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Real Exchange Rate and Economic Growth in Tunisia

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Abstract

This study examines the relationship between the real effective exchange rate (REER) and economic growth in Tunisia from 1980 to 2011, using the Generalized Method of Moments (GMM). The analysis incorporates key macroeconomic variables, including initial GDP per capita, investment, public expenditure, trade openness, and human capital, to assess their impact on economic performance. The results indicate that real exchange rate depreciation has a negative but statistically insignificant effect on growth. While depreciation may enhance external competitiveness and stimulate exports, its impact remains contingent on import costs and inflationary pressures. Conversely, trade openness and human capital have positive and statistically significant effects, reinforcing the argument that economic liberalization and investment in human capital are crucial drivers of growth. Public expenditure, however, shows a negative and significant relationship with growth, suggesting potential inefficiencies in fiscal policy. These findings highlight the importance of exchange rate management, investment policies, and trade liberalization in fostering economic development. Policymakers should prioritize structural reforms, technology transfer, and private investment to enhance long-term growth prospects. The study's insights are particularly relevant for other developing economies seeking to optimize exchange rate policies and economic strategies to achieve sustainable growth.

Keywords: *Real Effective Exchange Rate, Economic Growth, Human Capital, Tunisia.*

Introduction

The real exchange rate remains the key factor in the new economic growth model that we are striving to cultivate—difficultly but ambitiously—as the seed of emergence. In this context, exchange rate policy, considered one of the most important instruments of economic policy in an open economy, currently stands out as a means of monetary regulation and an essential tool for our external competitiveness (Demir, & Razmi, 2022).).

Like other countries, Tunisia faces the challenge of determining the exchange rate that will enable it to achieve its growth objectives (Becheikh, 2021; Dahmani et al., 2022). Despite the adoption of several economic policy measures, including various Structural Adjustment Programs and other economic recovery measures, the country continues to struggle with a structural imbalance in its main macroeconomic variables (Neaime, & Gaysset, 2022).

Indeed, Tunisia was severely affected by the economic and financial crisis of the 1980s. This crisis was characterized by a slowdown in economic growth, significant budgetary and external deficits (Ouertani, & Hamdani, 2025). As a result, Tunisia opted for a liberal economy, which led to major reforms aimed at restoring a viable macroeconomic environment (Caligiuri, & Sabatini, 2021; Do Céu Pinto Arena, 2024).

In these circumstances, we address the issue of the real exchange rate, which is of great importance for economic performance. Achieving this requires determining appropriate exchange rate parities, a central concern for economists.

The most widely used approach today remains the Purchasing Power Parity (PPP) theory. Developed in the 1920s, PPP suggests defining the reference exchange rate as the one that equalizes the purchasing power of currencies across different national economies (Vo, & Vo, 2023; Belbali et al., 2024). Initially based on the law of one price, it later found theoretical support in monetarist models through its relative expression. However, it quickly reveals its limitations, both theoretically and empirically. Indeed, this theory for determining an exchange rate benchmark is extremely difficult to verify: absolute PPP, like the law of

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one price, is almost never observed. As for relative PPP, it is only weakly verified, in the sense that it is observed only when a long-term relationship between the real exchange rate and relative prices can be established (Belloumi, 2010; Mimoun et al., 2024).

Economic literature is rich with articles analyzing the different definitions of the real exchange rate. It identifies two main approaches to determining the real exchange rate: one macroeconomic and the other microeconomic (Demir, & Razmi, 2022).

The first definition assumes that the real exchange rate is a ratio of baskets of goods or a ratio of price indices. This is the most traditional and widely used definition (Itskhoki, 2021). The second definition, inspired by microeconomics, defines the real exchange rate as a ratio of internal prices, specifically the relative price of goods in the sheltered sector versus the exposed sector (Baccaro, & Höpner, 2022).

Moreover, the importance of the exchange rate is also explained by its central role in economic dynamics. It is both a relative price that influences consumption and investment decisions and a competitiveness indicator that reflects the economy's position relative to foreign markets (Ramzan, 2021 ; Demir, & Razmi, 2022).

The renewed interest in studying the real exchange rate is driven by several major economic factors. It has been observed that economic and monetary crises are generally preceded by a persistent overvaluation of real exchange rates (Ugurlu, & Razmi, 2023). Similarly, long-term distortions and recurrent misalignments in the real exchange rate are associated with low economic growth rates. Additionally, some studies attribute the poor economic performance of developing countries to fluctuations in the real exchange rate (Khalid, et al., 2024)

Overall, the real exchange rate is an indicator of international competitiveness. For developing countries with outward-oriented economies, it serves as a key measure of both competitiveness and attractiveness (Olamide, et al., 2022)

Thus, exchange rate policy plays a crucial role in achieving strong economic performance (Chen, et al., 2021). When the exchange rate remains stable, it has a significant positive impact on the international competitiveness of a country's products (Fröhlich, 2023). This, in turn, facilitates higher exports, leading to increased national production. Such growth, all other factors being equal, helps reduce unemployment and sets the economy on a growth trajectory, ensuring internal balance (Girdzijauskas, et al., 2022). Additionally, the exchange rate influences the sustainability of the current account balance (Bousnina, et al., 2021)..

Given these considerations, achieving various economic objectives requires a thorough understanding of the key variables that influence economic growth. Since the real exchange rate contributes to economic activity through its impact on competitiveness, this study is particularly relevant in identifying and understanding the determinants of economic growth.

Therefore, this study aims to reliably predict the exchange rate level that aligns with achieving major macroeconomic balances, which are essential for sustainable and long-term economic growth (Guzman, et al., 2018).

It is evident that the sustainable economic development sought by developing countries in general, and Tunisia in particular, requires a significant level of economic growth (Trabelsi, E.2024). This acceleration is crucial in light of the increasing global economic integration. To achieve this, it is essential to establish and maintain a productive system capable of supporting growth, with the equilibrium real exchange rate serving as a foundation (Céspedes, et al., 2004; Barbosa, & Alencar, 2025).

Analyzing the factors that drive economic growth through an econometric approach would facilitate a clearer understanding and identification of Tunisia's growth determinants (Saidi, et al., 2015).

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The main objective of this study is to analyze the determinants of economic growth in Tunisia using a set of explanatory variables. This will enable economic policymakers to assess, over time, the extent of their contributions to economic activity.

Literature Revue

Developing countries can consolidate their economic achievements through rapid integration into the global economy (Shimizu, 2021). By improving their competitiveness in an open economy context, they can more easily attract both local and foreign investors, stimulate growth, and reduce economic vulnerability (Vîrjan, et al., 2023). The factors that enhance a country's competitiveness include exchange rate policy, the efficiency of production factors, and the role of structural and institutional reforms. This study focuses specifically on the first factor: exchange rate policy (Aman, et al., 2022).

For many years, the real exchange rate has been at the center of political debate in developing countries. With the liberalization of financial markets in the 1990s, the rapid increase in capital flows to developing countries had mixed effects on their economies (Mukherjee, et al., 2021; Davidson, 2022). While these countries were able to access international capital to finance their needs and accelerate growth, the impacts varied significantly.

There are two main approaches to determining the real exchange rate: the microeconomic approach and the macroeconomic approach. This study examines both from theoretical and empirical perspectives.

The use of the microeconomic definition of the real exchange rate is relatively recent. As noted by Edwards (1988), it has primarily been used in economic literature since the 1970s, particularly in discussions about developing countries. This approach defines the real exchange rate as the relative price of non-tradable goods compared to tradable goods. It is expressed P_A as the ratio of the price index for the sheltered sector P_E to that of the exposed sector :

$$TCR = P_A / P_E \quad (1)$$

This approach assumes that relative prices are flexible enough to ensure equilibrium between the supply and demand of tradable and non-tradable goods. The microeconomic expression of the real exchange rate highlights the incentives that guide resource allocation between the two sectors within a country, reflecting consumer preferences between these two types of goods.

Due to this dual equilibrium, much of the literature has used this formulation to define equilibrium exchange rates (Balassa, 1964; Edwards, 1994). The real exchange rate is written as a ratio of internal prices, but under the assumption of purchasing power parity P^*_E in the exposed sector, it can also be interpreted as a traditional real exchange rate.

$$TCR = P^* / P / P_M \quad (2)$$

And

$$TCR = S.P_A / P^*_E \quad (3)$$

However, this formulation is not entirely explicit, and the concept of the real exchange rate as a relative price between different sectors has been subject to various interpretations, contributing to confusion. Edwards (1988, 1989) identified at least four different expressions of the microeconomic real exchange rate. The most traditional definition in Anglo-Saxon literature considers the real exchange rate as the price of tradable goods relative to non-tradable goods:

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$$TCR = P^*_E / S.P_A \quad (4)$$

In this case, an increase in the real exchange rate indicates a real depreciation of the national currency. Other authors, including the International Monetary Fund (IMF), use the inverse expression($TCR = P^*_E / S.P_A$), where an increase in the real exchange rate indicates an appreciation of the national currency. This formulation is commonly used in development economics literature. Additionally, some definitions express the real exchange rate as an internal relative price, assuming purchasing power parity in the exposed sector:

$$TCR = P_A / P_E \quad \text{where} \quad (TCR = P_E / P_A) \quad (5)$$

In three-sector models, such as those of Edwards (1989, 1994), differentiating between importable and exportable goods within the exposed sector leads to two additional expressions of the real exchange rate, where the price of non-tradable goods is compared to that of either importable or exportable goods:

$$TCR = P_M / P_A \quad \textbf{Symmetric Expression} \quad TCR = P_X / P_A \quad (6)$$

With:

P_M: Price of importable goods

P_X: Price of exportable goods

Thus, there are various expressions of the real exchange rate. These expressions are often complex in practice because distinguishing between tradable and non-tradable sectors is challenging. Moreover, in this framework, the real exchange rate does not directly measure a country's competitiveness in global markets. In fact, it may even seem incompatible with this notion, as it assumes the law of one price, meaning that price competitiveness does not apply to tradable goods. Competitiveness is introduced indirectly in this formulation since a real appreciation leads to resource reallocation toward non-tradable goods, thereby reducing net exports.

Before conducting econometric regressions, it is essential to clarify the theoretical and practical framework of this study. Specifically, this research aims to explore how exchange rate-related variables affect economic growth.

The exchange rate is one of the key variables that define the relationship between external trade and economic growth (Busson & Villa, 1997). Poor exchange rate management can negatively impact a country's economic growth. Moreover, some empirical studies suggest that, for most countries, periods of high growth are associated with undervalued currencies. Conversely, a strong currency can weaken external trade competitiveness and hinder growth.

However, other empirical studies indicate that shocks leading to a lower real exchange rate can negatively impact economic activity and growth. On the other hand, growth prospects can attract capital inflows, which in turn appreciate the exchange rate.

Some studies highlight that, regardless of whether the exchange rate appreciates or depreciates, its stability is crucial for enhancing economic performance and accelerating growth. A study by Bosworth et al. (2003) found that instability in real exchange rates harmed export growth, whereas exchange rate stability was essential for promoting economic expansion. These findings reinforce the notion that there is a negative relationship between economic growth and exchange rate instability.

In light of these considerations, it is essential to assess how exchange rate fluctuations affect economic growth. To achieve this, the study first presents the general model specification and definitions of the

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variables used. This is followed by a description of the estimation method and the results of the econometric analyses.

Methodology

General Model Specification and Definition of Variables

The empirical model to be estimated is inspired by Barro's growth equation, which was used by Arellano & Bond (1991); particularly in the article by Hill et al., (2003), which forms the basis of our econometric specification:

$$GR_{i,t} = \alpha_i + \beta V_{i,t} + \delta X_{i,t} + \varepsilon_{i,t} \quad (1)$$

Where:

- $GR_{i,t}$: The medium-term growth rate of real GDP per capita of country I at period t,
- α_i : The country-specific effect,
- $V_{i,t}$: A row vector of growth determinants defined at the beginning of period t,
- $X_{i,t}$: A row vector of growth determinants defined by averages established over period ttt,
- $\varepsilon_{i,t}$: The error term.

The country-specific effect (α_i) aims to capture the impact of growth determinants that are not already accounted for by other explanatory variables. It represents unobservable factors that vary across countries but not over time. This effect can be either fixed or random. It is crucial to capture the impact of other growth determinants to ensure that the estimated coefficient of the exchange rate variable measures only the effect of this variable on growth and not those of other variables. Previous studies have guided us in selecting the appropriate variables.

Econometric Estimation Methods of the Model

The foundational works of Solow (1998, 1999) have formed the basis of numerous past empirical studies using the neoclassical model.

The model that we will estimate to study the relationship in question can be presented in its standard form as follows:

$$y_{i,t} = \alpha y_{i,t-1} + \beta V_{i,t} + \delta X_{i,t} + \varepsilon_{i,t} \quad (2)$$

where

$i = 1, \ldots, N$; $t = 1, \ldots, T$

$y_{i,t}$: The real GDP per capita growth rate of country i in period t.

$\alpha_{i,t}$: The country-specific effect.

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$V_{i,t}$: Determinants of growth defined at the beginning of period *t*.

$X_{i,t}$: Determinants of growth defined by averages established over period *t*.

$\varepsilon_{i,t}$: The error term.

The model specified in equation (2) presents several estimation issues when using classical estimators. For instance, it has been shown that the ordinary least squares (OLS) estimator is biased due to the inclusion of the lagged dependent variable and is non-convergent, regardless of the properties of $\varepsilon_{i,t}$.

Furthermore, under the assumption of random effects, the generalized least squares (GLS) estimator is also biased (Musau, et al; 2015; Antonakis, et al., 2021; Baltagi, et al., 2024).). This led Anderson, & Hsiao, (1982) to propose the use of first differences of $y_{i,t}$ lagged values over two periods to formulate an instrumental variable.

However, their estimator, although consistent, proved to be inefficient, which led Arellano and Bond (1991) to develop a generalized method of moments (GMM) that exploits all the orthogonality conditions existing between the lagged endogenous variable and the error term. Thus, alongside , all lagged endogenous variables of an order greater than two serve as valid instruments for the equation in first differences.

Their two-step estimator initially assumes that the error terms are independent across individuals and over time. The second step uses the residuals obtained to construct a consistent estimate of the variance-covariance matrix, thereby relaxing the previous assumptions. This two-step method allows for the consideration of autocorrelation in the error terms, as well as biases arising from simultaneity and measurement errors.

The linearization of model (2) using the logarithm gives us the following reduced form:

$$Log\,(y_{i,t}) = \beta_0 + \beta\, Ln(y_{i,t-1}) + \beta_1 LnTCER_{it} + \beta_2 LnDPUB_{it} + \beta_3\, LnINV_{it} + \beta_4 LnOUV_{it} + \beta_5 LnKH + \varepsilon_{it}$$

Where **y**: (GDP) is the real GDP per capita, (TCER) is the real effective exchange rate, (DPUB) is public expenditure, (INV) is investment, (OUV) is openness, and (KH) is human capital.

Explanatory Variables of Our Model

The dependent variable in our model is economic growth, measured by the annual growth rate of Gross Domestic Product (GDP).

Initial per capita (Y): This variable captures the effect of conditional convergence, which predicts that, all else being equal, countries with a lower initial real GDP per capita tend to grow relatively faster. Since the marginal return on capital is diminishing, this implies that initial real GDP per capita is negatively related to GDP growth.

The key explanatory variables selected for our model include:

Real Effective Exchange Rate (TCER): This variable is crucial to our analysis for several reasons. The concept of the equilibrium real exchange rate is partly based on a country's external balance, which is necessarily assessed in relation to the rest of the world. Additionally, the multilateral real exchange rate provides insight into the competitiveness of a country relative to its main trading partners.

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Public Expenditure (DPUB): To avoid the decomposition of public expenditures into tradable and non-tradable goods, we use as a proxy the share of total public consumption in GDP (in value terms).

Investment (INV): Private investment is measured by the annual growth rate of gross fixed capital formation (INVEST). Investment is a key driver of economic growth, as it serves as a transmission channel for economic policies to impact production. It is expected to have a strong positive effect on economic growth.

Trade Openness (OUV): Trade openness is measured as the sum of exports and imports relative to GDP. Increased trade openness can stabilize economic growth by enhancing an economy's adaptability and improving resource allocation efficiency. However, it also exposes the economy to greater external shocks, potentially leading to increased growth volatility. Therefore, the theoretical impact of trade openness remains uncertain.

Human Capital (KH): Human capital is approximated by the secondary school enrollment rate. The available stock of human capital is evaluated based on the distribution of the active population by education level (Lui, 2011).

Human capital is further classified into different qualification levels:

Unskilled human capital: Individuals with no formal education.

Low-skilled human capital: Individuals who have only completed primary education.

Intermediate human capital: Individuals who have completed secondary education.

Highly skilled human capital: Individuals who have pursued post-secondary education.

Estimation Methods: The Generalized Method of Moments (GMM)

A dynamic model is a model in which one or more lagged values of the dependent variable appear as explanatory variables. Unlike GMM, standard econometric techniques such as Ordinary Least Squares (OLS) fail to provide unbiased estimates for such models due to the presence of the lagged dependent variable on the right-hand side of the equation. This leads to biased estimates.

The GMM method relies on orthogonality conditions between lagged variables and the error term, both in first differences and levels. When the dynamic model is expressed in first differences, the instruments are in levels, and vice versa. In the estimated model, the use of lagged variables as instruments depends on the nature of the explanatory variables:

Exogenous variables: Their current values are used as instruments.

(Predetermined or weakly exogenous variables (variables that may be influenced by past values of the dependent variable but remain uncorrelated with future realizations of the error term): Their lagged values of at least one period can be used as instruments.

(Endogenous variables: Their lagged values of two periods or more serve as valid instruments.

The validity of the selected instruments can be confirmed or rejected using the Hansen and Sargan tests.

There are two main variants of the GMM estimator in dynamic panel data models:

- The First-Difference GMM estimator
- The System GMM estimator

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1.3.1) The Principle of the GMM Method

First-Difference GMM

The First-Difference GMM estimator, developed by Arellano and Bond (2006), involves taking the first difference of the estimated equation for each period to eliminate individual-specific effects. This results in:

$$\begin{cases} \Delta y_{i,t} = \beta \Delta y_{i,t-1} + \delta \Delta x_{i,t} + \Delta v_t + \Delta \varepsilon_{i,t} \\ y_{i,t} = \beta y_{i,t-1} + \delta x_{i,t} + v_t + \varepsilon_{i,t} \end{cases}$$

The lagged endogenous variable is then instrumented using its past values from at least two periods earlier.

However, this method has limitations:

- It does not capture the effect of time-invariant factors.
- Blundell and Bond (2006) demonstrated through Monte Carlo simulations that the System GMM estimator outperforms the First-Difference GMM estimator.
- The First-Difference GMM estimator produces biased results in small samples when the instruments are weak.

Key Tests in Dynamic Panel Models

Dynamic panel data models rely on several key hypothesis tests that must be accepted for the validity of the model. The main tests include:

- Sargan Test: H_0 The instruments are valid.
- Absence of Serial Correlation in Residuals:
  - H_1: First-order negative correlation (AR(1)) of residuals.
  - H_0: Absence of second-order correlation (AR(2)) of residuals.

We will apply the Generalized Method of Moments (GMM) as it allows us to control for unobserved individual and time-specific effects, while also addressing simultaneity bias, reverse causality, and omitted variable bias. The use of instruments based on lagged explanatory variables enables us to manage the potential endogeneity of the explanatory variables.

Results

Data Presentation and Descriptive Analysis

To highlight the relationship between economic growth and the exchange rate in Tunisia, we follow the methodological approach outlined below. First, we specify the model to be estimated, define the selected variables, and statistically analyze the data. Next, we present the tests and techniques used in the study. Finally, we estimate the variables and interpret the obtained results.

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This study utilizes annual data for Tunisia on economic growth, trade openness, inflation, foreign direct investment, and the real effective exchange rate for the period 1980-2011. The data is sourced from the World Bank's World Development Indicators database.

$$Log(GDP_{it}) = \alpha_0 + \alpha_1 \ln(GDP_{it}) + \alpha_2 \ln(TCER_{it}) + \alpha_3 \ln(DPUB_{it}) + \alpha_4 \ln(INV_{it}) + \alpha_5 \ln(OUV_{it}) + \alpha_6 \ln(KH_{it}) + \varepsilon_t \quad (5)$$

Avec

LGDPH: The logarithm of real GDP per capita in the country at time *t*.

LTCER: The logarithm of the real effective exchange rate (quoted in certain terms).

LINV: The logarithm of gross fixed capital formation as a percentage of GDP.

LDPUB: The logarithm of public expenditures.

LOUV: The logarithm of the economy's openness rate.

LKH: The logarithm of human capital.

The random shock (ε_t) represents a white noise term with zero expected value and finite variance.

Table 1. Real Effective Exchange Rate and Economic Growth (1980-2011)

Variables	Expected Signs	Observed Signs
LGDP (-1)	+	+
LTCER	-	-
LDPUB	-	-
LINV	+	+
LOUV	+	+
LKH	+	+

Notes: Real GDP per capita. *, **, and *** denote significance levels at 10%, 5%, and 1%, respectively.

The table above presents the estimation results of the model based on the previously specified methodology.

Regarding the expected signs of the estimated coefficients of the explanatory variables, the table below compares the expected signs, as suggested by economic theory, with the actual signs obtained from the estimation of our model's parameters.

Table 2. Expected and Observed Signs of the Explanatory Variables in the Model

Variables	Expected Signs	Observed Signs
LGDP (-1)	+	+
LTCER	-	-
LDPUB	-	-

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LINV	+	+
LOUV	+	+
LKH	+	+

The estimation results of our growth equation show that:

In general, as observed in the table, some variables are statistically significant, while others are not, and they may be either positively or negatively correlated with the dependent variable.

According to our results, the variable GDP (-1) is significantly positive (0.961), which means that the real GDP per capita growth rate in year (t) positively depends on that of year (t-1). Therefore, GDP from the previous period has a positive and significant effect on economic growth in Tunisia.

The estimation of the cointegration relationship between the real effective exchange rate and economic growth has received considerable attention. Our empirical results show a negative and statistically insignificant relationship, with a value of (-0.012). These findings support the idea of a negative relationship between economic growth and the real exchange rate. Collins (1996) suggested that currency undervaluation can stimulate external trade and encourage domestic demand, thereby accelerating economic growth. This is particularly the case when there is an effective elasticity of demand for exports and imports, as well as excess capacity in the economy. However, an undervalued exchange rate can also increase production costs and have inflationary effects on economic growth.

Regarding public expenditure, the estimation results show a negative and statistically significant impact (-0.429). Over the past few years, public spending in Tunisia has lost much of its appeal as a countercyclical policy instrument, as it may create distortions that hinder economic growth.

Investment has a positive effect on economic growth. In fact, it is one of the most contributive variables in explaining economic growth in Tunisia, as indicated by the estimations. The investment term has a positive but not statistically significant coefficient (0.025). Private investment is essential for economic growth, sustainable development, and poverty reduction. It increases an economy's productive capacity, promotes job creation, contributes to innovation and new technologies, and drives income growth.

The results indicate the existence of a positive and statistically significant relationship between GDP and the control variable trade openness (0.075). Its effect depends on the estimation method and the variables included in the estimation. This confirms that trade reforms depend on country-specific conditions and how the liberalization process is implemented. Grossman, & Helpman (1991) argued that trade openness is an opportunity, not a guarantee.

Trade openness concerns the movement of exports and imports. The structure of Tunisian exports has some positive aspects. There are a number of rapidly growing new export products, such as cable harnesses, textiles, electronic components, plastic products, essential oils, and detergents. However, their share in total exports remains relatively modest.

Openness increases the domestic imports of goods and services, including new technologies. Through learning by doing and technology transfer, the country experiences technological progress, leading to greater efficiency in production and higher productivity. More open economies are expected to grow faster than more protectionist ones. However, Levine (1996) argue that these gains depend on several factors, including the initial conditions of the country, which determine its long-term specialization and, consequently, its growth rate.

Regarding the estimation of human capital, the results show a positive and statistically significant coefficient (0.056). Since its independence, Tunisia has continuously prioritized education and human capital development. Strengthening general education should remain a priority in policies aimed at enhancing productivity and workforce adaptability. Tunisia views knowledge and technology as essential drivers of

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economic and social development. This is why Tunisia continues to invest in education and training, ensuring that the workforce acquires the necessary skills for the labor market and fosters a culture of initiative, creativity, and innovation.

The relationship between exchange rates and economic performance in developing countries (DCs) became a pressing issue in the late 1990s. The prevailing sentiment at the time suggested that more flexible exchange rates would lead to better economic performance.

In this chapter, we analyzed the relationship between the real effective exchange rate and economic growth in Tunisia from 1980 to 2011 using the Generalized Method of Moments (GMM). This topic deserves particular attention due to the interdependencies among variables and their implications for economic growth.

We conducted an empirical analysis of the impact of the real exchange rate on economic growth, using a set of variables and statistical indicators reflecting the Tunisian context. Our study explores the growth dynamics in relation to its main explanatory variables, aiming to assess the effectiveness of exchange rate policy in Tunisia over the 1980-2011 period.

Additionally, we provided explanations for each variable and discussed the transmission channels linking them. Furthermore, the estimated parameters align well with economic intuition. The real exchange rate and investment variables have the expected signs but are not statistically significant. However, public expenditure, trade openness, and human capital have the expected signs and are statistically significant, highlighting the impact of financial liberalization on economic growth.

The estimation was conducted using a dynamic GDP equation for Tunisia, incorporating key theoretical economic factors to either confirm or refute their effects. Our findings provide strong support for the model, revealing the following key insights:

A depreciated real exchange rate enhances exports by improving competitiveness. As exports grow, they ease external constraints and allow for greater capital imports, stimulating economic growth. Private investment is a key driver of economic growth, as it transmits economic policy impulses to production and should have a strong positive effect. Human capital serves as an alternative to technological advancement, contributing to long-term growth. Public expenditure may distort economic growth, as public finances, in their entirety, do not necessarily foster long-term growth. Trade openness boosts economic growth by increasing exports, which enhance productivity and alleviate foreign exchange constraints, and imports, which facilitate access to advanced technologies. Trade openness is also crucial in maximizing the growth potential of foreign direct investment (FDI).

Conclusion

This study investigates the relationship between the real effective exchange rate (REER) and economic growth in Tunisia over the period 1980–2011 using the Generalized Method of Moments (GMM). The analysis explores key determinants of economic growth, including trade openness, investment, public expenditure, and human capital, to assess their impact on the country's economic performance.

The findings suggest that the previous period's GDP has a significant and positive effect on current economic growth, indicating that Tunisia's economic growth follows a dynamic process where past performance influences future outcomes. Regarding the real effective exchange rate, the results show a negative but statistically insignificant relationship with economic growth. This suggests that while exchange rate depreciation may enhance external competitiveness and boost exports, it can also lead to inflationary pressures and higher import costs, which may offset potential growth benefits. This finding aligns with previous research highlighting the complex effects of exchange rate policies on economic performance.

Trade openness, on the other hand, is found to have a positive and statistically significant impact on economic growth. This confirms that integration into global markets allows for technology transfer,

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efficiency gains, and increased productivity. The results are consistent with the argument that open economies tend to grow faster than more protectionist ones, as they benefit from foreign direct investment (FDI) and exposure to international best practices. However, the benefits of trade openness depend on the country's initial conditions and the effectiveness of its economic policies.

The study also finds that public expenditure has a significant negative impact on economic growth. This suggests inefficiencies in the use of public resources, which could result in distortions that hinder long-term development. Poorly allocated government spending may crowd out private investment, reduce incentives for innovation, and contribute to economic inefficiencies. These findings align with the literature emphasizing the importance of effective public sector management in supporting sustainable growth.

Investment is found to have a positive but statistically insignificant effect on economic growth, indicating that while capital formation is crucial for economic expansion, other factors such as policy environment, infrastructure quality, and institutional stability play a significant role in determining its effectiveness. Additionally, human capital emerges as a key driver of growth, with a positive and significant coefficient, reinforcing the importance of education and workforce development in fostering long-term economic progress.

In conclusion, the study highlights the importance of exchange rate stability, investment in human capital, and trade liberalization for sustainable economic growth. Policymakers in Tunisia and other developing countries should focus on structural reforms, efficient public expenditure management, and investment-friendly policies to maximize the benefits of economic globalization and enhance long-term growth prospects.

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