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# The contribution of macroeconomic indicators to the attainment of economic development objectives in some western ASIAN countries

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## *ABSTRACT*

This study looks at how macroeconomic variables affect poverty, unemployment, and economic growth in seven Western Asian nations. We used 18 years of data (2003-2020) using a generalized moment analysis method, although experience has varied significantly in different countries as well as between different regions. The development and effective implementation of policies to accelerate employment growth are essential to success on a continent that still has an exceptionally high rate of poverty. These policies will allow us to address the persistent problems of unemployment and poverty. In developing an appropriate policy, countries need to take into account the universal acceleration of trends towards closer integration of the world economy and the rapid pace of liberalization as national economies move increasingly towards a market economy. According to our findings, poverty, unemployment, and economic growth are all significantly impacted by sustainable development indices. During the study period, investment and the activity rate were two of the primary factors influencing economic growth. Western Asian countries should improve the quality of their institutions and their capacity to adapt and acquire new skills. Trade and globalization should not be considered in isolation. Additional policies are needed to reinforce its impact on economic growth.

**Contribution/ Originality:** This research examines how the main macroeconomic factors affect Western Asian economic development. GDP growth rates, unemployment and poverty are examined to determine the main factors affecting their economic development. The results highlight the varied implications of these variables in different nations helping to tailor sustainable development policies.

## 1. INTRODUCTION

As economic activities globalize and trade liberalization intensifies, there has been a notable increase in pollutant emissions, particularly in developing countries. Conversely, some developed countries have successfully reduced their pollutant emissions levels.

Awareness of environmental regulations and the use of certain favorable products could be a solution to environmental problems (https://www.wto.org/).

There is no direct relationship between international trade and poverty, but the evidence suggests that trade liberalization generally helps reduce poverty by helping people realize their productive potential, stimulating growth, limiting arbitrary government intervention, and mitigating shocks.

However, most trade reforms take their toll (some of them for a long time to come) and can temporarily exacerbate poverty. In such cases, the wisest policy is to alleviate hardship and facilitate adjustment rather than abandon the reform process [1].

In the Arab world, the understanding of globalization is significantly influenced by ongoing conflicts like the Arab-Israeli conflict and various wars. This perception is shaped by two main factors: the prevailing mode of engagement with the global community largely centered around oil exports and migration and concerns regarding the potential impact of globalization on local cultural identities and traditions (https://www.diploweb.com/Actualite-des-livres-geopolitiques-720.html).

Oil is considered a valuable resource, but it also has disadvantages [2]. Infrastructure development and increased public and private spending have been facilitated by this financing. However, it has also hindered the growth of industrial and agricultural sectors while exacerbating inequalities both between and within countries in the region.

Wealthier states have become reliant on immigrant labor from the Arab world. Furthermore, the global significance of oil has attracted external actors to intervene in regional political affairs.

Many people in the region believe that globalization refers to foreign powers invading their political and economic spheres, eroding national sovereignty, and encouraging excessive military spending. Some also contend that western actors are reluctant to invest in the region's democratization either due to apprehensions about the rise of political Islam or to uphold existing regimes, particularly within the oil sector. These sentiments are compounded by the Palestinian situation and apprehensions regarding the influence of Western media and values. Additionally, concerns about possible job losses as a result of trade and investment liberalization and competition from developing countries with lower labor costs are common.

There are voices advocating that embracing globalization to modernize the economy could foster greater autonomy and reduce reliance on external influences. Surveys indicate increasing endorsement for regional integration both within Arab countries and Europe.

This alignment could enable the region to harness some advantages of globalization and withstand competition from low-cost Asian manufacturers [3].

Iraq, classified as an upper-middle-income nation, has seen a gradual economic recovery following the defeat of the Islamic State of Iraq and the Levant and the resumption of oil exports. Food insecurity persists particularly among displaced individuals, returnees, and rural communities in the southern regions despite this progress. The challenges Iraq faces to accomplish the sustainable development goals include rebuilding infrastructure, providing basic services, encouraging social cohesion, dismantling militias, creating jobs, improving gender equality, and maintaining security. This is particularly evident in the areas of economic growth, unemployment, and poverty alleviation.

The aforementioned issues enable us to partially respond to the following question: In an era of new financial and health crises, what contribution can the main economic indicators make to the development of western Asian countries?

The aim of this study is to see whether sustainable development indices stimulate economic growth and reduce unemployment and poverty. Therefore, we use various economic development variables to avoid misleading conclusions about such a link.

This article deals with four phases of recent developments in panel econometrics for seven countries, such as Iraq and some neighboring countries. Section 2 provides a theoretical and empirical overview of the main models of the impact of trade and sustainable development on economic growth. Section 3 presents the main Generalized Method of Moments (GMM) models. Section 4 is devoted to model presentation and univariate analysis of variables with empirical analysis of three estimations and a discussion of the significance of our results. Finally, Section 5 provides a conclusion and policy implications.

## 2. LITERATURE REVIEW

Knowledge of the factors influencing economic growth in a given economy has always been one of the primary objectives of economic researchers. One of these factors is foreign trade and it has been since the mercantilist theories. Most of the theoretical literature on growth and international trade asserts that trade stimulates economic growth in the long term.

### *2.1. Theoretical Overview*

Numerous economists and scholars launched a study to explore the probable relationship between international trade and economic growth based on Smith's findings. During the 1960s, policymakers were deeply engaged in identifying and establishing conducive conditions for enhanced well-being, striving to attain economic goals like sustainable growth.

Acknowledged theoretically as a pivotal factor in economic advancement, the crucial inquiry arises: should a nation pursue policies that encourage both exports and imports or concentrate on one aspect to foster a beneficial effect on growth? The ongoing dilemma of determining the optimal trade policy has been a central concern since the end of the Second World War.

Since the early 1980s, economists and scholars worldwide have increasingly directed their attention towards examining the impacts of trade openness and its various elements on economic growth. Balassa [4] was one of the very first to tackle the subject of the impact of trade on economic growth. The author explored the hypothesis suggesting that nations prioritizing export-oriented policies tend to exhibit superior economic growth compared to those opting for import substitution strategies.

Additionally, the author investigated the existing relationship between the growth of exports and the growth of gross national product (GNP) after subtracting exports. This relationship provides insights into the overall influence of exports on economic growth while also capturing the indirect effects of exports through associated revenues and costs. According to prominent publications by Edwards [5] and Dollar [6] empirical research by Sachs et al. [7] it is often accepted that trade liberalization, openness, or international commerce has a beneficial effect on growth.

Edwards [8] has attempted to measure the relationship between trade liberalization and productivity growth. He concludes that there is a strong relationship between trade liberalization indicators and factor growth. The author's main contribution to the debate on the relationship between trade liberalization and economic growth is methodological.

According to Edwards [8] the possible causes of the mixed results obtained are the use of irrelevant liberalization indicators coupled with a lack of data for comparative studies between countries leading to non-robust results, depending on the indicator used. A significant contribution to this subject can be found in the work of Frankel and Romer [9].

The authors center their attention on a country's geographical attributes as explanatory factors for growth. They assert that these characteristics provide valuable insights into both the scale and scope of international trade as well as intra-country trade. Frankel and Romer [9] contend that international trade not only positively impacts income but also stimulates intra-country trade using instrumental variable estimates to gauge the influence of trade on income.

In addition, authors examined whether large countries (the USA) trade more than small countries. They conclude that large countries in terms of population size or land area where there are huge trade opportunities appear to have lower trade-to-GDP ratios compared to the same ratios in smaller countries, such as Finland. Similarly, Winters et al. [10] reviewed the existing literature on trade liberalization and economic growth and concluded that liberalization favors the latter. The author also examined the interconnectedness between trade liberalization and economic growth, highlighting the role of complementary policies, such as anti-corruption

measures. Trade openness has the potential to mitigate corruption, as increased engagement with global markets often subjects countries to heightened institutional scrutiny [11]. According to this perspective, Wei [12] advocated for enhanced transparency in operations to meet the expectations of foreign investors.

### *2.2. Empirical Overview*

Several empirical investigations have delved into the relationship between international trade and economic growth. However, empirical findings on this matter are not consistently conclusive, similar to theoretical perspectives.

Some authors find a positive relationship between international trade and economic growth [13-15], while authors conclude that there is no relationship between the two concepts [16, 17]. The diversity of empirical results could be attributed to the differences in methodologies used and international trade indicators [11, 18]. A few works have focused on developing countries in sub-Saharan Africa [11, 18, 19]. Numerous studies demonstrate a positive relationship between international trade and economic growth in the respective countries under examination. Nonetheless, few studies explicitly treat West African countries, particularly those that are members of the Economic Community of West African States (ECOWAS), as a single regional trading block.

Various 1980s and 1990s's work examining the possible effects of trade liberalization on growth has been met with an avalanche of criticism.

For example, Greenaway [20] takes a skeptical view of the impact of trade liberalization on growth. The author argues that numerous works undertaken previously have used imperfect methods lacking an apparent, coherent, and unambiguous analytical framework. Moreover, trade liberalization is still plagued by definitional and conceptual inconsistencies across different aspects of the work, making it virtually impossible to construct reliable aggregate measures of trade distortions [20]. Similarly, the most cited contribution is probably that of Rodriguez and Rodrik [21].

In a skeptical empirical study, the author concludes that there is an inconclusive relationship between trade liberalization and economic growth. They also offer a critique of the existing literature on the subject. Rodriguez and Rodrik [21] found no significant relationship between openness and economic growth after criticizing the work of Edwards [8] who examined the relationship between openness and growth using nine different trade liberalization indices. They discredited a considerable body of other work [22-25]. The reasons cited encompass various factors, including flawed index construction, unreliable data, insufficient timeframes for measurement, and subjectivity in analysis.

Additionally, the correlation with non-trade elements such as geography and size further complicates the assessment. Based on their research findings, they conclude that there is scant evidence supporting the notion that trade liberalization policies inevitably lead to economic growth. In their influential work, Rodriguez and Rodrik [21] criticized econometric analyses for their weakness and lack of robustness. They also questioned the use of liberalization indicators, arguing that they were often correlated with other sources of poor economic performance and lacked direct linkage to trade.

This criticism led several other authors to introduce several other variables and attempt to determine their impacts on growth [26]. Levine and Renelt [27] pointed out that there is a strong correlation between all growth policies. As a result, it becomes challenging to isolate their individual effects by incorporating all economic policy variables into the analysis.

Conversely, it becomes simpler to attribute the impacts of omitted economic and institutional policy variables solely to trade. Addressing these concerns, Irwin and Terviö [28] extended their analysis to include additional time periods throughout the 20th century. They re-evaluated the conclusions drawn by Frankel and Rose [29] using the Two-Stage Least Squares (2SLS) method and determined that the findings remained consistent across different timeframes.

In addition, the coefficient of the 2SLS estimator proved significant at the conventional level compared with the marginal significance obtained by Frankel and Rose [29]. However, the addition of other geographical variables, such as latitude, negatively affects the robustness of the results. In addition, after a slight adjustment to the methodology of Frankel-Romer, Irwin and Terviö [28] proved that the OLS estimate underestimated the true effect of trade on income. Kneller et al. [30] empirically investigated the relationship between trade liberalization and economic growth.

They argue that both theoretical and empirical work on this question has led to conclusions that remain unresolved till now. For them, the diversity of results obtained could be due to the omission of a significant number of variables from the regression. Under these circumstances, Kneller et al. [30] concluded that formulating generalizations about trade liberalization and its effects on growth rates should be done cautiously and only subjectively. They conclude that trade liberalization has a significant impact on growth rates, focusing on developed countries such as those in the OECD and developing countries such as Singapore, Malaysia, Korea, etc.

In fact, Dollar and Kraay [31] base their work on Srinivasan [32] who examined the effects of trade liberalization on growth. They selected developing countries that had increased the share of trade in their GDP at constant prices over the past twenty years and also experienced a gradual increase in economic growth as a result of tariff reductions.

The results revealed a strong relationship between variations in growth over the past ten years and the changes observed in trade volume. Wacziarg and Welch [33] took up the work of Sachs et al. [7] using a new database of indicators of trade openness and liberalization. The results obtained support the existence of both positive and robust effects of trade liberalization on economic growth. Fajnzylber et al. [34] found similar results to Dollar and Kraay [31].

Indeed, several empirical inquiries have primarily concentrated on the enduring relationship between trade, trade liberalization, and economic growth in nations characterized by high levels of trade openness. These investigations encompass developing and transitional economies across Africa, Asia, and Latin America. For instance, Sarkar [35] scrutinized the relationship between trade openness and economic growth using panel data encompassing 51 less-developed countries, particularly in East Asia. Sarkar [35] findings suggest that there exists no positive long-term correlation between liberalization and growth except within the category of middle-income countries.

In their study, Dufrenot et al. [36] employed the quantile regression method to assess the "trade growth" hypothesis. Their findings indicated that in both short- and long-terms, the impact of openness on growth is more pronounced in low-growth countries compared to high-growth ones. Additionally, Brückner and Lederman [37] used instrumental variables on panel data to investigate the effects of trade openness on economic growth across 41 sub-Saharan African nations. Their analysis revealed that trade liberalization resulted in growth over both short and long periods for the countries under examination.

Eriş and Ulaşan [19] used a Bayesian approach across a dataset comprising 66 countries to assess the strength and extent of the causal link between trade openness and long-term economic growth. They conclude that trade liberalization is a fundamental variable for long-term growth. Menyah et al. [38] examined the causal relationship between international trade and growth by inserting the financial development variable and using a causality approach on panel data for 21 African countries. On the contrary, the results showed little support validating the hypothesis of highly trade-dependent growth. Thus, recent changes in trade policy do not appear to have a significant effect on economic growth [26].

Read and Parton [39] focused on developing countries in Africa, examining the trade liberalization endeavors in Kenya, Tanzania, and Uganda. They observed that despite shifts in international trade policies during the late 1980s and early 1990s, the trade balances of these countries have worsened over the last twenty-five years. They suggest that trade liberalization might not be the most suitable strategy for sub-Saharan African countries. They

cite reasons such as inadequate infrastructure, fragile and underdeveloped institutions, a feeble policy framework, and non-reciprocal market access terms imposed by developed nations.

Regional integration policies as well as trade policies have also attracted the attention of researchers. For example, several studies have examined the impact of a customs union and related trade policies on the economic and trade performance of certain Southern African Customs Union (SACU) member countries. The majority of these studies have borrowed partial equilibrium models, data combinations, and computable general equilibrium models (CGE) to analyze the potential impact of trade liberalization on the agricultural sector [40-47]. Nevertheless, a rigorous methodological approach that delves deeply into the discussion of liberalization and its effects on economic growth, exchange rate policies, investment, human capital, and factor productivity in these Southern African Customs Union (SACU) countries is still lacking [11].

Furthermore, Zahonogo [18] employed a dynamic growth model using the clustered mean group estimation technique and examined the empirical relationship between trade and economic growth across 42 sub-Saharan African nations. According to the author, the relationship between trade and economic growth exhibits non-linearity in these countries. Additionally, there exists a threshold below which international trade contributes positively to economic growth.

In a recent study, Alam and Sumon [48] demonstrated that trade openness and economic growth exhibit a positive long-term relationship using cointegration estimation of a panel comprising 15 Asian countries spanning from 1990 to 2017. However, they noted an exception with India where the coefficient was not statistically significant. Moreover, they uncovered bidirectional causality between economic growth and trade openness employing the vector error correction model (VECM).

As a result of this panoply of empirical results, three hypotheses will guide our research:

- *(H1): Economic development indicators have significant effects on economic growth in Western Asian countries.*
- *(H2): Economic development indicators have significant effects on unemployment in Western Asian countries.*
- *(H3): Economic development indicators have significant effects on poverty in Western Asian countries.*

To test these hypotheses, we will need to follow a rigorous research methodology, which will include using appropriate statistical analysis techniques, taking into account control variables, and reviewing existing literature on the subject. Additionally, it is important to consider other factors that may affect the findings of our study.

## 3. EMPIRICAL METHODOLOGY

Our empirical analysis aims to explore how sustainable development indices can mitigate the adverse impacts of economic growth employing the Generalized Method of Moments (GMM) system estimator based on the aforementioned studies. The dataset used in this investigation encompasses a panel of seven western Asian countries, specifically Iran, Iraq, Kuwait, Jordan, Saudi Arabia, Syria, and Turkey. This data is sourced from various databases, including the World Development Indicators (WDI), the International Energy Agency (EIA), and the United Nations Development Programme (UNDP), spanning a period of 18 years from 2003 to 2020.

### *3.1. Presentation of Model Variables*

In this sub-section, we study the interrelationship of economic growth (GDPG), unemployment rate, and poverty rate with the stock of physical capital as a percentage of GDP (investment), the employment rate of the population aged over 15 and under 65 (activity), the inflation rate, and trade openness as a percentage of GDP. Thus, with reference to the work of Apergis and Payne [49], Bhattacharya et al. [50], Rahman and Velayutham [51] and Wang et al. [52] we formulate our three functions as follows:

$$GDPG_{it}/Unemployment_{it}/Poverty_{it} = \beta_0 + \beta_1 Investment_{it} + \beta_2 Activity_{it} + \beta_3 Inflation_{it} + \beta_4 Trade_{it} + u_{it} \quad (1)$$

Where $u_{it}$ is the error term synthesizing all the variables not taken into account and assuming that it satisfies the classical Gauss-Markov assumptions; the index i = 1, ..., N designates the country and t = 1, ..., T designates the time period. In fact, our group includes (N = 7) western Asian countries between 2003 and 2020.

Table 1 summarized the Equation 1 variables.

**Table 1.** Definition of variables

| Variables | Description | Definition | References |
|---|---|---|---|
| Endogenous variable | | | |
| GDPG | Annual percentage growth rate of GDP at market prices based on constant U.S. dollars. | The annual average rate of change in a nation's gross domestic product (GDP) at market prices measured in constant local currency over a specified period reflects the economic growth trajectory of that country. | Romer [53] and Lucas Jr [54] |
| Unemployment | This indicator measures the use of available labor resources. | Analysis of employment in developing countries requires the use of more refined categories than the simple employment and non-employment dichotomy. | Barro [55] |
| Poverty | The poverty rate corresponds to the proportion of people whose income is below the poverty line. | This poverty rate is also available by age group for children (0–17), working-age people (18–65) and seniors (66 and above ). | Epaulard and Pommeret [56] |
| Explanatory variables | | | |
| Investment | It depends on its financing conditions. | Instability in financial development will inevitably lead to instability in investment rates. | Guillaumont and Deméocq [57] and Guillaumont [58] |
| Activity | As an indicator of the labor force. | The gross domestic product (GDP) at market prices based on constant local currency for a given national economy during a specified period of time encompasses all individuals engaged in economic activities including those who contribute labor. | Solow [59] and Solow [60] |
| Inflation | Used for the inflation measure with 2005 serving as the base year. | This metric represents the average price level of a basket of goods and services consumed by individuals, proportionate to their respective quantities consumed. Hence, it serves as a robust indicator of inflation within a specified period elucidating the dynamics of monetary value. | Kim and Beladi [61] and Thomas and Lamm [62] |
| Trade | It shows the country's dependence on the outside world. | An indicator of the degree of openness of a country's foreign trade. | Boyd et al. [63] and Rousseau and Bernardi [64] |

### *3.2. Generalized Method of Moments (GMM)*

We use the Generalized Method of Moments (GMM) developed for time series models by Holtz-Eakin et al. [65], Arellano and Bond [66] and Arellano and Bover [67].

The empirical model used can be presented as follows:

$$y_{it} - y_{i,t-1} = \gamma y_{i,t-1} + \beta' X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (2)$$

where $i = 1, \ldots, N; t = 1, \ldots, T$ and $y_{it} - y_{i,t-1}$ is the dependent variable for interval $t$, $y_{it}$ the natural logarithm of the variable at time t is a vector of control variables. These elements constitute the economic determinants of growth. $\mu_i$, $\lambda_t$ and $\varepsilon_{it}$ denote, respectively: individual-specific effects, time-specific effects and an error term. With $\alpha = 1 + \gamma$, Equation 2 becomes

$$y_{it} = \alpha y_{i,t-1} + \beta' X_{it} + \lambda_t + \varepsilon_{it} \quad (3)$$

In the context of a time series analysis employing the ordinary least squares (OLS) method may lead to biased estimates due to the inclusion of the lagged dependent variable on the right-hand side of Equation 3. This renders OLS estimates inconsistent as the lagged dependent variable ($y_{i,t-1}$) becomes correlated with the error term [66, 68]. Although the bias diminishes over a large study period, it remains problematic given the relatively short duration of our analysis. To address this issue, the first difference equation is used which mitigates individual $\mu_i$ effects and eliminates this potential source of bias [69].

$$\Delta y_{it} = \alpha \Delta y_{i,t-1} + \beta' \Delta X_{it} + \Delta \mu_i + \Delta \lambda_t + \Delta \varepsilon_{it} \quad (4)$$

However, transforming all exogenous variables into the first differences equation introduces endogeneity, as these differences become correlated with the error term. In response to this issue, Arellano and Bond [66] devised the Generalized Method of Moments (GMM) estimation method for data models presented in Equation 4 based on the framework proposed by Holtz-Eakin et al. [65]. GMM addresses endogeneity by instrumentalizing the lagged endogenous variable with its past values spanning two or more periods. Additionally, predetermined or weakly exogenous variables are instrumented with their values lagged by at least one period. These variables may be influenced by previous values of the dependent variable but are uncorrelated with future error term realizations. For exogenous variables, their current values serve as instruments.

However, this method lacks the ability to identify the impact of time-invariant factors. Moreover, in finite samples, Blundell and Bond [70] showed through Monte Carlo simulations that the GMM first difference estimator leads to biased results when the instruments show weakness. They propose the application of the system GMM approach, which was first proposed by Arellano and Bover [67] to overcome these difficulties. This approach estimates the difference model and the level equation at the same time.

Through Monte Carlo experiments, Blundell and Bond [70] illustrate that this system estimator mitigates potential bias in finite samples and reduces the asymptotic imprecision associated with the difference estimator. According to this approach, if the first differences of an explanatory variable are uncorrelated with individual effects, lagged values of the first differences can serve as instruments in the level equation. Additionally, lagged first differences of the dependent variable can act as valid instruments for level equations.

The GMM-system method is theoretically more efficient than first difference GMM. It tends to yield biased outcomes. We adopt the two-stage estimation method proposed by Windmeijer [71], which corrects for variance in finite sample sizes to address this issue [72].

The efficacy of the GMM estimator hinges on the validity of two key assumptions: (*i*) the instruments are adequately validated, and (*ii*) the error terms are free from autocorrelation.

Arellano and Bond [66], Arellano and Bover [67], and Blundell and Bond [70] propose Hansen/Sargan over-identification tests to assess the validity of lagged variables as instruments. In this study, we employ the Hansen test due to its effectiveness in addressing autocorrelation and heteroscedasticity issues [73, 74]. We conduct a second-order autocorrelation test to examine the hypothesis of error term non-correlation as the first-difference error term is inherently first-order correlated [75].

The estimation of growth models using the difference GMM estimator for linear data models was pioneered by Caselli et al. [76]. Subsequently, Levine et al. [75] introduced the GMM-system estimator, which has since become standard practice in the literature [77, 78].

## 4. EMPIRICAL RESULTS

This part will contain an analysis of the main characteristics of the set of variables in seven western Asia countries, namely Iran, Iraq, Kuwait, Jordan, Saudi Arabia, Syria, and Turkey, linking investment, activity, inflation, and trade to economic growth, unemployment, and poverty during the study period from 2003 to 2020

using the system GMM estimator (sys-GMM). The data are selected from the World Development Indicators (WDI), International Energy Agency (EIA), and UNDP databases.

### *4.1. Variable Analysis*

First, let's analyze the main descriptive statistics for the various variables outlined in Table 2. It is clear from the data that the majorities of variables exhibit a right-skewed distribution and possess a leptokurtic shape. Additionally, the hypothesis of series normality is rejected based on Jarque and Bera's [79] test. It is evident that all variables exhibit issues with serial autocorrelation regarding the autocorrelation test on the panel Born and Breitung [80] data.

**Table 2.** Summary of the main descriptive statistics for variables

| Designations | GDPG | Unemployment | Poverty | Investment | Activity | Inflation | Trade |
|---|---|---|---|---|---|---|---|
| Average | 4.114 | 27.860 | 64.992 | 6305.691 | 43.177 | 35.912 | 56.725 |
| Standard deviation | 8.279 | 22.429 | 83.893 | 14313.4 | 52.334 | 44.347 | 33.309 |
| Maximum | 53.38 | 101.59 | 430.6 | 72455.88 | 242.67 | 220.78 | 154.23 |
| Minimum | -36.66 | 1.40 | 1.10 | 0.20 | 0.79 | 0.3 | 11.33 |
| Median | 4.71 | 20.245 | 33 | 12.15 | 23.665 | 16.37 | 50.82 |
| Coefficient of variation (CV) | 2.012 | 0.805 | 1.290 | 2.269 | 1.212 | 1.234 | 0.587 |
| Skewness statistic | -0.073 | 1.438 | 2.190 | 2.796 | 1.669 | 1.863 | 0.971 |
| Kurtosis statistic | 18.224 | 4.511 | 8.028 | 10.571 | 5.368 | 6.709 | 3.530 |
| Jarque-Bera (JB) statistic | 1217 | 55.44 | 233.5 | 465.2 | 87.98 | 145.2 | 21.31 |
| JB probability | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Born-Breitung (BB) statistic | 5.64 | 6.39 | 3.03 | 2.80 | 3.27 | 5.27 | 7.02 |
| BB probability | 0.060 | 0.041 | 0.220 | 0.247 | 0.195 | 0.072 | 0.030 |

According to Figure 1, the first economic growth variable (GDPG) is characterized by non-stability over the study period, with several trend changes and breaks related to the various economic and social crises.

According to the diagnostic findings in Table 2, our dataset displays an average GDP growth rate of 4.114 with a notable standard deviation of 8.279, indicating substantial variability among the observations (coefficient of variation = 2.012).

The range of observations spans from -36.66 (the lowest observed value, attributed to Iraq), to 53.38 (the highest observed value, also attributed to Iraq) with a prevalent concentration around 4.71. The distribution of GDP growth appears slightly skewed to the left (skewness = -0.073) and exhibits leptokurtosis (kurtosis = 18.224). This variable demonstrates non-normality as indicated by the Jarque-Bera statistic's probability being less than 5%. Furthermore, we reject the null hypothesis at the 1% significance level, suggesting the presence of serial autocorrelation issues based on the Born-Breitung statistic.

According to Figure 2, the second variable in our analysis is unemployment, which shows an upward trend over the study period. Indeed, our series shows an overall mean of 27.860 with a standard deviation of 22.429. The distribution is skewed to the right (skewness = 1.438>0) and leptokurtic (kurtosis = 4.511). Observations range from 1.4 (Kuwait) to 101.59 (Turkey), with a high concentration of around 20.245. This distribution rejects the normality hypothesis (p-value = 0.00). The existence of a serial autocorrelation problem is shown by rejecting the null hypothesis at the 1% threshold.

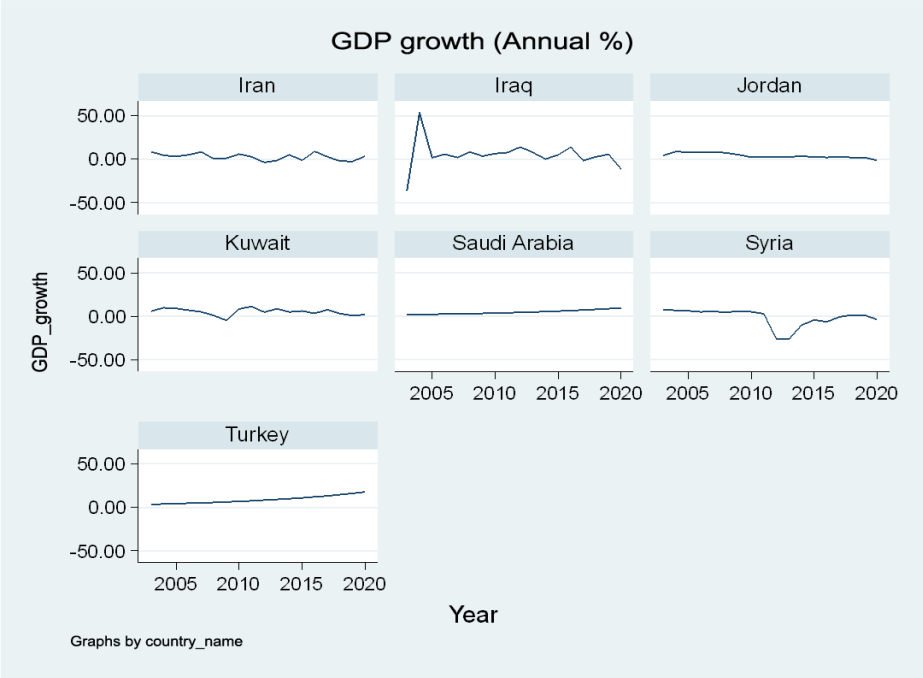


**Figure 1.** GDP-growth trends by country.

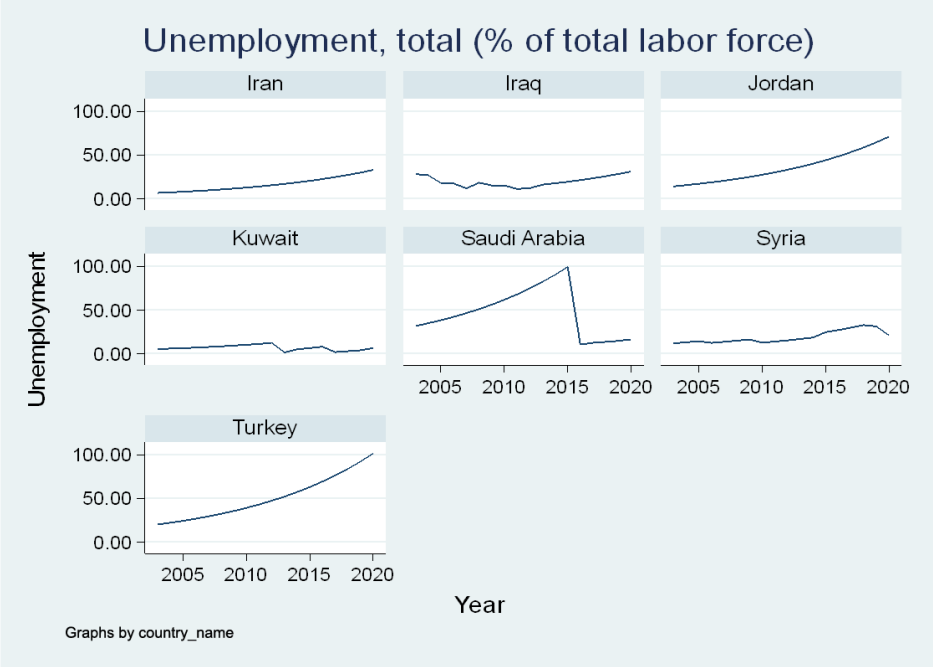


**Figure 2.** Unemployment trends by country.

Our third variable, poverty (refer to Figure 3) exhibits a break throughout the study period. The series displays an average of 64.992 with a standard deviation of 83.893. It is notably right-skewed (skewness = 2.190) and leptokurtic (kurtosis = 8.028). Values range from 1.1 (attributed to Kuwait) to 430.6 (attributed to Syria), with greater concentrations observed around 33. The distribution of this variable rejects the normality hypothesis (p-value = 0.00), leading to the rejection of the null hypothesis at the 1% significance level. Similar to the GDP growth variable, the Born-Breitung statistic indicates a serial autocorrelation issue in the poverty series.

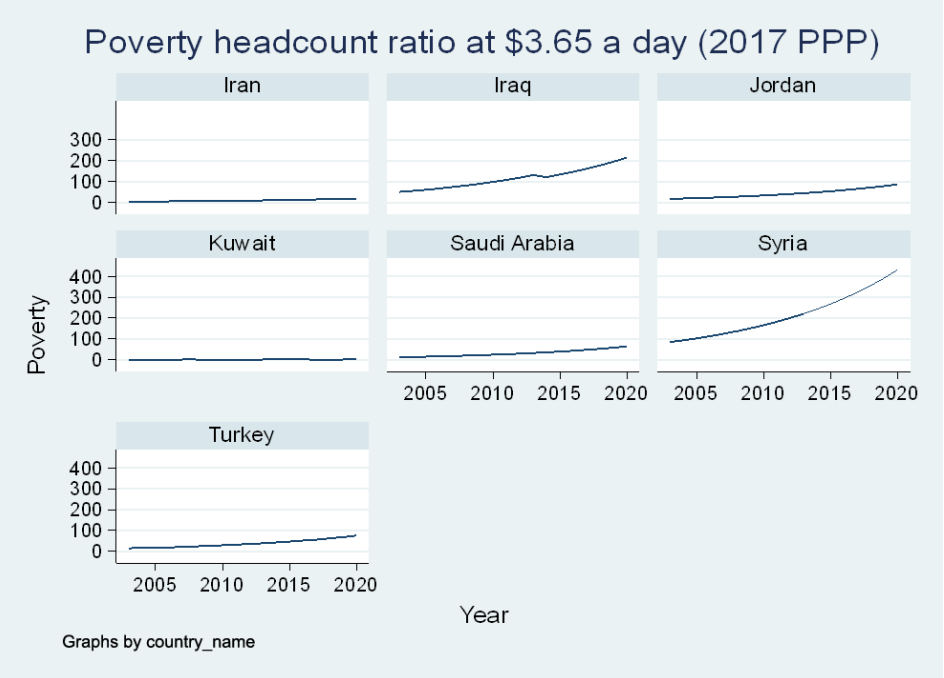


**Figure 3.** Poverty trends by country.

All series exhibit issues with autocorrelation and persisting strong heterogeneity, which can potentially impact the accuracy of subsequent estimation results.

Panel data offers a two-fold advantage over time series and cross-sectional data. This approach enables consideration of both the diverse characteristics of individuals and the evolution of behavior over time. Moreover, panel data leverages a larger sample size, facilitating estimates that closely approximate the true parameter values. Recent advancements in unit root, causality, and cointegration testing in panel data have garnered significant attention. Throughout this section, our emphasis is primarily on unit root tests as we endeavor to offer a thorough review of the literature on panel data econometrics.

One of the primary concerns in panel unit root testing revolves around the form of heterogeneity incorporated into the model used for testing the unit root. The simplest form of heterogeneity assumes the presence of individual-specific constants. This model, commonly referred to as the individual effects model (specified either as fixed or random effects), accounts for heterogeneity solely in the mean level while maintaining the assumption of homogeneity in other model parameters, particularly the autoregressive root. Initial unit root tests by Levin et al. [81], Im et al. [82], Breitung [83] and Hadri [84] adopted this modeling approach. However, this limited conception of heterogeneity focused solely on individual effects or deterministic trends was soon found to be inadequate in macroeconomic applications.

However, it becomes pertinent to explore the dynamic relationship between these variables considering the various issues observed in the different series. For this reason, we conducted tests to ascertain the presence of both first- and second-generation unit roots in levels and first differences, aiming to address the issue of heterogeneity among the selected countries. The results of these tests are presented in Table 3.

**Table 3.** Unit root tests.

| Variables | GDPG | Unemployment | Poverty | Investment | Activity | Inflation | Trade |
|---|---|---|---|---|---|---|---|
| In level | | | | | | | |
| First generation | | | | | | | |
| Levin et al. [81] | 26.572 | 202.650 | 70.088 | 4.1e+04 | 335.578 | 64.459*** | -0.608** |
| Im et al. [82] | 3.218 | 7.813 | 14.500 | 15.526 | 8.365 | 8.778 | 0.443 |
| Breitung [83] | 4.382 | 5.733 | 9.191 | 9.358 | 6.662 | 6.576 | 0.106 |
| Levine et al. [75] | 2.072** | 15.820*** | 26.052*** | 24.832*** | 22.641*** | 22.421*** | 18.612*** |
| Second generation | | | | | | | |
| Pesaran [85] | | | | | | | |
| Constant | 2.069 | 5.165 | 4.586 | 11.148 | 5.911 | 4.268 | -0.045 |
| Constant and trend | 1.844 | 5.389 | 5.412 | 10.426 | 6.738 | 5.239 | 0.678 |
| Pesaran [86] | | | | | | | |
| Constant | -1.403 | 0.356 | -0.259 | 2.608 | 0.703 | 0.149 | -2.154 |
| Constant and trend | -1.946 | -0.095 | -0.491 | 1.700 | 0.340 | -0.086 | -2.675 |
| Karavias and Tzavalis [87] | | | | | | | |
| Statistic | -13.089*** | -5.063** | -3.191** | 0.774 | -3.165** | -1.150 | -2.075 |
| Break date | 2019 | 2016 | 2019 | - | 2017 | - | - |
| Decision | NS | NS | NS | NS | NS | NS | NS |
| In first difference | | | | | | | |
| First-generation | | | | | | | |
| Levin et al. [81] | -6.805*** | -5.317*** | -8.869*** | -5.911*** | -4.409*** | -8.083*** | -4.633*** |
| Im et al. [82] | -3.012** | -2.480*** | -3.885*** | -2.600** | -3.032** | -3.001*** | -4.962*** |
| Breitung [83] | -2.112** | -4.246*** | -4.513*** | -6.262*** | -4.187*** | -4.068*** | -7.070*** |
| Levine et al. [75] | -1.409 | 0.206 | 0.982 | 2.583 | 0.115 | 0.034 | 1.054 |
| Second generation | | | | | | | |
| Pesaran [85] | | | | | | | |
| Constant | -2.152** | -5.095*** | -2.407** | -9.581*** | -5.353*** | -3.645*** | -3.002*** |
| Constant and trend | -2.884* | -4.734*** | -2.164** | -8.553*** | -4.660*** | -3.349*** | -4.005*** |
| Pesaran [86] | | | | | | | |
| Constant | -2.154** | -2.280** | -2.238** | -2.033** | -2.545** | -2.091** | -3.595*** |
| Constant and trend | -3.030*** | -2.296*** | -3.306*** | -2.995*** | -2.892*** | -2.623*** | -4.065*** |
| Karavias and Tzavalis [87] | | | | | | | |
| Statistic | -19.442*** | -12.624*** | -6.195*** | -13.431*** | -12.845*** | -11.175*** | -12.904*** |
| Break date | 2005 | 2019 | 2019 | 2019 | 2019 | 2019 | 2005 |
| Decision | S | S | S | S | S | S | S |

**Note:** *, **, *** significant at 10%, 5%, 1%. NS denotes non-stationary; S denotes stationary.

Notably, the second-generation tests proposed by Pesaran [85] and Pesaran [86] along with the break unit root test developed by Karavias and Tzavalis [87] hold particular relevance. Across all iterations, these tests indicate the presence of unit roots at the level (leading to rejection of the null hypothesis, H0). Conversely, the same series accepts the hypothesis that the first order difference is stationary. Consequently, we can conclude that all series are integrated at the first order (I (1)).

### *4.2. Model's Estimations*

In this section, we will attempt to empirically develop three development models (economic growth, unemployment rate, and poverty) for seven Western Asian countries, including Iraq.

Table 4 presents the results of our model estimates using the GMM dynamic panel system to explain the non-linear impact of foreign trade liberalization on certain sustainable development indicators in Iraq and some of its neighboring countries and to make comparisons with the above estimates. The regressions are conducted separately for each variable to mitigate challenges arising from multicollinearity issues. It is necessary to include one or more lagged values of the endogenous variable in the model given the dynamic nature of the autoregressive model. This enables us to examine whether the GDP growth, unemployment, and poverty of a given year are influenced by those of previous years.

**Table 4.** Dynamic panel data estimation and two-stage GMM system.

| Variables | GDPG model | | Unemployment model | | Poverty model | |
|---|---|---|---|---|---|---|
| | Coefficient | p-value | Coefficient | p-value | Coefficient | p-value |
| $GDPG_{it-1}$ | -0.251 | 0.060 | ***** | ***** | ***** | ***** |
| $Unemployment_{it-1}$ | ***** | ***** | 0.857 | 0.003 | ***** | ***** |
| $Poverty_{it-1}$ | ***** | ***** | ***** | ***** | 1.098 | 0.000 |
| $Investment_{it}$ | -0.001 | 0.757 | -0.001 | 0.031 | 0.001 | 0.010 |
| $Activity_{it}$ | -0.002 | 0.890 | -0.093 | 0.089 | 0.017 | 0.095 |
| $Inflation_{it}$ | 0.093 | 0.011 | 0.346 | 0.019 | -0.038 | 0.077 |
| $Trade_{it}$ | 0.237 | 0.000 | -0.194 | 0.000 | -0.089 | 0.071 |
| Constant | -11.038 | 0.000 | 2.008 | 0.701 | -0.089 | 0.950 |
| Arellano-Bond test for AR(1) | 0.79 | 0.428 | -1.14 | 0.428 | -0.34 | 0.736 |
| Arellano-Bond test for AR(2) | -1.46 | 0.144 | 1.18 | 0.144 | 0.03 | 0.979 |
| Hansen test | 0.681 | 1.000 | 0.788 | 1.000 | 0.971 | 1.000 |

**Note:** ***** are no numbers in these boxes.

According to the GMM system method, Arellano and Bond's [66] first difference and second difference autocorrelation tests of residuals as well as Hansen's over-identification test presented in the third panel of Table 4 offer valuable insights. As evident from the results, the serial autocorrelation test of the Arrellano and Bond first difference residuals confirms the appropriateness of the GMM model specification, indicating the absence of second-order autocorrelation. Hansen's test statistics endorse the selection of instruments, affirming their significance and validity. Consequently, the GMM system model is deemed suitable for analyzing the relationship between GDP growth, unemployment, and poverty with other variables across the 7 countries in our study from 2003 to 2020.

In the initial estimation, the findings aligned with theoretical expectations. The coefficient associated with lagged GDP growth is negative and statistically significant. Similarly, we observe a positive and significant impact of inflation and trade openness on growth. However, the investment and activity terms exhibit a negative sign, although not statistically significant, indicating the presence of a complementary effect between the proxy of investment quality and growth.

This suggests a non-linear relationship between growth and sustainable development indices. It can be argued that a 1% increase in the inflation variable leads to a 0.093% decrease in economic growth in the GMM model based on the results. The GMM estimator enhances the impact of investment on sustainable development indices at the country output level by addressing endogeneity issues. These preliminary findings support the initial hypothesis

(**H1**) indicating significant influences of economic development indicators on economic growth in Western Asian countries.

In the second estimation presented in Table 4, we aim to empirically construct the unemployment model. Overall, the estimation results demonstrate that the effects of our explanatory variables align with theoretical expectations. The coefficient associated with lagged unemployment is positive and statistically significant. Similarly, we find a positive and significant effect of inflation on the unemployment rate but a negative sign for the investment term, activity, and trade openness, which is not significant and therefore highlights the existence of a complementarity effect between the investment quality proxy and the unemployment rate. This implies that the relationship between unemployment and sustainable development indices is not linear. A 1% increase in the activity variable corresponds to a 0.093% decrease in unemployment within the GMM framework based on the findings. Addressing endogeneity concerns through the GMM estimator enhances the impact of the unemployment rate on sustainable development indices at the country's output level. Our findings affirm the second hypothesis (**H2**), demonstrating that economic development indicators indeed play a significant role in influencing unemployment in countries located in western Asia.

In the third estimation outlined in Table 4, we endeavor to empirically formulate the poverty model. Overall, the estimation results indicate that the effects of our explanatory variables are consistent with theoretical predictions. Specifically, the coefficient associated with lagged poverty is positive and statistically significant. Similarly, we observe a positive and significant impact of investment and activity on poverty, whereas the coefficients for inflation and trade openness exhibit negative signs. This underscores the presence of a complementary effect between the proxy of investment quality and poverty, implying a non-linear relationship between poverty and sustainable development indices. According to the results, a 1% increase in the inflation variable is associated with a 0.038% decrease in poverty within the GMM framework. Accounting for endogeneity issues through the GMM estimator amplifies the effect of poverty on sustainable development indices at the country output level. The evidence suggests that the relationship does not follow a straight line, confirming the third hypothesis (**H3**) that economic development indicators have significant effects on poverty in western Asian countries.

These results are in line with those of Ikpesu et al. [88] who also show that openness variables positively influence economic growth in African countries.

In more general terms, the development of international trade encourages companies to improve their price and non-price competitiveness through technical progress, human capital training, etc. and is thus beneficial to economic growth [3]. Price competitiveness refers to a company's ability to offer goods or services at a lower price than its competitors for the same quality. On the other hand, non-price competitiveness is a company's ability to offer products that stand out from the competition in terms of quality, innovation, design, branding, and so on.

Such a reduction in tariffs for environmentally friendly products, services, and technologies would encourage governments to introduce measures and programs to protect the environment. Encouraging the liberalization of trade in new technologies and clean goods promotes the creation of new businesses and new sources of employment in clean industrial activities.

Tariffs paid during the process of importing environmental goods and services have advantages for countries that do not produce this type of goods and whose industrial fabric is underdeveloped. If importing environmental products is costly for some countries, they will encourage foreign direct investment and the establishment of new multinational companies.

In labor-intensive consumer goods industries, the dynamics significantly diverge. Multinational corporations typically conceptualize the product, define its quality standards, and delegate production tasks to local firms in developing nations. These corporations oversee quality assurance and production timelines, often subject to alterations in design and volume. The key driver behind this approach is the imperative for flexibility necessitating

swift adjustments to meet shifting consumer demands while minimizing inventory costs. This operational model mirrors a "just-in-time" production system but operates on a global scale. Additionally, multinational entities maintain control over marketing strategies. Brand identities and logos serve as pivotal sources of market influence and, concurrently, contribute to the accumulation of substantial private wealth.

Varying degrees of individual mobility are an important variable contributing to differing perspectives on the social effects of globalization. When someone has lost their job, their income is decreasing, or they are from a region where poverty and unemployment are prevalent, they tend to evaluate globalization based on these experiences rather than considering the broader context. Consequently, at least a portion of the contentious discourse surrounding the social ramifications of globalization arises from disparate interpretations of global social indicators and contrasting perspectives on how globalization is perceived and experienced.

The multitude of variations in economic performance, employment rates, inequality and poverty levels render it exceedingly challenging to formulate generalizations about the impact of globalization. This complexity arises in part from the intricate nature of the phenomenon itself. For instance, outcomes observed in terms of unemployment and poverty is not solely attributable to globalization even when broadly defined. Instead, they represent the combined effects of a diverse array of factors. Internal structural elements such as disparities in income and wealth distribution or the effectiveness of governance often exert significant influence. Hence, it's crucial to avoid the common fallacy of attributing all observed outcomes, whether positive or negative, solely to globalization.

Faced with the challenges of climate change, Iraq must work towards a "greener" development model, in particular by diversifying and "decarbonizing" its economy, said the World Bank (WB) after presenting a new report in Baghdad.

The country needs $233 billion in investment up to 2040 to "meet Iraq's main development needs and enable it to embark on the path of green growth," the WB report estimates, i.e., 6% of GDP each year. Iraq is considered by the UN to be one of the five countries in the world most exposed to certain consequences of climate change, hitting certain sectors such as agriculture, hardest water shortages, rampant desertification, and rising temperatures.

After decades of conflict, the country's infrastructure is in a state of disrepair, and its economy remains largely dependent on the huge oil windfall that accounts for 90% of government revenues. The WB report presented to Iraqi authorities at a roundtable examines the cost of transitioning to a less carbon-dependent economy and discusses reforms for "a greener growth model," according to a statement released. There are three major challenges: the challenge of water, the challenge of desertification, and the challenge of air pollution," Ferid Belhaj, WB vice president for the Middle East and North Africa, told AFP. Iraq has sufficient financial resources to manage these challenges, he said during a visit to Baghdad, stressing the need to see these resources made available for new policies.

Our research indicates that trade openness is important. It must be complemented by supportive policies aimed at enhancing investment accessibility and human capital development. These factors serve as crucial sources for fostering high-tech trade and acquiring technological expertise. This facilitates the growth of high-tech-intensive industries and enhances the innovation capabilities of domestic firms, thereby bolstering international trade performance and consequently, economic growth. Additionally, there is a pressing need for western Asian countries to strengthen their institutions and foster adaptability and growth. It's imperative to consider globalization as a whole and implement further policies to maximize its positive impact on economic growth.

## 5. CONCLUSION AND POLICY IMPLICATIONS

A more nuanced understanding of how globalization has influenced countries can be obtained by delving into a burgeoning array of country-specific studies on these matters. These studies typically reveal a multifaceted impact. Evaluating the social ramifications of globalization necessitates moving beyond mere economic indicators and scrutinizing changes in employment, income distribution, and poverty levels over the last two decades.

This emergence of the very rich is important for the analysis of globalization, as very large incomes are generally linked to the emoluments paid by multinationals, the development of new global businesses, and the phenomenon of global celebrity. The concentration of wealth is likely to give the beneficiaries of the situation greater political and market power both nationally and globally. It also has a major influence on people's feelings about globalization.

In terms of sustainable development, Western Asian countries have raised awareness of the environmental aspect and the harmful effects of commercial activity through the laws, decrees, and fiscal and financial measures presented in the work.

Finally, we can conclude that international trade activities and their negative effects have awakened awareness towards a new development that will be sustainable, less damaging to the environment, and healthy for future generations following these theoretical and practical components. We can also conclude that sustainable development and international trade in Iraq are more of a matter for the state because, as far as companies are concerned, although they declare themselves aware of their responsibilities towards both terms, their commitment is a matter of strict regulatory obligation.

These observations underscore a fundamental ambiguity in interpreting data on global poverty trends. The overall reduction in poverty is undoubtedly a positive development. It offers little solace to those residing outside the limited number of countries where poverty has actually decreased.

Moreover, there exists a potential discrepancy wherein real social costs may persist even if overarching indicators such as unemployment rates or poverty levels exhibit no deterioration. Indeed, the stability of these rates can obscure significant disruptions in labor markets and fluctuations in individuals' transitions in and out of poverty. These phenomena appear to have become more pronounced as globalization has advanced. Consequently, it provides little consolation for individuals who have lost their jobs or fallen into poverty to recognize that others following a contrasting trajectory have prevented a decline in unemployment or poverty rates.

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## REFERENCES

[1] H. Fayou, N. Boubrahimi, and A. Ghoufrane, "Commercial openness sand attractiveness of FDI: What synergistic effect of human capital in middle-income countries?," *Journal of Multidisciplinary Studies in Economic and Social Sciences*, vol. 6, no. 2, 2021. https://doi.org/10.19044/esj.2021.v17n19p156

[2] L. Frédéric *et al.*, "Maximizing chiral perturbation on thermally activated delayed fluorescence emitters and elaboration of the first top-emission circularly polarized OLED," *Advanced Functional Naterials*, vol. 30, no. 43, p. 2004838, 2020. https://doi.org/10.1002/adfm.202004838

[3] K. Eberhard, "The effects of visualization on judgment and decision-making: A systematic literature review," *Management Review Quarterly*, vol. 73, no. 1, pp. 167-214, 2023. https://doi.org/10.1007/s11301-021-00235-8

[4] B. Balassa, "Tariff protection in industrial countries: An evaluation," *Journal of Political Economy*, vol. 73, no. 6, pp. 573-594, 1965. https://doi.org/10.1086/259085

[5] S. Edwards, "Trade orientation, distortions and growth in developing countries," *Journal of Development Economics*, vol. 39, no. 1, pp. 31-57, 1992. https://doi.org/10.1016/0304-3878(92)90056-F

[6] D. Dollar, "Outward-oriented developing economies really do grow more rapidly: Evidence from 95 LDCs, 1976-1985," *Economic Development and Cultural Change*, vol. 40, no. 3, pp. 523-544, 1992. https://doi.org/10.1086/451959

[7] J. D. Sachs, A. Warner, A. Åslund, and S. Fischer, "Economic reform and the process of global integration," *Brookings Papers on Economic Activity*, vol. 1995, no. 1, pp. 1-118, 1995. https://doi.org/10.2307/2534573

[8] S. Edwards, *Capital flows, real exchange rates, and capital controls: Some Latin American experiences. In Capital flows and the emerging economies: Theory, evidence, and controversies*. University of Chicago Press. https://doi.org/10.3386/w6800, 2000.

[9] J. A. Frankel and D. Romer, "Does trade cause growth?," *The American Economic Review*, vol. 89, no. 3, pp. 379-399, 1999. https://doi.org/10.1257/aer.89.3.379

[10] L. A. Winters, N. McCulloch, and A. McKay, "Trade liberalization and poverty: The evidence so far," *Journal of Economic Literature*, vol. 42, no. 1, pp. 72-115, 2004. https://doi.org/10.1257/002205104773558056

[11] F. Manwa and A. Wijeweera, "Trade liberalisation and economic growth link: The case of Southern African custom union countries," *Economic Analysis and Policy*, vol. 51, pp. 12-21, 2016. https://doi.org/10.1016/j.eap.2016.05.001

[12] S. J. Wei, "Natural openness and good government," NBER Working Paper, No. (w7765), 2000.

[13] C. Chang and G. H. Glover, "Effects of model-based physiological noise correction on default mode network anti-correlations and correlations," *Neuroimage*, vol. 47, no. 4, pp. 1448-1459, 2009. https://doi.org/10.1016/j.neuroimage.2009.05.012

[14] J. H. Kim *et al.*, "High cleavage efficiency of a 2A peptide derived from porcine teschovirus-1 in human cell lines, zebrafish and mice," *PloS One*, vol. 6, no. 4, p. e18556, 2011. https://doi.org/10.1371/journal.pone.0018556

[15] J. Jouini, "Economic growth and remittances in Tunisia: Bi-directional causal links," *Journal of Policy Modeling*, vol. 37, no. 2, pp. 355-373, 2015. https://doi.org/10.1016/j.jpolmod.2015.01.015

[16] J. W. Musila and Z. Yiheyis, "The impact of trade openness on growth: The case of Kenya," *Journal of Policy Modeling*, vol. 37, no. 2, pp. 342-354, 2015. https://doi.org/10.1016/j.jpolmod.2014.12.001

[17] B. Ulaşan, "Trade openness and economic growth: Panel evidence," *Applied Economics Letters*, vol. 22, no. 2, pp. 163-167, 2015. https://doi.org/10.1080/13504851.2014.931914

[18] P. Zahonogo, "Financial development and poverty in developing countries: Evidence from Sub-Saharan Africa," *International Journal of Economics and Finance*, vol. 9, no. 1, pp. 211-220, 2017.

[19] M. N. Eriş and B. Ulaşan, "Trade openness and economic growth: Bayesian model averaging estimate of cross-country growth regressions," *Economic Modelling*, vol. 33, pp. 867-883, 2013. https://doi.org/10.1016/j.econmod.2013.05.014.

[20] D. Greenaway, "Liberalising foreign trade through rose-tinted glasses," *The Economic Journal*, vol. 103, no. 416, pp. 208-222, 1993. https://doi.org/10.2307/2234347

[21] F. Rodriguez and D. Rodrik, "Trade policy and economic growth: A skeptic's guide to the cross-national evidence," *NBER Macroeconomics Annual*, vol. 15, pp. 261-325, 2000. https://doi.org/10.3386/w7081

[22] D. Ben-David, "Equalizing exchange: Trade liberalization and income convergence," *The Quarterly Journal of Economics*, vol. 108, no. 3, pp. 653-679, 1993. https://doi.org/10.2307/2118404

[23] D. G. Lee and H. Gai, "Kinetics and mechanism of the oxidation of alcohols by ferrate ion," *Canadian Journal of Chemistry*, vol. 71, no. 9, pp. 1394-1400, 1993. https://doi.org/10.1139/v93-180

[24] R. Harrison, P. Ashworth, and N. Miller, "Bicarbonate/CO2, an effector of capacitation, induces a rapid and reversible change in the lipid architecture of boar sperm plasma membranes," *Molecular Reproduction and Development: Incorporating Gamete Research*, vol. 45, no. 3, pp. 378-391, 1996.

[25] R. Wacziarg, "Measuring the dynamic gains from trade," *The World Bank Economic Review*, vol. 15, no. 3, pp. 393-429, 2001. https://doi.org/10.1093/wber/15.3.393.

[26] J. Semančíková, "Trade, trade openness and macroeconomic performance," *Procedia-Social and Behavioral Sciences*, vol. 220, pp. 407-416, 2016. https://doi.org/10.1016/j.sbspro.2016.05.515

[27] R. Levine and D. Renelt, "A sensitivity analysis of cross-country growth regressions," *The American Economic Review*, pp. 942-963, 1992.

[28] D. A. Irwin and M. Terviö, "Does trade raise income?: Evidence from the twentieth century," *Journal of International Economics*, vol. 58, no. 1, pp. 1-18, 2002. https://doi.org/10.1016/S0022-1996(01)00164-7

[29] J. A. Frankel and A. K. Rose, "Estimating the effect of currency unions on trade and output (No. 7857)," National Bureau of Economic Research, Inc, 2000.

[30] R. Kneller, C. W. Morgan, and S. Kanchanahatakij, "Trade liberalisation and economic growth," *World Economy*, vol. 31, no. 6, pp. 701-719, 2008. https://doi.org/10.1111/j.1467-9701.2008.01101.x

[31] D. Dollar and A. Kraay, "Trade, growth, and poverty," *The Economic Journal*, vol. 114, no. 493, pp. F22-F49, 2004. https://doi.org/10.1111/j.0013-0133.2004.00186.x

[32] T. N. Srinivasan, "Developing countries in the world trading system: From GATT, 1947, to the third ministerial meeting of WTO, 1999," *The World Economy*, vol. 22, no. 8, pp. 1047-1064, 1999. https://doi.org/10.1257/000282802320189212

[33] R. Wacziarg and K. H. Welch, "Trade liberalization and growth: New evidence," *The World Bank Economic Review*, vol. 22, no. 2, pp. 187-231, 2008. https://doi.org/10.3386/w10152

[34] P. Fajnzylber, N. Loayza, and C. Calderón, "Economic growth in Latin America and the Caribbean: Stylized facts, explanations, and forecasts," *Working Documents (Central Bank of Chile)*, no. 265, pp. 1-150, 2004.

[35] D. Sarkar, *Multivariate data visualization with R. Use R*. Springer. https://doi.org/10.1007/978-0-387-75969-2, 2008.

[36] G. Dufrenot, V. Mignon, and C. Tsangarides, "The trade-growth nexus in the developing countries: A quantile regression approach," *Review of World Economics*, vol. 146, pp. 731-761, 2010. https://doi.org/10.1007/s10290-010-0067-5

[37] M. Brückner and D. Lederman, "Trade causes growth in Sub-Saharan Africa," World Bank Policy Research Working Paper, No. (6007), 2012.

[38] K. Menyah, S. Nazlioglu, and Y. Wolde-Rufael, "Financial development, trade openness and economic growth in African countries: New insights from a panel causality approach," *Economic Modelling*, vol. 37, pp. 386-394, 2014. https://doi.org/10.1016/j.econmod.2013.11.044

[39] D. M. Read and K. A. Parton, "Economic deregulation and trade liberalization in Kenya, Tanzania and Uganda: Growth and poverty," *Journal of Economic Issues*, vol. 43, no. 3, pp. 567-586, 2009. https://doi.org/10.2753/JEI0021-3624430301

[40] E. L. Black, "Life-cycle impacts on the incremental value-relevance of earnings and cash flow measures," *Journal of Financial Statement Analysis*, vol. 4, pp. 40-56, 1998.

[41] J. W. Fedderke, J. S. Kayemba, S. Henderson, M. Mariotti, and P. Vaze, "Changing factor market conditions in South Africa: The capital market–a sectoral description of the period 1970–97," *Development Southern Africa*, vol. 18, no. 4, pp. 493-511, 2001. https://doi.org/10.1080/03768350120083914

[42] G. Jonsson and A. Subramanian, "Dynamic gains from trade: Evidence from South Africa," *IMF Staff Papers*, vol. 48, no. 1, pp. 197-224, 2001. https://doi.org/10.2307/4621665

[43] S. Roberts and J. Thoburn, "Adjusting to trade liberalisation: The case of firms in the South African textile sector," *Journal of African Economies*, vol. 12, no. 1, pp. 74-103, 2003. https://doi.org/10.1093/jae/12.1.74

[44] B. O. Tsheko, "A Sam-multiplier analysis of the linkages between trade policy and poverty reduction in Botswana," *Journal of Sustainable Development in Africa*, vol. 7, no. 2, pp. 48-69, 2005. http://dx.doi.org/10.7910/DVN/28526

[45] C. Thurlow and G. Aiello, "National pride, global capital: A social semiotic analysis of transnational visual branding in the airline industry," *Visual Communication*, vol. 6, no. 3, pp. 305-344, 2007. https://doi.org/10.1177/1470357207081002

[46] A. R. Ola, D. Thomy, D. Lai, H. Brötz-Oesterhelt, and P. Proksch, "Inducing secondary metabolite production by the endophytic fungus Fusarium tricinctum through coculture with Bacillus subtilis," *Journal of Natural Products*, vol. 76, no. 11, pp. 2094-2099, 2013. https://doi.org/10.1021/np400589h

[47] A. Edwards, "Relational agency: Learning to be a resourceful practitioner," *International Journal of Educational Research*, vol. 43, no. 3, pp. 168-182, 2005. https://doi.org/10.1016/j.ijer.2006.06.010

[48] K. J. Alam and K. K. Sumon, "Causal relationship between trade openness and economic growth: A panel data analysis of Asian countries," *International Journal of Economics and Financial Issues*, vol. 10, no. 1, pp. 118-126, 2020. https://doi.org/10.32479/ijefi.8657

[49] N. Apergis and J. E. Payne, "Renewable energy consumption and growth in Eurasia," *Energy Economics*, vol. 32, no. 6, pp. 1392-1397, 2010. https://doi.org/10.1016/j.eneco.2010.06.001

[50] P. T. Bhattacharya, S. R. Misra, and M. Hussain, "Nutritional aspects of essential trace elements in oral health and disease: An extensive review," *Scientifica*, vol. 2016, 2016. https://doi.org/10.1155/2016/5464373

[51] M. M. Rahman and E. Velayutham, "Renewable and non-renewable energy consumption-economic growth nexus: New evidence from South Asia," *Renewable Energy*, vol. 147, pp. 399-408, 2020. https://doi.org/10.1016/j.renene.2019.09.007

[52] P. Wang *et al.*, "Increased resistance of SARS-CoV-2 variant P. 1 to antibody neutralization," *Cell Host & Microbe*, vol. 29, no. 5, pp. 747-751, 2021. https://doi.org/10.1016/j.chom.2021.04.007

[53] P. Romer, "Idea gaps and object gaps in economic development," *Journal of Monetary Economics*, vol. 32, no. 3, pp. 543-573, 1993. https://doi.org/10.1016/0304-3932(93)90029-F

[54] R. E. Lucas Jr, "On the mechanics of economic development," *Journal of Monetary Economics*, vol. 22, no. 1, pp. 3-42, 1988. https://doi.org/10.1016/0304-3932(88)90168-7

[55] R. Barro, "Health and economic growth," *World Health Organization*, pp. 1-47, 1996. https://doi.org/10.1192/bjp.169.1.30

[56] A. Epaulard and A. Pommeret, "Recursive utility, endogenous growth, and the welfare cost of volatility," *Review of Economic Dynamics*, vol. 6, no. 3, pp. 672-684, 2003. https://doi.org/10.1016/S1094-2025(03)00016-4

[57] P. Guillaumont and K. Deméocq, "Open policy and economic growth: The effects of growth and export instability," *Development Economics Review Year 1994*, no. 2-1, pp. 91-114, 1989. https://doi.org/10.3406/ecop.2006.7954

[58] P. Guillaumont, "Open policy and economic growth: The effects of growth and export instability," *Journal of Development Economics*, vol. 2, no. 1, pp. 91-114, 1994.

[59] R. M. Solow, "A contribution to the theory of economic growth," *The Quarterly Journal of Economics*, vol. 70, no. 1, pp. 65-94, 1956. https://doi.org/10.2307/1884513

[60] R. M. Solow, "Technical change and the aggregate production function," *The Review of Economics and Statistics*, vol. 39, no. 3, pp. 312-320, 1957. https://doi.org/10.2307/1926047

[61] M. Kim and H. Beladi, "Is free trade deflationary?," *Economics Letters*, vol. 89, no. 3, pp. 343-349, 2005. https://doi.org/10.1016/j.econlet.2005.06.016

[62] T. E. Thomas and E. Lamm, "Legitimacy and organizational sustainability," *Journal of Business Ethics*, vol. 110, pp. 191-203, 2012. https://doi.org/10.1007/s10551-012-1421-4

[63] J. H. Boyd, R. Levine, and B. D. Smith, "The impact of inflation on financial sector performance," *Journal of Monetary Economics*, vol. 47, no. 2, pp. 221-248, 2001. https://doi.org/10.1016/S0304-3932(01)00049-6

[64] J.-J. Rousseau and B. Bernardi, *Discourse on political economy*. Vrin. https://doi.org/10.3917/rfhip.015.0045, 2002.

[65] D. Holtz-Eakin, W. Newey, and H. S. Rosen, "Estimating vector autoregressions with panel data," *Econometrica: Journal of the Econometric Society*, vol. 56, no. 6, pp. 1371-1395, 1988.

[66] M. Arellano and S. Bond, "Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations," *The Review of Economic Studies*, vol. 58, no. 2, pp. 277-297, 1991. https://doi.org/10.2307/2297968

[67] M. Arellano and O. Bover, "Another look at the instrumental variable estimation of error-components models," *Journal of Econometrics*, vol. 68, no. 1, pp. 29-51, 1995. https://doi.org/10.1016/0304-4076(94)01642-D

[68] B. H. Baltagi, "Forecasting with panel data," *Journal of Forecasting*, vol. 27, no. 2, pp. 153-173, 2008. https://doi.org/10.1002/for.1047

[69] A. Aisen and F. J. Veiga, "How does political instability affect economic growth?," *European Journal of Political Economy*, vol. 29, pp. 151-167, 2013. https://doi.org/10.1016/j.ejpoleco.2012.11.001

[70] R. Blundell and S. Bond, "Initial conditions and moment restrictions in dynamic panel data models," *Journal of Econometrics*, vol. 87, no. 1, pp. 115-143, 1998. https://doi.org/10.1016/S0304-4076(98)00009-8

[71] F. Windmeijer, "A finite sample correction for the variance of linear efficient two-step GMM estimators," *Journal of Econometrics*, vol. 126, no. 1, pp. 25-51, 2005. https://doi.org/10.1016/j.jeconom.2004.02.005

[72] D. Roodman, "How to do xtabond2: An introduction to difference and system GMM in Stata," *The Stata Journal*, vol. 9, no. 1, pp. 86-136, 2009. https://doi.org/10.1177/1536867X0900900106

[73] D. Roodman, "The anarchy of numbers: Aid, development, and cross-country empirics," *The World Bank Economic Review*, vol. 21, no. 2, pp. 255-277, 2007. https://doi.org/10.1093/wber/lhm004

[74] K. C. Neanidis and D. Varvarigos, "The allocation of volatile aid and economic growth: Theory and evidence," *European Journal of Political Economy*, vol. 25, no. 4, pp. 447-462, 2009. https://doi.org/10.1016/j.ejpoleco.2009.05.001

[75] B. Levine *et al.*, "Rehabilitation of executive functioning: An experimental–clinical validation of goal management training," *Journal of the International Neuropsychological Society*, vol. 6, no. 3, pp. 299-312, 2000.

[76] F. Caselli, G. Esquivel, and F. Lefort, "Reopening the convergence debate: A new look at cross-country growth empirics," *Journal of Economic Growth*, vol. 1, pp. 363-389, 1996. https://doi.org/10.1007/BF00141044

[77] S. N. Durlauf, P. A. Johnson, and J. R. Temple, "Growth econometrics," *Handbook of Economic Growth*, vol. 1, pp. 555-677, 2005. https://doi.org/10.1016/S1574-0684(05)01008-7

[78] T. Beck, A. Demirgüç-Kunt, and M. S. Martinez Peria, "Bank financing for SMEs around the world: Drivers, obstacles, business models, and lending practices," World Bank Policy Research Working Paper, No. (4785), 2008.

[79] C. M. Jarque and A. K. Bera, "A test for normality of observations and regression residuals," *International Statistical Review*, vol. 55, pp. 163-172, 1987. http://dx.doi.org/10.2307/1403192

[80] B. Born and J. Breitung, "Testing for serial correlation in fixed-effects panel data models," *Econometric Reviews*, vol. 35, no. 7, pp. 1290-1316, 2016. https://doi.org/10.1080/07474938.2014.976524

[81] A. Levin, C.-F. Lin, and C.-S. J. Chu, "Unit root tests in panel data: Asymptotic and finite-sample properties," *Journal of Econometrics*, vol. 108, no. 1, pp. 1-24, 2002. https://doi.org/10.1016/S0304-4076(01)00098-7

[82] K. S. Im, M. H. Pesaran, and Y. Shin, "Testing for unit roots in heterogeneous panels," *Journal of Econometrics*, vol. 115, no. 1, pp. 53-74, 2003. https://doi.org/10.1016/S0304-4076(03)00092-7

[83] J. Breitung, *The local power of some unit root tests for panel data. In Nonstationary panels, panel cointegration, and dynamic panels*. Emerald Group Publishing Limited. https://doi.org/10.1016/S0731-9053(00)15006-6, 2001.

[84] K. Hadri, "Testing for stationarity in heterogeneous panel data," *The Econometrics Journal*, vol. 3, no. 2, pp. 148-161, 2000. https://doi.org/10.1111/1368-423X.00043

[85] M. H. Pesaran, "Estimation and inference in large heterogenous panels with cross section dependence," *Available at SSRN 385123*, 2003. http://dx.doi.org/10.2139/ssrn.385123

[86] M. H. Pesaran, "A simple panel unit root test in the presence of cross-section dependence," *Journal of Applied Econometrics*, vol. 22, no. 2, pp. 265-312, 2007. https://doi.org/10.1002/jae.951

[87] Y. Karavias and E. Tzavalis, "Testing for unit roots in short panels allowing for a structural break," *Computational Statistics & Data Analysis*, vol. 76, pp. 391-407, 2014. https://doi.org/10.1016/j.csda.2012.10.014

[88] F. Ikpesu, O. Vincent, and O. Dakare, "Growth effect of trade and investment in Sub-Saharan Africa countries: Empirical insight from panel corrected standard error (PCSE) technique," *Cogent Economics & Finance*, 2019. https://doi.org/10.1080/23322039.2019.1607127