“Can sustainable development goals go hand in hand with economic growth? Evidence from Morocco”

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CAN SUSTAINABLE DEVELOPMENT GOALS GO HAND IN HAND WITH ECONOMIC GROWTH? EVIDENCE FROM MOROCCO

Abstract

This study investigates the influence of implementing the Sustainable Development Goals (SDGs) on the economic growth of Morocco. The main purpose is to empirically verify whether the pursuit of sustainable development goals can go hand in hand with economic growth. Employing a robust least squares regression, this paper analyzed carefully chosen data that closely aligns with the essence of the SDG indicators. The findings reveal a positive correlation between financial inclusion and financial stability and the economic growth. Conversely, the poverty reduction exerts a positive effect on economic growth, while the quality of education does not sufficiently account for changes in GDP. Moreover, the estimates indicate a favorable outcome stemming from the enhancement of institutional quality, reflected in improved economic freedoms, as well as the reduction of administrative burdens, both of which positively contribute to economic growth. Furthermore, the results demonstrate a negative impact of renewable energy and a negligible influence of energy efficiency on Morocco's economic growth. The negative impact of renewable energy can be attributed to a number of sources, including high initial costs, structural changes in the industry and the need to set up infrastructure for production. The positive effects of adopting renewable energies on economic growth can take time to be realized over the very long term.

Keywords Sustainable Development Goals, economic growth, financial inclusion and stability, social inclusion, renewable energies

JEL Classification O11, O44, Q01, Q56, I25

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INTRODUCTION

Sustainable development (SD) has gained significant importance in the field of economics. Despite the extensive literature on this topic, there is a need to clarify the issues surrounding SD and further understand its implications for human development. The international community has sought to strike a balance between environmental protection and economic development through the mainstreaming of sustainable development. Sustainability is now considered a guiding principle for global development, even within a capitalist framework. This has fostered a favorable alliance between environmentalists and developmentalists. International initiatives for sustainable development are based on the 17 goals and 169 corresponding targets outlined in the 2030 Agenda. After extensive negotiations involving 193 UN countries, the global Agenda 2030 is now being implemented at national and international levels. The 17 universal goals of the 2030 Agenda will play a crucial role in shaping Morocco's development strategy in the coming years. These new sustainable development goals replace the previous Millennium Development Goals (MDGs). The SDGs are designed to be integrated, interconnected, and indivisible, aiming to achieve what the MDGs could not by encompassing the social, economic, and environmental dimensions of sustainable development.

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The SDGs offer a mechanism for attracting investment and mobilizing resources in sectors that contribute to sustainable economic growth. Many of these goals, such as clean energy, infrastructure development and sustainable agriculture, offer opportunities for innovation, job creation and private sector engagement. By focusing on these areas, countries can attract domestic and foreign investment that drives economic growth while advancing sustainable development goals. The SDGs also highlight the importance of inclusive growth, which ensures that the benefits of economic development are shared equitably across all segments of society. By addressing issues such as poverty, inequality, gender gaps and access to education and healthcare, the SDGs promote a more inclusive economic system. Inclusive growth not only reduces social inequalities, but also improves economic productivity by ensuring that all people have equal opportunities to contribute to and benefit from economic progress. In addition, the SDGs recognize the need for sustainable consumption and production patterns. The transition to a more sustainable and circular economy can generate economic growth by creating new markets, promoting resource efficiency, reducing waste, and stimulating technological innovation. This shift towards sustainable production and consumption can stimulate economic activity, create jobs, and strengthen the competitiveness of industries in the long term.

1. LITERATURE REVIEW

Subsequent to a focused literature review, the forthcoming section will expound upon the development of research hypotheses. These hypotheses will serve as the foundation for constructing an econometric model that can be empirically tested. The theoretical research hypotheses will be systematically classified into four principal axes: i) axis 1 relating to finance and sustainable economic development, ii) axis 2 relating to the social aspect of sustainable economic development, iii) axis 3 relating to the energy sector and sustainable development, and iv) axis 4 relating to economic freedom and sustainable development.

1.1. Financial aspects of SDGs and economic growth: financial inclusion and stability

Financial inclusion plays a crucial role in addressing poverty (SDG Goal 1), reducing inequality (SDG Goal 10), and promoting access to healthcare and overall well-being (SDG Goal 3). While extensive research has examined the interplay between financial inclusion and various facets of development, a specific focus on the nexus between financial inclusion and sustainable development remains limited. Guru and Yadav (2019) posit that indicators of banking sector and stock market development synergize to propel economic growth. Recent studies in numerous countries underscore the imperative of prioritizing financial inclusion as a pivotal policy objective (Cull et al., 2021). Governments' emphasis on financial inclusion underpins its positive influence on economic growth, financial stability, poverty reduction, and diminished income inequality, as suggested by Huang and Zhang (2020). Cabeza-Garcıa et al. (2019) assert that women's engagement in the financial system contributes to reduced inequality, heightened physical and social well-being, thus bolstering economic advancement. The work of Matekenya et al. (2021) contends that access to and utilization of financial services foster enterprise creation, facilitate investments in health and education, mitigate risks, cushion financial shocks, and elevate human development. Puatwoe and Piabuo (2017) establish a strong, enduring impact of various financial development indicators on economic growth. Anarfo et al. (2019) suggest a mutual interplay between financial inclusion and financial sector development, with each phenomenon propelling the growth trajectory of the other. In a similar vein, Huang et al. (2021) reveal that the accessibility, depth, efficiency, and holistic development of financial institutions contribute positively to human development, thereby accentuating the favorable impacts of financial inclusion.

Lenka (2021) identifies financial inclusion as a pivotal determinant of financial sector development in developing nations. The instability within the financial system can hamper economic growth by obstructing financial institutions' capacity to finance innovative projects within an economy (Ozili, 2018). Within an unstable financial environment, pressure ripples from pivotal institu-

tions to businesses and households, curtailing the fluid flow of capital towards productive assets and giving rise to systemic risk. This risk has the potential to set off a chain of corporate failures, thereby casting a shadow on productive endeavors and curbing individuals' economic well-being. Cicchiello et al. (2021) underscore that economic growth nurtures financial inclusion, highlighting elements like unemployment and literacy rates as contributors. Ade'Soyemi et al. (2020) establish a short-term causal link between the count of commercial bank branches and the human development index. The availability of credit and a stable payment system, facilitated by a stable financial system, enable households and firms to transfer financial assets easily, thereby contributing to economic growth and development (Babajide & Olokoyo, 2017). While limited studies delve into the repercussions of financial stability on development outcomes, there remains a notable absence of research exploring the influence of financial stability on more comprehensive metrics of sustainable development. Financial stability can be integrated into the framework of Goal 16 of the SDGs, which calls for, among other things, effective economic and political institutions. This financial stability is closely linked to Goal 8 of the SDGs, which emphasizes that economic growth cannot take place without economic and financial stability.

1.2. Social aspects of SDGs and economic growth: poverty and education

Understanding how the characteristics of poverty impact the attainment of sustainable development is a crucial question, particularly in developing countries (Ewane & Ajagbe, 2018). While poverty reduction is the focus of Goal 1 of the SDGs, it is closely and indirectly linked to several other goals, including reducing inequality (SDG 10), promoting decent work (SDG 8), improving health and well-being (SDG 3), and ensuring access to clean water and sanitation (SDG 6). Poverty is influenced by a multitude of factors, encompassing elements like unemployment, inadequate health conditions, gender bias, disparities between rural and urban areas, and deficiencies in governance (Atinmo et al., 2009). Siddique et al. (2018) emphasize the significant threat that poor health poses to sustainable development in terms of improving economic productivity and human well-being. Improved education and infrastructure development are key factors in determining pro-poor growth (Menezes-Filho & Vasconcellos, 2004). Unemployment hinders economic freedom and influences attitudes toward environmental conservation and development, limiting sustainable development (Boateng et al., 2000). Acemoglu et al. (2012) emphasize governance's pivotal role in poverty and sustainable development within developing nations. To engage meaningfully in a democratic society, access to learning opportunities stands as a critical requisite (Aspin & Chapman, 2001). The rates of primary and secondary school enrolment, alongside literacy, exhibit a positive correlation with economic growth (Levine & Renelt, 1992). Notably, directing investments toward enhancing educational quality effectively reduces both economic and educational disparities (Bosworth & Collins, 2003). The quality of the labor force, as measured by cognitive skills, contributes to economic growth (Hanushek & Kimko, 2000). Education provides the foundation for sustainable development at all levels (UNESCO, 2015). Education is positively correlated with labor productivity and human capital formation (Ullah et al., 2019). Human capital is crucial for long-term economic growth (Ogunniyi, 2018). Public policies influence investments in children and shape labor market engagement (Corak, 2013). A more skilled workforce contributes to a competitive and advanced economy (Auerbach, 2015). Cognitive attainment measures are indicators of labor market-relevant skills and economic growth potential (Hunter, 2013a). Public spending on education is positively related to economic growth (Dauda, 2010). The government plays a role in investing in profitable forms of education (Nicolăescu, 2013a).

1.3. Energy aspects of SDGs and economic growth: renewable energy and energy efficiency

Environmental protection, particularly renewable energy consumption and energy efficiency, is central to the 2030 vision of the SDGs. Clean energy and energy efficiency contribute not only to SDG 7 but also to the fight against climate change (SDG 13), responsible consumption and produc-

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tion (SDG 12), and the promotion of sustainable cities and communities (SDG 11). Arminen and Menegaki (2019) explored the causality among energy consumption and economic growth. They identified a mutual causality between GDP and energy in high-income and upper-middle-income countries. This implies that for these particular countries, changes in energy consumption can affect economic growth, and vice versa. Developing and transitioning economies possess the chance to embrace contemporary, efficient energy technologies and partake in growth patterns that consume less energy and produce fewer carbon emissions (Goldemberg, 1998). Topcu et al. (2020), in their investigation into the influence of energy consumption, natural resources, and gross capital accumulation on economic growth, arrived at the conclusion that energy consumption fosters GDP growth in high-income countries. Conversely, Davis and Caldeira (2010) attribute the observed decrease in energy intensity within industrialized nations, to some extent, to the migration of energy-intensive industries to developing countries.

Clean and dependable energy access holds paramount importance for human development, encompassing domains such as health, gender equality, education, and environmental security. In the context of mitigating greenhouse gas emissions as a global public good, cost considerations must be aligned with burden-sharing frameworks, a concept articulated by Stern (2007). Notably, renewable energy exhibits potential for cost savings when compared to fossil fuels, particularly in remote rural regions lacking grid connectivity, as evidenced by research by Casillas and Kammen (2010). Concurrently, enhancements in energy efficiency hold promise for yielding sustainable reductions in production costs and bolstering competitiveness, an assertion supported by Carrillo-Hermosilla et al. (2010). On a broader scale, energy efficiency is acknowledged as a crucial strategy for curbing carbon emissions both nationally and globally, as emphasized by Doris et al. (2009).

Enhancing energy efficiency holds the potential to yield lasting reductions in production costs and elevate competitiveness, as indicated by Carrillo-Hermosilla et al. (2010). Recognized as a pivotal strategy, energy efficiency stands as a significant avenue for mitigating carbon emissions both on a national and global scale, a viewpoint emphasized by Doris et al. (2009). When deliberating the adoption of renewable energy, comprehensive evaluations are essential, encompassing economic costs, secondary advantages, and avenues for financing through climate finance. The viability of renewable energy is underscored by its potential for cost savings relative to fossil fuels, particularly evident in remote rural regions without grid connectivity, an observation made by Casillas and Kammen (2010). In this endeavor, cost considerations assume even greater importance when coupled with burden-sharing frameworks that define the costs and benefits of reducing greenhouse gas emissions as a global public good, a perspective elucidated by Stern (2007).

1.4. Institutional aspects of SDGs and economic growth: economic freedom

Economic freedoms play a crucial role in improving economic performance, advancing economic integration, and promoting sustainable development. These freedoms encompass improvements in institutional frameworks, regulations, and government policies to minimize barriers and create a conducive environment for economic growth. Economic freedom is closely related to the quality of political and economic institutions, making it relevant to Goal 16 of the MDGs. The presence of economic freedoms can contribute to entrepreneurial freedom, job creation, and economic growth, aligning with SDG Goal 8. For instance, economic freedoms can support competitive markets, protect intellectual property, and foster an environment conducive to innovation and investment. Nevertheless, it is crucial to acknowledge that the absence of economic freedoms can yield adverse consequences. This might involve diverting resources from more productive paths, establishing entry barriers within industries, and stifling investment and innovative initiatives. A consistent body of research underscores the constructive influence of economic freedom on economic growth. For instance, Crafts (2006) evaluated evidence showcasing that stringent market regulations, especially those curtailing new market entry, impede the transfer of technology and exert an unfavorable impact on productivity.

According to Easton and Walker (1997), well-functioning markets have a positive impact on property rights, personal income, and economic growth. Nevertheless, Carlsson and Lundstrom (2002) find mixed effects of the components of economic freedom on economic growth. Doucouliagos and Ulubasoglu (2006) present findings supporting the idea that economic freedom has both direct and indirect positive effects on economic growth. This study underscores the significance of economic freedom in driving per capita income and overall economic growth. Similarly, Aghion et al. (2001) argue that the business climate in markets, particularly those with restrictions on new entry, can impede technology transfer, productivity, and sustainable development. Nystrom (2008) discovers a positive connection between institutional economic freedom and entrepreneurship. Institutions, essential for achieving growth, income distribution, and environmental improvement, are strongly intertwined with a country's economic performance and its capacity for sustainable development (Veeman & Politylo, 2003).

Weak legal and judicial systems can undermine the rule of law, environmental quality, and biodiversity conservation. Empirical studies have unveiled significant correlations between aspects of economic freedom and various dimensions of sustainable development. Hayward (2002) concludes that nations with more open economies exhibit superior progress in enhancing environmental quality, highlighting the critical roles of free markets and democracy in sustainability. Norton (1998a) contends that robust property rights are linked with high environmental quality and poverty reduction. Based on the literature review provided above, the following hypotheses can be constructed:

H1: Economic growth is influenced by the financial targets of the SDGs.

H1a: Financial inclusion has a positive impact on economic growth in Morocco.

H1b: Financial stability has a positive impact on economic growth in Morocco.

H2: Economic growth is influenced by the social goals of the SDGs.

H2a: Poverty reduction has a positive impact on economic growth in Morocco.

H2b: Education has a positive impact on economic growth in Morocco.

H3: Economic growth is influenced by the energy aspects of the SDGs.

H3a: Renewable energy consumption has a positive impact on economic growth in Morocco.

H3b: Energy efficiency has a positive impact on economic growth in Morocco.

H4: Economic growth is influenced by the institutional quality and economic freedoms aspects of the SDGs.

H4a: The simplification of the administrative burden has a positive impact on economic growth in Morocco.

H4b: The reduction of barriers to business start-ups has a positive impact on economic growth in Morocco.

2. METHODS

Once the research hypotheses have been determined, the econometric model is specified. The data that will be used in the empirical study and that will be used to obtain the results are then presented.

2.1. Model specification

Econometricians widely recognize the issue of distributional inconsistency and multicollinearity in time series data, which poses a significant concern. These problems can lead to biased estimations and misinterpretation of models. To address this, econometricians have developed the robust least squares regression method, which aims to mitigate these issues. Robust least squares regression is particularly effective in accounting for autocorrelation and heteroscedasticity commonly associated with time series analysis (Yang, 2004; Audiert & Catoni, 2010). In this study, robust least

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Table 1. Definition of variables used

Variable	Meaning	Measure
GDPC	Economic growth	GDP per capita
FININC	Financial inclusion	Commercial bank branches (per 100,000 adults)
FINSTA	Financial stability	Financial Institutions Efficiency Index
RPOV	Poverty reduction	1/(misery index)[1]
QEDU	Quality of education	Primary school pupil-teacher ratio
RENENG	Renewable energy consumption	Renewable energy consumption (% of total energy consumption)
ENGEFF	Energy efficiency	Energy use (kg oil equivalent per capita)
RADB	Reduction of administrative burden	1/ (Time needed to start a business)
RSDIF	Reduction of start-up difficulties for the company	1/ (number of start-up procedures to register a business)

Note: [1] The misery index, devised by economist Arthur Okun, is an economic indicator used to gauge the economic well-being of the average citizen. It is computed by summing the seasonally adjusted unemployment rate and the annual inflation rate. The underlying belief is that increased unemployment and inflation impose social burdens on a country.

squares regression is adopted due to the presence of variables that are stationary in first and second differences, denoted as I(1) and I(2), respectively. This approach ensures the stability and robustness of the results. A simple linear model is employed to establish a functional relationship between the variables considered in this study. The simple linear macroeconomic model is presented explicitly as follows:

$$\begin{aligned} GDPC_t &= C + \beta_1 \cdot FININC_t + \\ &+ \beta_2 \cdot FINSTA_t + \beta_3 \cdot RPOV_t + \beta_4 \cdot QEDU + \\ &+ \beta_5 \cdot RENENG_t + \beta_6 \cdot ENGEFF_t + \\ &+ \beta_7 \cdot RADB_t + \beta_8 \cdot RSDIF_t + e_t. \end{aligned} \quad (1)$$

It is important to note that the simple macroeconomic model described (Table 1) represents a system of equations in which the variables included have mutual influence on each other.

2.2. Data

The data utilized in this study comprise both annual and quarterly data sourced from the World Development Indicators (WDI) database. These data span the timeframe from 1980 to 2020. The subsequent provides an overview of the descriptive statistics for the variables employed.

The data used in this analysis is sourced from the World Development Indicators, which is published by the World Bank (2021). By examining Table 2, one can observe the maximum and minimum values, which reflect the range of distribution for each variable over time. Notably, all variables exhibit a significant range between their maximum and minimum values, indicating substantial fluctuations over the study period. Additionally, all variables demonstrate positive skewness, suggesting a right-skewed distribution compared to the normal distribution. This departure from normality violates the assumptions required for ordinary least squares (OLS) regression, rendering it an inefficient estimator for this analysis.

After formulating the research hypotheses and specifying the econometric model, the next step in the empirical study is to select an appropriate econometric method. To this end, tests will be carried out to assess collinearity, examine the stationarity of the time series and study cointegration. In addition, the paper will analyze the robustness of the estimate obtained by the chosen method.

Table 2. Descriptive statistics

Descriptive statistics	GDPC	FININC	FINSTA	RPOV	QEDU	RENENG	ENGEFF	RADB	RSDIF
Mean	1852.934	14.072	0.563	14.750	28.231	16.189	411.841	0.055021	0.083333
Median	1465.315	9.900	0.564	13.666	27.362	17.108	386.588	0.028571	0.260163
Maximum	3264.216	24.920	0.673	23.536	38.375	23.59562	566.641	0.118959	0.83333
Minimum	634.595	9.7875	0.452	8.081	24.658	10.37458	264.805	0.025911	0.0782400
Observations	164	164	164	164	164	164	164	164	164

These steps are crucial to guarantee the reliability and validity of the empirical analysis.

2.3. Choice of the econometric method to be used

Once the econometric model is established, research hypotheses are defined, and the model is specified, the subsequent phase involves conducting the empirical study. To proceed effectively, the selection of a fitting econometric method is imperative. This selection is guided by a sequence of crucial steps, including collinearity tests to evaluate the existence of multicollinearity, an assessment of time series data stationarity, and an exploration of potential cointegration among variables. These steps are pivotal in determining the appropriate econometric method that should be employed for the empirical analysis.

2.4. Collinearity test

The correlation matrix table (Table 3) presents the relationships between the variables under consideration. The findings indicate that financial inclusion, financial stability, and energy efficiency exhibit a positive correlation with per capita income. Similarly, poverty, education quality, renewable energy, and the respective economic freedom variables demonstrate a positive correlation with GDP per capita. However, it is noteworthy that the explanatory variables display substantial and statistically significant correlations among themselves, suggesting the presence of multicollinearity in the model. This raises concerns about the potential interdependence and shared information among the variables, which can impact the accuracy and reliability of the analysis.

Table 3. Correlation matrix

	GDPC	FININC	FINSTA	RPOV	QEDU	RENENG	ENGEFF	RADB	RSDIF
GDPC	1.000								
prob	–								
FININC	0.899	1.000							
prob	0.000	–							
FINSTA	0.603	0.467	1.000						
prob	0.000	0.000	–						
RPOV	0.841	0.695	0.612	1.000					
prob	0.000	0.000	0.000	–					
QEDU	–0.496	–0.359	–0.261	0.575	1.000				
prob	0.000	0.000	0.000	0.000	–				
RENENG	–0.834	–0.886	–0.371	0.728	0.383	1.000			
prob	0.000	0.000	0.000	0.000	0.000	–			
ENGEFF	0.975	0.851	0.655	–0.897	–0.523	–0.815	1.000		
prob	0.000	0.000	0.000	0.000	0.000	0.000	–		
RADB	0.929	–0.833	–0.717	0.761	0.401	0.649	–0.930	1.000	
prob G	0.000	0.000	0.000	0.000	0.000	0.000	0.000	–	
RSDIF	0.932	–0.887	–0.662	0.743	0.385	0.713	–0.922	0.980	1.000
prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

Table 4. Variance decomposition of the coefficients

	Associated eigenvalue								
Variable	1	2	3	4	5	6	7	8	9
C	0.995117	0.004883	1.11E-09	8.80E-09	1.44E-09	1.33E-11	1.75E-10	2.66E-11	3.08E-15
FININC	0.616622	0.019916	0.036910	0.215635	0.026257	0.078869	0.005774	1.57E-05	1.05E-08
FINSTA	0.348099	0.651900	2.63E-07	3.12E-08	2.20E-10	1.10E-09	8.40E-10	3.55E-11	6.84E-15
RPOV	0.311873	0.000162	0.002529	0.474081	0.185830	0.000184	0.024864	0.000477	1.20E-08
QEDU	0.109534	0.078981	0.001222	0.001495	0.678469	0.003346	0.125133	0.001821	1.34E-07
RENENG	0.748221	0.073498	0.031952	0.122280	0.010831	0.011322	0.001815	8.05E-05	3.15E-09
ENGEFF	0.821775	0.079781	0.022547	0.049404	0.000729	0.008275	0.014375	0.002262	0.000851
RADB	0.523272	2.34E-06	0.445657	0.000765	2.05E-06	0.006559	0.022127	0.001617	1.91E-08
RSDIF	0.000733	0.015402	0.983179	0.000437	1.01E-06	5.13E-05	0.000176	2.11E-05	4.25E-10

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The existence of multicollinearity has the potential to cause inflation in the variances of both the model and its coefficients, subsequently undermining the reliability of inferences drawn from the analysis. The consequences may include coefficients with incorrect signs or implausible magnitudes. The Belsley, Kuh, and Welsch (BKW) test, using eigenvalue values exceeding the 0.5 threshold, can identify collinearity. Table 4 indicates the presence of collinearity based on this criterion.

2.5. Analysis of time series stationarity

Time series data frequently display patterns such as trends, seasonal and non-seasonal cycles, and outliers. These characteristics can contribute to the non-stationarity of the data. The existence of non-stationarity, identifiable through the presence of a unit root, contradicts the assumptions of constant means and variances inherent in OLS regression. Conducting a unit root test is crucial to avoid spurious results in regression models that ignore stationarity properties. The augmented Dickey-Fuller (ADF) test is used instead of the Dickey-Fuller (DF) test as it considers potential serial correlation by including lagged differences of the dependent variable. When the series displays an order of integration of either I(0) or I(1), the autoregressive distributed lag (ARDL) approach becomes applicable. In cases where this condition is not met, the RLS method stands as a viable alternative.

The ADF test in Table 5 indicates that the variable for quality of education (QEDUC) is stationary at the level, denoted by integration order I(0). This is supported by the ADF t-statistic. On the other hand, the variable for financial inclusion (INCFIN) requires two differentiations to achieve stationarity, indicating an integration order of I(2). The remaining variables exhibit an integration order of I(1). It is important to note that the distributions of these variables are not consistent throughout the study period, except for quality of education. Therefore, any interpretations based on these variables should be considered temporary. To examine the long-term relationship between the variables, it is necessary to conduct the autoregressive distributed lag (ARDL) Bounds cointegration test.

2.6. Cointegration analysis

Differentiating time series variables can often lead to the loss of important long-term information and properties related to the equilibrium relationship between the variables. It is important to consider the non-stationarity of residuals, as it violates the standard assumptions necessary for applying OLS methods. To assess the long-run equilibrium connection between economic growth and the explanatory factors, the ARDL bounds test approach implemented by Pesaran and Shin (1999) and Pesaran et al. (2001) has been adopted. This procedure allows for the examination of the long-term relationship while considering the non-stationarity of the variables.

Table 6. ARDL limit test

Bounds Tests		Null hypothesis: No level relationship		
Statistical test	**Value**	**Signif.**	**I(0)**	**I(1)**
F-statistics	3.293604	10%	1.85	2.85
k	8	5%	2.11	3.15
		1%	2.62	3.77

Based on Table 6, the F-statistic value (3.293604) exceeds the critical upper bound value (3.15). Consequently, the null hypothesis is discarded, indicating the absence of a long-run rela-

Table 5. Augmented Dickey-Fuller (ADF) unit root test

Variables	ADF t–Statistics	5% critical value	10% critical value	Level of Difference	Order of integration
GDPC	–3.070735	–2.880211	–2.576805	1	I(1)
FININC	–5.550135	–2.880722	–2.577077	2	I(2)
FINSTA	–3.048966	–2.880722	–2.577077	1	I(1)
RPOV	–4.780484	–2.880211	–2.576805	1	I(1)
QEDU	–5.359892	–2.880722	–2.577077	0	I(0)
RENENG	–3.778249	–2.880211	–2.576805	1	I(1)
ENGEFF	–3.283069	–2.880211	–2.576805	1	I(1)
RADB	–3.075168	–2.880722	–2.577077	1	I(1)
RSDIF	–3.074327	–2.880722	–2.577077	1	I(1)

tionship, while the alternative hypothesis is embraced, signifying the presence of a long-run relationship among the variables within the model. Nevertheless, the notably elevated F-statistic in relation to the upper bound critical value raises a potential red flag regarding the presence of multicollinearity among the variables in the model. To tackle this concern, the decision is made to employ the robust least squares method for estimation. This method adeptly addresses prevalent issues like autocorrelation, heteroscedasticity, and multicollinearity that often arise in the context of time series analysis (Audiert & Catoni, 2010).

3. RESULTS

After opting for the robust least squares method, the focus shifts to analyzing the robustness of the estimation process. This analysis unfolds in the following manner: i) Testing the model's specification; ii) Conducting an examination of autocorrelation and partial correlation among the residuals; iii) Assessing the normality of the residuals; iv) Carrying out tests for both serial correlation and heteroscedasticity; and v) Evaluating the model's stability.

3.1. Model specification test

When the functional form of a model is misspecified, it often indicates the omission of crucial variables or the disregard of non-linear relationships. Such misspecification can yield biased coefficients, heteroscedasticity, and autocorrelation. Four widely used techniques are employed to test for such misspecification: BAMSET, WSET, the Q-Sum test, and the RESET test. Among these, the RESET test stands out for its resilience against issues stemming from non-linearity, heteroscedasticity, and autocorrelation. The outcomes of the Ramsey RESET test provide assurance that the model maintains proper specification, supported by the probability value surpassing 5%, as displayed in Table 7.

Table 7. Ramsey RESET test

Test	Value	df	Probability
t-statistics	0.190145	152	0.8494
F-statistics	0.036155	(1, 152)	0.8494
Likelihood ratio	0.038291	1	0.8449

3.2. Test of the normality of residuals

Various tests of normality exist in the literature, including the normal probability plot, Jarque-Bera (JB) test, and Anderson-Darling test. In this study, the JB test is employed to assess the normality of the model residuals. The histogram of the estimated model residuals indicates negative skewness and high kurtosis. However, the Jarque-Bera statistic in Figure 1 indicates that the model does not suffer from a normality issue, as the probability value exceeds the 5% significance level.

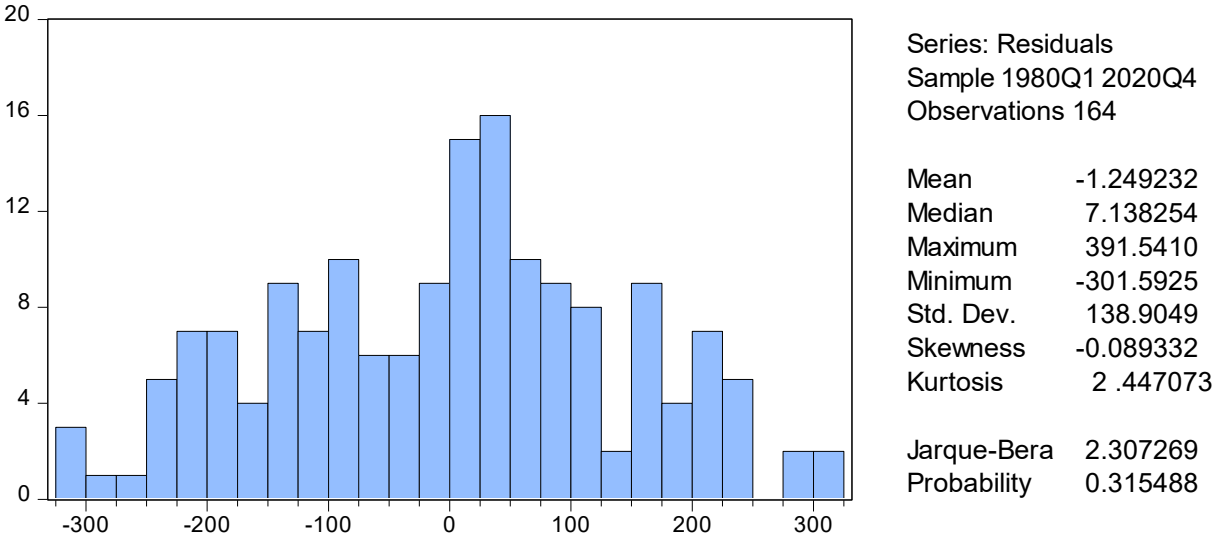

Figure 1. Normality test for residuals

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3.3. Auto-correlation and partial correlation testing of residuals

In this study, various diagnostic tests were conducted to assess the adequacy of the model. These assessments included examining the correlogram, histogram, autocorrelation, and heteroscedasticity. Table 8 presents the correlogram statistics, illustrating the absence of significant autocorrelation or partial correlation within the model. Moreover, the Q statistic remains statistically insignificant at the 5% confidence level, providing further support for the lack of autocorrelation.

Table 8. Correlogram statistics

Lags	Q-Stat	Prob*
1	0.813	0.367
2	2.199	0.333
3	2.225	0.527
4	3.742	0.442
5	7.104	0.213
6	5.014	0.542
7	9.820	0.199
8	13.143	0.107
9	11.163	0.264
10	14.558	0.149
11	14.432	0.201
12	17.433	0.134

3.4. Testing the stability of the model

To evaluate the model's stability, two tests were utilized: the CUSUM and CUSUMSQ tests. These tests represent the statistical value over time, along with the associated confidence interval. Should the test statistic lie beyond the limits of the confidence interval, it suggests a possible disturbance in the model's structure or disparities in its parameters. Figure 2 illustrates that, at the 5% confidence level, the model maintains stability, as the test statistic remains within the confines of the confidence interval.

Figure 3 showcases confidence ellipses for the variables being examined. The significant aspect here is that all variables fall within their corresponding ellipses, signifying that the model's coefficients sustain stability at the 5% significance level. This finding serves to bolster the overall stability of the estimated model and demonstrate additional confidence in the credibility of the coefficients.

3.5. Serial correlation test and heteroscedasticity test

Heteroscedasticity can occur when a regression model is misspecified, important variables are omitted, or outliers are present. It does not bias estimated coefficients, but it affects the accuracy of standard errors, test statistics, and confidence intervals.

Table 9. Heteroscedasticity ARCH test

Heteroscedasticity test: ARCH			
F-statistics	0.152302	Prob. F-statistics	0.8324
Observed R-squared	0.063873	Prob. Chi-square	0.8198

The LM serial correlation test estimated using the Breusch-Godfrey method and the heteroscedasticity test performed using the ARCH test, indi-

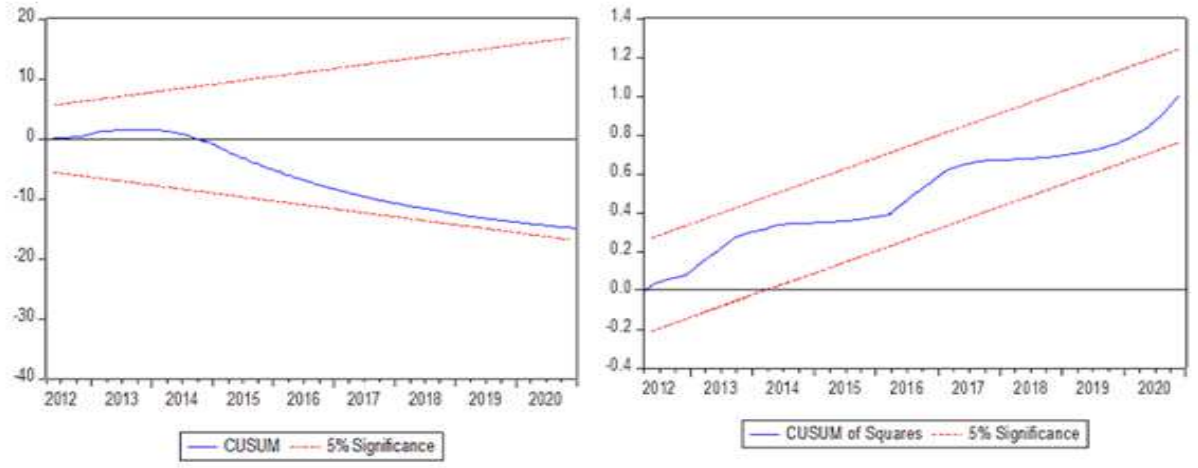

Figure 2. Stability of the model by the CUSUM test and the CUSUMSQ test

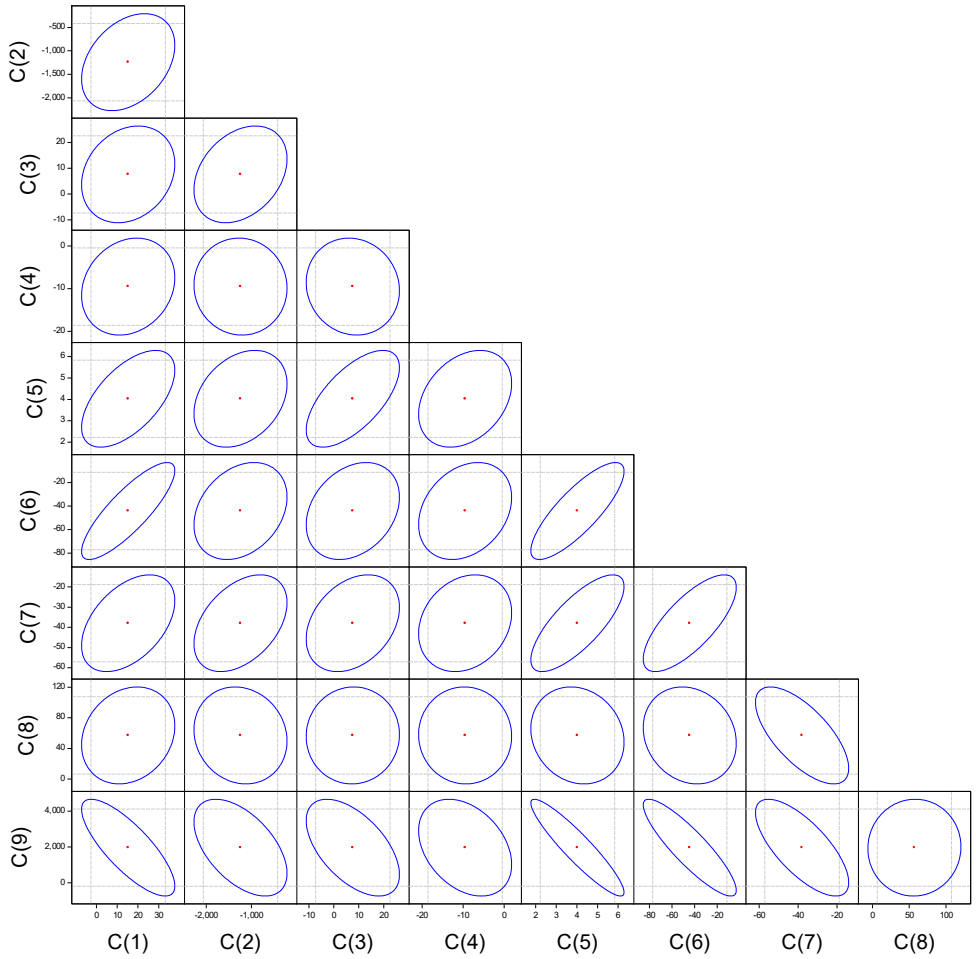

Figure 3. Confidence ellipse

cated that the model is not affected by serial correlation or heteroscedasticity issues. This conclusion is based on the probability value, which is higher than the 5% significance level, as shown in Tables 9 and 10.

Table 10. LM serial correlation test

Breusch-Godfrey LM serial correlation test			
F-statistics	1.425328	Prob. F-statistics	0.3341
Observed R-squared	0.160098	Prob. Chi-square	0.1896

3.6. Results of the robust least squares regression

Table 11 displays the robust least squares regression estimates, indicating a positive relationship between financial inclusion and financial stability with the per capita income. This finding supports the acceptance of hypothesis H1. Furthermore, the coefficient on poverty is statistically significant at the 10% level, leading us to accept hypothesis H2a. However, the quality of education does not provide an explanation for the impact on GDP per capita, resulting in the rejection of hypothesis H2b. The results also demonstrate a contrary effect of renewable energies, contradicting the initial hypothesis. Additionally, the impact of energy efficiency on the economic growth of Morocco is found to be insignificant. Consequently, hypothesis H3 is rejected based on these findings.

The results show that reducing the administrative burden has a positive relationship with economic growth in Morocco, which has made fundamental changes in this direction. Finally, the estimation shows a significant impact of the reduction of procedures for business creation on GDP per capita. These results lead us to accept the two sub-hypotheses, H4a and H4b, and thus to accept the hypothesis H4.

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Table 11. Robust least squares regression estimates

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	2711.141**	1149.720	2.358088	0.0184
FININC	29.05270***	10.09316	2.878453	0.0040
FINSTA	1693.180***	461.7681	3.666733	0.0002
RPOV	13.356*	7.965106	1.676897	0.0936
QEDU	1.5640	6.375872	0.245300	0.8062
RENENG	–44.951***	17.26426	–2.603730	0.0092
ENGEFF	–1.5574	1.903531	–0.818187	0.4133
RADB	89.229***	18.23325	4.893793	0.0000
RSDIF	226.09***	56.86603	3.975881	0.0001

Note: *** significant at 1%; ** significant at 5%; * significant at 10%.

4. DISCUSSION

The analysis acknowledges that Morocco has made significant progress in promoting financial inclusion, as evidenced by the positive impact of financial inclusion on economic growth, poverty reduction, and overall well-being, as highlighted in the literature (Guru & Yadav, 2019; Cull et al., 2021; Huang & Zhang, 2020). However, the analysis also highlights the challenges faced in achieving broader access to financial services, such as insufficient resources, a shortage of bank branches, and a lack of trust in financial institutions. The results regarding the stability of Morocco's banking sector and its resilience to shocks are consistent with the literature, which emphasized the positive impact of financial stability on economic growth and development (Puatwoe & Piabuo, 2017). This indicates that the country has taken appropriate measures to strengthen its financial sector, contributing to overall economic stability and growth. The study also demonstrates the progress made by Morocco in reducing poverty, but it also identifies it as a significant ongoing challenge, which is in line with the literature recognizing the positive link between poverty reduction and economic growth in the country (Ade'Soyemi et al., 2020). The efforts made by the government, such as the National Human Development Initiative, have contributed to poverty reduction, but there is still a considerable number of people living below the poverty line, particularly in rural areas.

While Morocco has a substantial potential for renewable energy, especially solar energy, and has made efforts to explore hydro, solar, and wind resources for electricity generation, the results contradict the literature, which highlights the importance of renewable energy in achieving sustainable development and environmental goals (Arminen & Menegaki, 2019). The positive focus on renewable energy is a step towards ensuring a sustainable and environmentally friendly energy supply, but the negative correlation between renewable energy and GDP and the non-significance of the energy efficiency coefficient indicate that additional efforts are required in this direction in the Moroccan context. The factors behind these negative effects on growth can be identified in several regards. Firstly, the high initial costs associated with the transition to renewable energies, although beneficial in the long term in terms of carbon emissions and sustainability, can lead to significant initial investments. In addition, structural changes within the energy industry are another key factor. The transition to renewable energy sources may require major structural transformations, including adjustments and replacements in jobs and skills linked to fossil fuels, which may cause short-term disruption and impact economic growth. In addition, setting up infrastructures for the production, distribution and storage of renewable energies may require considerable resources and time.

The results also show the positive impacts of economic freedom on Morocco's growth, which aligns with the literature emphasizing the role of economic freedom -as a proxy of institutional quality- in promoting economic performance and sustainable development (Nystrom, 2008). The government's efforts to simplify administrative burdens, tax procedures, and regulatory requirements have led to improvements in the country's ranking and business environment. However, challenges remain, such as brain drain, the informal economy, and restrictive labor market legis-

lation, which require further attention and additional reform efforts. Overall, the analysis of the results indicates that Morocco has made progress in various areas related to sustainable development and economic growth. However, it also highlights the challenges that need to be addressed, in line with the findings and recommendations from the literature. Continuous efforts, reforms, and policies are necessary to ensure sustainable development and inclusive growth for all citizens, aligning with the country's commitment to SDGs. The findings suggest that embracing SDGs has the potential to promote economic growth that is both sustainable and equitable across various dimensions, including the economy, society, and quality of institutions.

CONCLUSION

The economic and social development model in the context of the SDGs raises important questions regarding economic sovereignty. This article examines this issue by conducting an empirical analysis and reflecting on the sustainability and inclusiveness of economic policies in Morocco. Despite the implementation of significant reforms since 2002 to promote financial sector openness and achieve the MDGs and SDGs, financial exclusion remains prevalent, particularly among specific groups such as youth, low-income households, women, the least educated, and rural residents. However, the findings indicate that financial stability in Morocco has a positive impact on economic growth.

Furthermore, this study reveals a negative correlation between economic growth and renewable energy consumption. This suggests that the increase in energy demand has outpaced the efforts in renewable energy production. Despite the considerable potential for solar energy, Morocco currently relies heavily on energy imports. To ensure sustainable and environmentally friendly energy supply, Morocco should explore opportunities to harness hydro, solar, and wind resources for electricity generation. Regarding economic freedom, the results align with the assumptions. Morocco has made significant strides in reducing administrative and regulatory burdens. This progress is attributed to a series of government measures that have improved all factors related to economic freedom. Substantial efforts have been made to enhance economic freedoms in Morocco, including simplifying business startup procedures, as supported by the empirical findings. Overall, the adoption of SDGs by Morocco can generate a more sustainable and equitable economic growth, even though additional efforts need to be considered in the energy sector.

AUTHOR CONTRIBUTIONS

Conceptualization: Mustapha Ziky, Latifa El-Abdellaoui.
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Funding acquisition: Mustapha Ziky, Latifa El-Abdellaoui.
Investigation: Mustapha Ziky, Latifa El-Abdellaoui.
Methodology: Mustapha Ziky, Latifa El-Abdellaoui.
Project administration: Mustapha Ziky, Latifa El-Abdellaoui.
Resources: Mustapha Ziky, Latifa El-Abdellaoui.
Software: Mustapha Ziky, Latifa El-Abdellaoui.
Supervision: Mustapha Ziky, Latifa El-Abdellaoui.
Validation: Mustapha Ziky, Latifa El-Abdellaoui.
Visualization: Mustapha Ziky, Latifa El-Abdellaoui.
Writing – original draft: Mustapha Ziky, Latifa El-Abdellaoui.
Writing – review & editing: Mustapha Ziky, Latifa El-Abdellaoui.

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