, both of which are crucial for driving economic growth(Haddad, 2002; Kadri et al., 2024; Lopez-Calix et al., 2012; Magdy Barbary, 2023).

The importance of this topic extends beyond understanding how exchange rate fluctuations and inflation affect price competitiveness and economic growth, and is also reflected in the growing number of studies published on this subject. It also reflects the increasing body of work examining these variables across

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various economic contexts, whether in developed, developing, or transitioning countries. This diversity reflects the increasing interest in the mechanisms that govern the competitiveness of economies in a globalized environment. As such, this topic holds increasing relevance for both academic debate and a deeper understanding of global economic dynamics.

In the context of economic reforms and efforts to diversify the economies of the MENA region, understanding the effects of exchange rate fluctuations and inflation is essential for formulating effective economic policies and ensuring sustained economic growth. However, despite the growing interest, empirical studies using panel data analysis across MENA countries remain limited, often focusing on specific economies or studying these variables in isolation, without considering their simultaneous interaction in particular economic contexts, such as that of the MENA region. As a result, the question that arises is: **How do exchange rate fluctuations and inflation impact economic growth in the MENA region?** 

To address the research question, the study is structured into three main parts. First, we will begin with a literature review that will outline relevant economic theories and key prior works to better understand the issue and identify the scientific gap. Next, we will conduct an empirical analysis of the available data, using statistical methods to assess the relationships between exchange rates, inflation, and economic growth in the MENA countries. This step will include econometric estimation. Finally, a discussion of the results will confront our findings with existing theories and examine the implications for economic policies in the MENA region.

## Literature Review

A substantial body of literature has examined both the theoretical and empirical aspects of the relationships between exchange rates, inflation, and economic growth. This section is divided into two parts: the first focuses on the impact of inflation on economic growth, and the second explores the relationship between exchange rates and economic growth.

### Selected Empirical Literature on Inflation and Economic Growth

The relationship between inflation and economic growth has been extensively studied. Traditionally, this relationship was considered linear; Mundell (1965) and Tobin (1965) suggest a positive relationship between the two variables, while Stockman (1981) and Fischer (1983) propose the opposite, advocating for a negative relationship. However, Fischer (1993) introduces a different perspective, arguing that the relationship between inflation and growth is nonlinear. According to his view, this relationship remains positive up to a certain threshold of inflation, beyond which it becomes negative. These theoretical differences highlight the complexity of this relationship and emphasize the importance of understanding the specific conditions under which inflation can either stimulate or hinder economic growth.

Several studies have demonstrated that inflation, beyond a certain threshold, negatively affects growth. For example, Odhiambo (2009) found unidirectional causality from inflation to growth in Tanzania, suggesting that high inflation impedes long-term growth. Similarly, Bruno & Easterly (1998) found that inflation above 40% leads to an inflationary crisis that hampers growth, and Gylfason & Herbertsson (2001) showed that inflation between 10% and 20% hurts growth in both developed and developing countries. Kremer et al. (2013) identified that in developed countries, a threshold of 2% inflation, and 17% in developing countries, marks a point beyond which inflation becomes detrimental to growth.

However, some studies suggest that moderate inflation could have beneficial or stabilizing effects. Baharumshah et al. (2016) observed that inflation uncertainty could, in some cases, stimulate growth, particularly in inflation ranges between 5.6% and 15.9%. Mamo (2012), in his study on 13 Sub-Saharan African countries, found that inflation and growth are sometimes inversely related, but in certain cases, inflation may predict growth when it stays within reasonable limits. Thus, moderate inflation, when well-managed, could play a stabilizing role in some economies, especially those in developing countries.

On the other hand, some studies have found positive relationships between inflation and growth, particularly in specific contexts or during economic transition periods. Mallik & Chowdhury (2001) observed a positive relationship between inflation and growth in South Asian countries such as Bangladesh, India, Pakistan, and Sri Lanka. Osuala et al (2013) for Nigeria also found a positive relationship between inflation and economic growth during their study period. These findings suggest that, in some situations, inflation could be a driver of growth, especially in developing or rapidly industrializing economies.

Inflation thresholds identified across different studies vary considerably from one country to another. Akgül & ÖzdemiR, (2012) found a threshold of 1.26% for Turkey, beyond which inflation begins to harm growth. In Azerbaijan, Hasanov (2012) identified a threshold of 13%, while Ahmed & Mortaza (2005) found a threshold of 6% for Bangladesh. These differences demonstrate that the effects of inflation on growth depend on each country's economic context, as well as the economic policies in place. In some cases, lower thresholds may be relevant to limit the negative impact of inflation.

Finally, some studies have found no significant relationship between inflation and growth. Kasidi & Mwakanemela (2013) in their study on Tanzania, observed that the relationship between inflation and growth was weak and insignificant. Similarly, Mukoka (2018)found no notable relationship between inflation and growth in Zimbabwe. These results suggest that, depending on the macroeconomic context and the policies in place, inflation may not be a determining factor for growth.

Hypothesis 2: Inflation has a direct and negative effect on economic growth in the MENA region by increasing production costs and reducing consumers' purchasing power.

### Selected Empirical Literature on Exchange Rates and Economic Growth

The relationship between the real exchange rate and economic growth has been extensively explored in economic literature. Much of this research focuses on the impact of real exchange rate depreciation, which is generally considered beneficial for growth, especially in developing countries. Rodrik (2008) shows that real exchange rate undervaluation stimulates economic growth by supporting the tradable sector, particularly industry. This relationship holds across various exchange rate measures and estimation techniques. Rodrik argues that real exchange rate depreciation improves export competitiveness, thus promoting capital accumulation and growth. Similar findings are reported by Habib et al. (2017), who analyze the impact of real depreciation on growth for 150 countries between 1970 and 2010. They find that real depreciation tends to reduce GDP growth, with a stronger effect in countries with fixed exchange rate regimes. Missio et al. (2013), in their analysis of 63 developing countries, confirm that maintaining a competitive real exchange rate, particularly through currency depreciation, boosts long-term growth by increasing the income elasticity of demand for exports.

However, the volatility of the real exchange rate is generally seen as having negative effects on economic growth. Rapetti (2016) examines the impact of real exchange rate volatility on economic growth in both OECD and developing countries from 1950 to 2014. He finds a significant negative relationship between real exchange rate volatility and growth, with a stronger effect in developing countries. Exchange rate volatility generates uncertainty, hindering investment and long-term growth, particularly in the context of financial globalization. Morina et al. (2020) study the effect of real effective exchange rate volatility on economic growth in Central and Eastern European countries between 2002 and 2018 and confirm that this volatility negatively affects economic growth, supporting the idea that exchange rate fluctuations hinder long-term growth. Kandil et al. (2007) analyze the effects of exchange rate fluctuations on the Turkish economy and show that anticipated real exchange rate appreciation has significant adverse effects on real output growth, investment, and exports. Furthermore, unanticipated exchange rate fluctuations have asymmetric effects on output growth, private consumption, and investment, although their impact on export growth is positive.

Additionally, some studies highlight the importance of contextual and institutional factors in the relationship between exchange rates and economic growth. Basirat et al. (2014), in a study covering 18

countries from 1986 to 2010, examine the impact of exchange rate fluctuations while considering the development of financial markets. Their analysis shows that while exchange rate fluctuations and financial market development negatively affect economic growth, the interaction between these two factors is not significant enough to produce a positive impact. This suggests that, even though a developed financial market may offer some protection against the negative effects of exchange rate fluctuations, this relationship remains limited. Rodrik (2008) also discusses the role of institutional weaknesses and product-market failures in the tradable sector. These factors can either mitigate or amplify the effects of exchange rate fluctuations.

Finally, Adu-Gyamfi et al. (2019) investigate the impact of trade openness, inflation, and the real exchange rate on GDP growth in nine West African countries from 1998 to 2017. Their study reveals that inflation negatively affects economic growth, particularly in models using pooled Ordinary Least Squares and random effects tests. In contrast, the real exchange rate shows a positive and significant impact on GDP growth across all models, underscoring the importance of exchange rate competitiveness in supporting GDP growth in these countries.

**Hypothesis 1**: Exchange rate fluctuations have a direct and negative impact on economic growth in the MENA region by influencing price competitiveness.

Despite the extensive body of theoretical and empirical research on the relationship between inflation, exchange rates, and economic growth, much of the existing literature remains limited in its geographical scope and methodological approaches. While studies have focused on various regions, including South Asia, Sub-Saharan Africa, and OECD countries, there is still a lack of focused research on the MENA region, which presents unique economic and institutional characteristics. Moreover, few studies have employed panel data analysis to simultaneously examine the effects of both inflation and exchange rates on growth within this region. This gap in the literature provides a compelling reason to explore the joint impact of inflation and exchange rate fluctuations on economic growth in the MENA region.

## Methodology

### Data description

The aim of this study is to analyze the impact of exchange rates and inflation on economic growth in the MENA region. By understanding this relationship, the study seeks to provide valuable insights into the dynamics of regional economic growth and the role of external and internal economic factors in its formation.

Our study covers a long period, from 2000 to 2023, and includes a geographical scope of 9 countries in the Middle East and North Africa (MENA) region, note that this number is mainly due to limits in data availability.

The reliability and relevance of our results are guaranteed through the careful collection of the data used in our analysis from reliable international sources. The data were extracted using the World Bank Development Indicators (WDI) software package in the programming language R. This guarantees the robustness of our empirical base. For ease of understanding, Table 1 provides a summary of the basic information on each variable used in this study.

#### Table 1. Variable's description.

Variable	Title	Description

	DOI: <u>https://doi.org/10.02/94/j0c.v50.9040</u>						
GDP	Gross Domestic Product	Total value of all goods and services produced in a country, representing the country's economic performance.					
INF	Inflation	Using the consumer price index as a measure of inflation, this index shows how the cost of a basket of goods and services evolves over time.					
REER	Real Effective Exchange Rate	A measurement of the value of a currency relative to a basket of other major currencies.					
EXP	Exports	Total value of goods and services sold abroad, representing a country's trade with the world.					
IMP	Imports	Total value of goods and services purchased from other countries, showing a country's dependence on foreign goods and services.					

The countries of the Middle East and North Africa (MENA) used in this study, along with their respective tree-character International Organization for Standardization (ISO) country codes, are shown in Table 2 below.

#### Table 2. MENA countries.

Country	Morocco	Algeria	Armenia	Cyprus	Georgia
ISO Code (Alpha-2)	MA	DZ	AM	CY	GE
Country	Bahrain	Iran	Malta	Saudi Arabia	Tunisia
ISO Code (Alpha-2)	BH	IR	MT	SA	TN

#### Model specification

To examine the impact of inflation and the exchange rate on economic growth, we used a panel model. This approach is particularly effective for analyzing two-dimensional data: a time dimension, extending from 2000 to 2023, and a cross-sectional dimension, encompassing all nine MENA countries. These econometric models enable us to capture individual-level variations over time, while taking into account specific time and country effects. Based on a panel model our function of growth is basically written as follows:

# $GDP_{it} = \alpha_i + \beta_1 INF_{it} + \beta_2 REER_{it} + \beta_3 EXP_{it} + \beta_4 IMP_{it} + \mu_{it}$

This equation models GDP  $(GDP_{it})$  as a function of various indicators while accounting for countryspecific ( $\alpha_i$ ) and time-specific (t) effects. The coefficients ( $\beta_1, \beta_2, \beta_3, \beta_4$ ) quantify the impact of each trade variable on economic prosperity.

#### Panel model

Panel data models are used on data that spans both cross-sectional and time-series dimensions. The general form of the panel data model is:

$$Y_{it} = \alpha + \beta X_{it} + u_{it}$$

Where  $Y_{it}$  and  $X_{it}$  represents the dependent variable and the independent variables for entity *i* at time *t*,  $\alpha$  is the intercept,  $\beta$  is the coefficient for the independent variable, and  $u_{it}$  is the error term.

The error term  $u_{it}$  can be further decomposed into two components in panel data:

$$u_{it} = \mu_i + \varepsilon_{it}$$

Where  $\mu_i$  is the individual-specific effect (the fixed or random effect), and  $\varepsilon_{it}$  is the idiosyncratic error that varies over both time and entities.

#### Hsiao Test (for Pooling Model vs. individual effects)

The Hsiao Test is used to decide whether a pooled model is more appropriate than a model with individualspecific effects. In the pooling model, there is no distinction between entities; all data is treated as if it's coming from a single entity. In Individual-specific Effects models, the intercept varies across entities, capturing individual-specific effects (fixed or random):

- **Null Hypothesis H**<sub>0</sub>: The pooling model is appropriate.
- Alternative Hypothesis H<sub>1</sub>: The individual-specific model is more appropriate.

The test uses a likelihood ratio test or an F-test to determine if the additional entity-specific intercepts significantly improve the fit of the model.

### Fixed and Random Effects Models

The **Fixed Effects (FE)** model assumes that each entity has its own intercept, and the individual-specific effect  $(\mu_i)$  is correlated with the independent variables. This model controls for all time-invariant characteristics of the entities by differencing or including dummy variables.

$$Y_{it} = \alpha_i + \beta X_{it} + \varepsilon_{it}$$

The **Random Effects (RE)** model assumes that the individual-specific effects  $(\mu_i)$  are uncorrelated with the regressors and are treated as random variables drawn from a distribution. In this model, the entity-specific effect is treated as part of the error term.

$$Y_{it} = \alpha + \beta X_{it} + u_i + \varepsilon_{it}$$

Hausman Test FE vs. RE

The Hausman Test is used to decide whether to use the Fixed Effects model or the Random Effects model. The test compares the consistency of the two estimators:

- **Null Hypothesis H**<sub>0</sub>: The Random Effects model is consistent and efficient.
- Alternative Hypothesis H<sub>1</sub>: The Random Effects model is inconsistent, and Fixed Effects should be used.

The Hausman test computes the difference between the estimates of the two models and tests if this difference is statistically significant. If the difference is large, the Fixed Effects model is preferred; if not, the Random Effects model is deemed appropriate.

### Heteroskedasticity and Serial Correlation tests

In the presence of heteroskedasticity, the variance of the error term is not constant across entities or time periods. This can lead to inefficient estimates and invalid inferences in the standard panel data models. The common tests for heteroskedasticity are Breusch-Pagan test and White's test.

As for Serial correlation, it occurs when the errors are correlated across time for a given entity. This is especially problematic in time-series data and can bias standard errors, leading to incorrect inferences. in panel data the Wooldridge test can be used for autocorrelation.

When heteroscedasticity and serial correlation are present, Generalized Least Squares (GLS) is often recommended to obtain efficient estimators. The Feasible Generalized Least Squares (FGLS) is the practical method to deal with these issues in panel data, FGLS adjusts for both heteroskedasticity and serial correlation by transforming the data using an estimate of the variance-covariance matrix of the error terms.

## Results

### Correlation Analysis

The correlation between GDP and EXP is very strong (0.9359), indicating that exports have a direct and significant impact on economic growth. An increase in exports is strongly linked to GDP growth, underlining the central role of exports in wealth creation and external demand in the economies studied. Similarly, the correlation between GDP and IMP is also very strong (0.9694), suggesting that imports are closely linked to economic growth. This could be due to their role in supplying intermediate goods for domestic production or supporting domestic consumption.

The correlation between GDP and INF is 0.2014, This could be explained by moderate inflation that does not directly affect GDP, or whose effects are mitigated by factors such as monetary and fiscal policies. Similarly, the correlation between GDP and the real effective exchange rate is 0.1854, suggesting that exchange rate variations have no direct effect on economic growth. However, this effect could be indirect, influencing growth through exports and imports.

Independent variables include a strong correlation between INF and REER, as well as between EXP and IMP, which can pose challenges of collinearity in econometric models, as shown in table 2.

	GDP	EXP	IMP	INF	REER
GDP	1.0000000	0.9359303	0.9575386	0.1068864	0.1117375
EXP	0.9359303	1.0000000	0.9694076	0.2013789	0.1853962
IMP	0.9694076	0.9575386	1.0000000	0.1735874	0.1511721
INF	0.2013789	0.1068864	0.1735874	1.0000000	0.7819471
REER	0.1853962	0.1117375	0.1511721	0.7819471	1.0000000

#### Table 2: Variables correlation

### Panel Models

This study uses several panel data models to analyze the relationships between key economic variables and GDP, focusing on MENA countries between 2000 and 2023. Panel data models make it possible to take into account both variations between countries and over time, offering a suitable framework for understanding economic dynamics. We have selected nine different models, including pooled OLS, fixed-effects models which treat effects between and within countries and random-effects models which incorporate individual, temporal and bidirectional effects.

Each model has a specific purpose: pooled OLS provides a basic estimate, while fixed-effect models control for unobserved country- or period-specific factors. Random-effects models, on the other hand, assume that unobserved factors follow a random distribution. The combined use of fixed and random effects, with individual, temporal and bidirectional effects, enables us to take better account of the particularities of countries or periods. This makes it possible to isolate more precisely the impact of the variables of interest, while limiting the risk of bias due to omitted factors.

The results, presented in Table 3, show how variables such as inflation, the real effective exchange rate, exports and imports are related to variations in GDP in the MENA region. This analysis helps us to better understand the drivers of economic growth and to identify the factors that significantly influence GDP in this specific panel data context.

Models		Fetimate				Drof	
Models		Louman				TICI	
		INF	REER	EXP	IMP	R	p-value
Pooling		-0.108	0.174***	0.196***	0.397***	0.66	0.0000
	Between	-0.111	0.581	-0.318	1.233*	0.87	0.004
Fixed effects	Within	-0.167	0.179***	0.201***	0.390***	0.64	0.0000
	Within two ways	-0.315*	0.226***	0.189***	0.182***	0.24	0.0000
	One way	-0.108	0.174***	0.196***	0.397***	0.66	0.0000
	Two ways	-0.111	0.181***	0.201***	0.365***	0.61	0.0000
Random effects							

#### Table 3: Panel models estimations and results

### 1. Note: \*, \*\* and \*\*\* represent significance level at 10%, 5% and 1% respectively.

The results show that the REER variable is significant (p < 0.01) in almost all models, suggesting a robust relationship with economic growth. The EXP and IMP variables are also significant, with positive coefficients, indicating that they have a favorable impact on GDP. In contrast, the INF has negative coefficients, but is only significant in the two-way effects model. In terms of model accuracy, coefficients of determination ( $R^2$ ) vary, but the "Between" model seems to offer the best fit, with an  $R^2$  of 0.87, suggesting that it explains well the variability of GDP in the data analyzed.

#### Specification Tests

The tests listed in Table 4 examine key aspects of panel data modeling, including the significance of unobserved individual and time effects, the comparison of fixed versus random effects models, and the evidence of heteroscedasticity and serial autocorrelation.

#### Table 4: Specification tests

Test	p-value	result
	9.162e-05	both individual (fixed or random) effects and
F test for twoways effects		time are significant
	2.2e-16	Fixed effects model is applicable than the
Hausman test		random effects
	2.436e-05	there is evidence of heteroskedasticity in the
Studentized Breusch-Pagan test		model, the variance of the error terms is not
		constant across observations.
Breusch-Godfrey / Wooldridge test	0.1321	There is no serial correlation in idiosyncratic
for serial correlation		errors

The diagnostic tests reveal several important points about the model specification. The F-Test for two-way confirms the relevance of both individual and time effects in the data, highlighting their crucial role in the analysis. The Hausman Test suggests a preference for the fixed-effects model over the random-effects model, indicating a non-random relationship between the explanatory variables and individual effects. Additionally, the Breusch-Pagan Test shows the presence of heteroscedasticity in the data, which could affect the efficiency of classical estimators. However, the Serial Correlation Test reveals no serial correlation in the errors, which strengthens the reliability of the estimated models.

To further improve the robustness of the results and address heteroscedasticity, it would be beneficial to apply the Panel Feasible Generalized Least Squares (FGLS) method. The FGLS model can be an effective approach to handle heteroscedasticity in panel data, as it adjusts both the coefficients and the standard errors to account for the variance-covariance structure of the errors, ultimately improving the efficiency of the estimates.

Panel Feasible Generalized Least Squares Model's Results

#### Table 5: Panel FGLS results

Models	Estimate			Pref		
	INF	REER	EXP	IMP	R	p-value
Panel feasible generalized least squares	-0.167*	0.179***	0.201***	0.390***	0.65	0.00000

### Note: \*, \*\* and \*\*\* represent significance level at 10%, 5% and 1% respectively.

The FGLS model provides interesting results. The estimated coefficients are similar to those of the internal fixed effects model, indicating a certain robustness despite the adjustment for heteroscedasticity. One notable change concerns the inflation rate, which becomes significant, suggesting that inflation has a measurable impact on economic growth in this adjusted model. In addition, the REER, EXP and IMP variables remain significant with p-values below 0.01, confirming their key role in the analysis of economic growth.

The appropriate model for our data is therefore:

## $GDP_{it} = -0.167 INF_{it} + 0.179 REER_{it} + 0.201 EXP_{it} + 0.390 IMP_{it}$

The coefficient of -0.167 for INF indicates a negative relationship between inflation and economic growth. This means that a 1 unit increase in INF leads to a 0.167 unit decrease in GDP, ceteris paribus (all else being equal). In other words, higher inflation is associated with reduced economic growth, a trend generally observed in economies where inflation becomes too high or uncontrolled.

The coefficient of 0.179 for the Real Effective Exchange Rate (REER) indicates a positive relationship between the real effective exchange rate and economic growth. An increase in the REER of 1 unit (generally indicating a depreciation of the currency or an improvement in international competitiveness) is associated with an increase of 0.179 units in GDP. This suggests that a more competitive exchange rate favors exports and stimulates economic growth, which is often the case when the domestic currency becomes cheaper relative to other currencies.

The coefficient of 0.201 for exports also shows a positive relationship with economic growth. This means that a 1 unit increase in exports is associated with a 0.201 unit increase in GDP. This result is consistent with the idea that exports stimulate external demand for goods and services produced in the economy, thus contributing directly to economic growth.

The coefficient of 0.390 for imports shows that imports also have a positive effect on economic growth. A 1 unit increase in imports leads to a 0.390 unit increase in GDP. This may seem counter-intuitive, but it is possible that imports play an essential role in providing intermediate goods or technologies that support domestic production and innovation, thus stimulating economic growth.

### **Results Discussion**

The results of this study provide valuable insights into the factors influencing economic growth in the MENA region over the period 2000-2023. The analysis shows that key macroeconomic variables, such as INF, the REER, exports, and imports, significantly impact GDP.

INF has a negative impact on GDP, in line with economic theory, as high inflation can erode purchasing power, create uncertainty and discourage investment. However, moderate inflation is not necessarily detrimental to economic growth, underscoring the need for price stability to support long-term growth.

The REER shows a positive relationship with GDP, indicating that a more competitive exchange rate enhances the attractiveness of exports, stimulating external demand and economic growth. This suggests that MENA countries should adopt exchange rate policies that improve competitiveness in order to stimulate exports and growth.

Exports are a key driver of GDP growth, their expansion leading to higher demand for domestic goods, increased production and job creation. This is particularly important for the MENA region, which is seeking to diversify away from oil dependency and develop non-oil sectors such as manufacturing and services.

The positive effect of imports on GDP challenges conventional wisdom, showing that imports can support economic growth by providing essential goods, services and technologies that enhance national production and competitiveness. Policies need to strike a balance between the benefits of imports and the need to protect domestic industries.

## Conclusion

Through this research, specific awareness is generated of the macroeconomics of the MENA region that enhances its growth for the period of 2000 to 2023. The empirical findings are consistent with the theoretical analysis indicating a negative relationship between inflation and growth and a positive relationship of exchange rate depreciation with economic performance.

Consistent with many earlier research works, our results indicate that inflation in most instances does depress the GDP growth rates. This trend goes hand in hand with high inflation levels that have an adverse effect on purchasing power, create instability, and inhibit investment (Odhiambo 2009; Bruno & Easterly 1998; Gylfason & Herbertsson 2001). While moderate inflation per se may not always inhibit economic growth, how it is monitored is paramount in determining the economic sustenance. Therefore, it is recommended that MENA countries adopt strong monetary policies to maintain price stability, as this will help create a stable environment conducive to long-term investment and growth.

In addition, the study also presents evidence of a positive link between GDP growth and a lower competitive REER, further confirming the theory that exchange rate depreciation is good for economic growth, especially in developing countries. Depreciation improves competitiveness of exports, which boosts foreign demand leading to growth (Rodrik 2008; Habib et al. 2017; Missio et al. 2013). To leverage this, it is crucial for MENA countries to implement exchange rate policies that foster competitiveness, while minimizing excessive volatility, which can create uncertainty and deter investment.

The positive effect of exports and imports on GDP emphasizes their critical role in economic performance. MENA countries should, therefore, enhance export incentives, particularly in non-oil sectors, and strategically manage imports to balance economic growth and domestic industry protection.

Moreover, the findings suggest the importance of diversification in boosting long-term growth. MENA countries should prioritize investment in non-oil sectors, particularly in manufacturing, technology, and services, to reduce dependence on oil revenues and create a more resilient economy.

In conclusion, the study provides valuable policy implications for MENA countries, highlighting the need to address inflation, manage exchange rate policies effectively, support export-driven growth, and encourage diversification. By implementing these recommendations, MENA countries can create a more stable and competitive economic environment that fosters sustainable growth and development.

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