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Thesis title

Human development and economic performance of Arab countries During the period 1990-2022

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Acknowledgment

First of all, we thank God for His great mercy in enabling me to offer this Looking the best I wanted it to be, I would like to thank The supervisor of this research, Dr.Okba Rimi for his valuable help and advice I thank my family for their help, support and encouragement. To complete this project.

Abstract

The study aims to know the relationship between economic performance and human development through the use of economic measurement tools represented in panel data using the STATA 15 program with the aim of measuring the level of the relationship formed between the variables of the study that was conducted in the Arab countries from the period 1990 until 2022. Through the study, we have reached the following results HDI causes changes in GDP. This means that economic growth plays an important role in promoting human development. Granger improvements in GDP in human development demonstrate the importance of human capital in driving economic performance.

Keywords : Economic performance ,Human development, Panel data , Arab countries

JEL Classification: o47; o15

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List of Acronyms

- **HDI:** human development Index
- **GDP:** gross domestic product.
- **IHDI:** Inequality-adjusted Human Development Index.
- **MPI:**Multidimensional Poverty Index.
- **EPI:** economic performance indicator.
- **EG:** economic growth.
- **MG:** mean group.
- **PMG:** pooled mean group.
- **GCC:** Gulf Cooperation Council.

General introduction

Background and Context: Human development is a social, economic and political process by its nature and human beings are its object and tools, and at the same time, its objective. This process of development allows human beings to renew, create and innovate, it is one of the most important processes because it generates unlimited energy, through education, health, nutrition and the improvement of the standard of living. Human development also considers economic growth to be a necessary condition for achieving high levels of development, but it is not sufficient. Many studies confirm the positive relationship between human development and economic performance, for example, research shows that countries with higher levels of education and health indicators tend to have stronger and more sustainable economic growth (Human Development Reports).

Problem Statement: The problem of the research lies in the emergence of a difference in vision (theoretical and empirical) regarding the causal relationship between economic performance and the human development indicators within the Arab countries during the period 1990-2022.

Hypotheses: The study explores the following hypotheses.

Hypothesis 1: High human development may have a positive impact on economic performance expressed by the economic growth index.

Hypothesis 2: Some studies suggest a relationship between human development and economic performance, where each influences the other,Determining the direction of this influence can be achieved using a causality test.

Objectives and Goals: The research aims to estimate the mutual impact between economic performance expressed by economic growth index and the human development index, based on the cointegration test of panel data.

Methodology: This study uses panel cointegration econometric (mean group (MG) and pooled mean group (PMG)) to evaluate how the relationship between economic performance and the human development indicator in Arab countries . The cross-section of 22 countries, for which annual observations During the period 1990-2022 of two variables were collected (balanced data).

Scope and Deliverables: Define the scope of the project and the deliverables

expected upon completion. Outline what will be included in the report and any additional materials or outputs produced as part of the project.

Structure of the Thesis : The research was divided into four (04) chapters: The first section discussed defining and measuring human development, defining and measuring economic performance, The relationship between the impact of economic growth and human development.

The second section discussed Literature Review Empirical Studies in Arab countries,Empirical studies in other countries.

The third section is discussed Data Description and Sources,Econometric Methodology.

The fourth section discussed Panel Unit Root Testing,Panel Cointegration Testing,Testing for Granger causality ,Discussion of Results,

Chapter 1

human development and economic performance

Introduction

Recent literature has contrasted human development, which is described as the ultimate goal of the development process, and economic performance, which is described as an imperfect proxy for greater general well-being, or as a means toward enhancing human development. This debate has expanded definitions of development and its goals, but it still needs to identify important interrelationships between human development and economic performance. In this chapter, we will present the following elements:

1. Definition of human development
2. Definition of economic performance
3. The relationship between the impact of economic growth and human development.

1.1 Defining and measuring human development

1.1.1 Definition of human development

The concept of human development is an evolving one to previous development concepts, which considered that investing in improving human capabilities to contribute to economic development is no less important than investing in material capital, but disagreeing from these concepts it's what makes individuals focus on the development and

participation, bringing people back into their place. The correct thing in the development process, after several decades has passed, was the focus in which capital accumulation increased production and wealth, and the growth of national income as a measure of economic development, focusing on the benefits of society members from the fruits of economic growth in a more equitable way [2]
Human development is development by the people, of the people and for the people. For it is people, both poor and rich, as individuals and in groups, who create human development. So human development empowers people to be responsible and innovative actors. Because human development views people not as passive victims but as entrepreneurs and active agents, it helps people to help themselves [3]
As the 1990 human development report argued, a basic distinction needs to be made between the means and the ends of development human beings are the real end of all activities, and development must be centered on enhancing their achievements, freedoms, and capabilities. It is the lives they lead that is of intrinsic importance, not the commodities or income that they happen to possess. Income commodities)"basic" or otherwise),and wealth do of course have instrumental importance but they do not constitute a direct measure of the living standard itself. A person income level. [4]

1.1.2 Indicators for measuring human development

1. The human development Index (HDI), The human development index is and remains the flagship of UNDP's human development indices. It is widely known, used by many actors, taught in schools and universities, and seen as the best available alternative to GDP per capital This widespread recognition and long history require care in changing the index and only making changes that seem clearly superior. As a result, I won't question the three components (health, education and living standards) and their equal weights. The three components clearly are important for human development, and equal weights are an easily defendable, if arbitrary, The key features of the HDI changed in 2010 and retained until now were the use of the geometric mean instead of the arithmetic mean to average across subindices, the use of mean years of schooling and expected years of schooling for the education component, and the switch from GDP to gross national income (GNI). Some further changes introduced in 2010 have been taken back, which suggests that some of these changes were not carefully considered. They include variable goalposts that made intertemporal comparisons of the index difficult; the use of the geometric mean to average the two education components,

which was not really justified the removal of caps on the upper goalposts for income and school life expectancy, which generated problems of income outliers and unreasonable education projections distorting the HDI and the use of projections to 'now-cast' the HDI, which led to the need to correct values when real data appears. All of these reforms of the reform seem well taken. Of the 2010 reforms that remained, the switch to the new education indicators (away from literacy and enrolment) was a clear improvement, given the low variability and poor quality of the literacy variable, and the low reliability of enrolment rates as an indicator of educational outputs. Similarly, the switch to GNI was justified and an improvement. If a country does well in one dimension but terribly in another, human development is likely to be worse than in a country where dimensions are more balanced, This leads me to the two main criticisms of the switch to the geometric mean. The first, expressed among others by Amartya Sen, is that the geometric mean is not very intuitive, simple, or transparent, thereby undercutting one of the key advantages of the HDI. This is a serious drawback. The second argument, made particularly forcefully by Ravallion (2010,2011) emphasizes the different marginal rates of substitution between dimensions at different income levels. At one extreme, Ravallion points to Zimbabwe where, in 2010, an increase of income by 51 cents would raise the HDI by the same amount as an additional year of life expectancy, while among the richest countries, an increase of almost 9,000 would be required to achieve the same increase in the HDI as an increase of one year of life expectancy. This dramatic difference is partly related to the geometric mean, which is equivalent toa log transformation of each dimension; the additional log transformation in the income component, which heavily discounts the HDI impact of higher incomes; and, in the case of Zimbabwe, its position in 2010 close to minimum income (which has since been rectified by lowering the minimum income threshold to a more plausible figure Ravallion finds these different trade-offs troubling, suggests that they imply that the value of life is far too low in poor countries, and would lead to the policy conclusion to invest more in the health of rich countries where life is more valuable. While it is the case that the differences in the trade-offs between poor and rich countries are very large, probably excessively so, they do not imply the two conclusions he draws. In a country that is very rich, additional income has hardly any human development impact, while in a poor country, it has a huge impact. So rather than interpreting these figures as 'values attached to human life', one should emphasize that they rather reflect differences in the importance of added income for human development. Secondly, one cannot draw any direct policy conclusions between an allocation of funds between countries, since one knows nothing about the costs of such

improvements. [5]

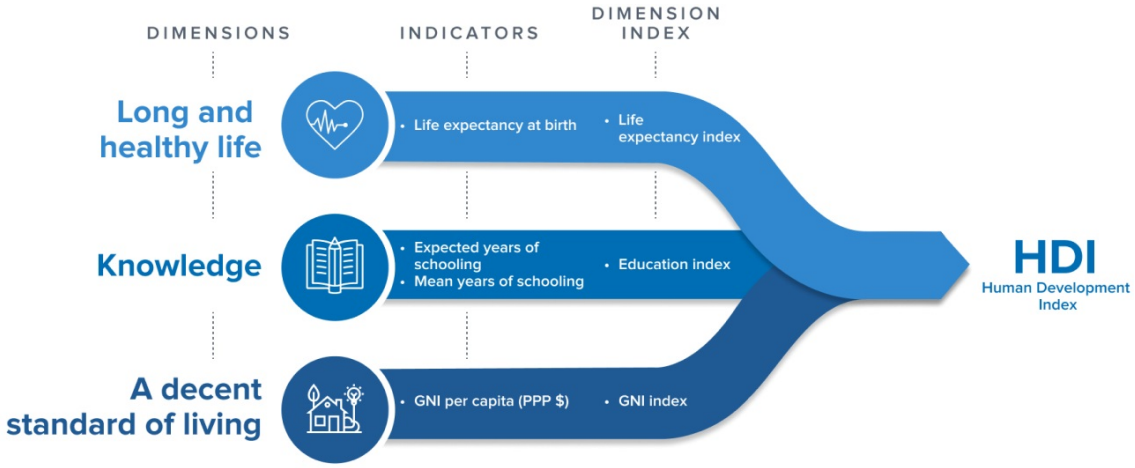

Figure 1.1: HDI Dimensions and Indicators [1].

2. The Inequality-adjusted Human Development Index (IHDI), The Inequality-adjusted Human Development Index, introduced by the Human Development Report Office in 2010, is an excellent addition to the suite of indices. It measures inequality in human development, long a problem of the HDI, which focuses on average performance. The approach is sensible, and data availability is very good. Three points are worth noting, however. First, it appears that not enough is made of the index, its results and what they mean in the Human Development Reports. This is a shame since the IHDI generates useful insights that can make an important contribution to the growing debates on inequality. Such a discussion in the reports could also include experimenting with different inequality aversion values, Second, as pointed out in the technical notes, the IHDI is, due to data limitations, unable to assess the joint distribution of inequality in the three dimensions. One could experiment here with ways to consider that, Third, it is important to clarify what data for inequality in the life expectancy dimension are actually used. In particular, it is measuring the distribution of actual life lengths associated with a particular life expectancy rather than differences in life expectancy for different socioeconomic groups within a country. In a country with low life expectancy, actual life lengths are strongly bimodal with many dying already in the first years of life, while the second mode is after age 50, leading to high inequality in life lengths. In a country with high life

expectancy, actual life lengths are in contrast essentially unimodal with most dying between 60 and 90, leading to low inequality in life lengths. This needs to be explained and interpreted more in the reports. [5]

3. The Multidimensional Poverty Index(MPI). The MPI, introduced in 2010, is also an excellent addition to the suite of indices. What the HDI is to GDP per capita, the MPI is to dollar-a-day measures: a multidimensional, capability-based measure to rival and complement an income-focused indicator. Of course, such a micro-based measure creates a range of challenges in terms of data availability, statistical capacity, status of the data as well as many technical issues that need to be considered Suffice it to say that the changes introduced in 2014 (to change cut-offs and deal with 'ineligible populations') are all sensible. [5]

The Weighted Economic Performance Index (EPI) is calculated using the following formula:

$$\begin{aligned}\text{Weighted EPI} = 100\% &- W_{\text{inf}} \cdot |\text{Inf}(\%) - I^*| - W_{\text{Unem}} \cdot (\text{Unem}(\%) - U^*) \\ &- W_{\text{def}} \cdot \left(\frac{\text{Def}}{\text{GDP}}(\%) - \frac{\text{Def}}{\text{GDP}}^*\right) + W_{\text{GDP}} \cdot (\Delta\text{GDP}(\%) - \Delta\text{GDP}^*)\end{aligned} \tag{1.1.1}$$

1.2 Defining and measuring economic performance

1.2.1 Definition of economic performance

Economic performance can be interpreted in a variety of ways at each level of analysis. At the country level, where much of the debate has occurred, it usually refers to economic growth, labor productivity growth, and consumer welfare . Economic growth is the rate of change in real output, or GDP, and is measured at the country level. Labor productivity growth, or growth in output per worker, is a measure of the efficient use of resources to create value. It "allows the economy to provide lower-cost goods and services relative to the income of domestic consumers, and to compete for customers in international markets" . Corresponding measures focusing on the output of an industry sector are utilized at the industry level. Clearly, labor productivity growth is also an indicator of the economic performance of firms. A firm that is more productive than its competitors will generally enjoy higher profitability, which is of course, also an important measure of economic performance for firms. A more productive firm will either produce the

same output with fewer inputs and thus experience a cost advantage, or produce higher quality output with the same inputs, enabling a price premium. However, as will be discussed later in the review in regard to firm-level research, competition induces other firms to catch up in productivity. Sustaining higher profits through productivity gains requires a firm to maintain productivity levels higher than its competitors. Therefore, over time, profits might be competed away with the result that consumers benefit. This benefit is measured as consumer surplus and refers to the aggregate value realized by consumers from their purchase of a good less the price paid. [6]

1.2.2 Indicators for measuring economic performance

1. Methodology for measuring the economic performance indicator (EPI)

   The Economic Performance Index (EPI) is a macro-indicator that examines the overall performance of a country's economy and reports any deviation from the desired level of economic performance. Similar to the construction of GDP, which measures the overall output of an economy, the EPI reflects the active in the economy's three main sectors: households, firms, and government. The EPI comprises variables that influence all three sectors simultaneously the inflation rate as a measure of the economy's monetary stance. the unemployment rate as a measure of the economy's production stance. the budget deficit as a percentage of total GDP as a measure of the economy's fiscal stance. the change in real GDP as a measure of the aggregate performance of the entire economy. [6]

   An EPI score can be calculated annually, quarterly, or monthly by taking a total score of 100 percent and subtracting the inflation rate, the unemployment rate, the budget deficit as a percentage of GDP, and, finally, adding back the percentage change in real GDP, all weighted and calculated as deviations from their desired values. A grade is then assigned to these scores to further communicate economic performance in a manner easily understood by everyone. This methodology is effective for measuring economic performance for economies at a national, subnational, or multinational level 1- Construction: To begin, for simplicity, we normalize the optimal EPI score to 100

   the desired inflation rate (I*) is 0.0the desired unemployment rate (U*) is 4.75the desired value for government deficit as a share of GDP (Def/GDP*) is 0.0the desired change in GDP (GDP*) is a healthy real growth rate of 4.75we construct the EPI, such that its score:

   falls when the inflation rate deviates from its desired value. falls when the

unemployment rate rises from its desired value. falls when the government deficit rises from its desired value. rises with positive growth in GDP. [6]

2-Weighted EPI Construction: The Weighted EPI formula is:

$$\text{Weighted EPI} = 100\% - W_{\text{inf}} \cdot |\text{Inf}(\%) - I^*| - W_{\text{Unem}} \cdot (\text{Unem}(\%) - U^*) - W_{\text{def}} \cdot \left(\frac{\text{Def}}{\text{GDP}}(\%) - \frac{\text{Def}}{\text{GDP}}^*\right) + W_{\text{GDP}} \cdot (\Delta\text{GDP}(\%) - \Delta\text{GDP}^*) \tag{1.2.1}$$

where Wi is the weight of each component of the indicator, calculated by the formula:

$$W_i = \frac{1}{\text{StD}_i} \cdot \text{StDev}_{\text{Av}} \tag{1.2.2}$$

where StDv is a standard deviation of each variable (inflation, or unemployment, or deficit as a share of GDP, or GDP growth) and StDev Avis the average standard deviation, calculated as:

$$\text{StDev}_{\text{Av}} = \frac{1}{4}\sum_{i=1}^{4} \text{StD}_i \tag{1.2.3}$$

Note that the average of the weights is equal to one. This weighting scheme allows keeping the same unit of measurement, percent, across all four variables. The Weighted EPI assigns smaller weights to more volatile variables and bigger weights to less volatile variables. This approach is similar to the ones used for the Chicago Fed National Activity Index (CFNAI) and the Conference Board Coincident Economic Index (CEI), both of which use variables normalized by their standard deviations and then assign weights to each of them, by applying affine Transformations.

2- Raw EPI Construction : The Raw EPI is a very simple metric that assigns equal weights to each of its subcomponents. We define the Raw EPI formula as the equally weighted deviations of its components from their desired values, such that the Raw EPI is equal to:

$$\text{Raw EPI} = 100\% \text{ - } |\text{Inf}(\%) \text{ - I}^*| - (\text{Unem}(\%) - U^*) - \left(\tfrac{\text{Def}}{\text{GDP}}(\%) - \tfrac{\text{Def}}{\text{GDP}}^*\right) + (\Delta\text{GDP}(\%) - \Delta\text{GDP}^*) \tag{1.2.4}$$

Examining the formula, we discover that the desired unemployment rate and the desired change in GDP cancel each other out, while the desired inflation rate and the desired budget deficit as a percent of GDP have no effect:

$$\text{EPI} = 100\% - |\text{Inf}(\%)| - \text{Unem}(\%) - \frac{\text{Def}}{\text{GDP}}(\%) + \Delta\text{GDP}(\%) \qquad (1.2.5)$$

1.3 The relationship between the impact of economic growth and human development

must adhere to certain rules of usage to ensure clarity, professionalism, and effectiveness in their writing. One fundamental rule is to maintain consistency in language, style, and formatting throughout the report. This includes:

(a) The number of pages of the report, excluding annexes, must not exceed:
   i. Growth and its Impact on Human Development
   ii. Human Development and its Impact on Growth
   iii. The effects of economic growth on government human development

(b) The first major attempt to translate the capabilities approach into a tractable ranking of nations came in the 1990 UNDP human development report .The HDR's objective was to "capture better the complexity of human life" by providing a quantitative approach to combining various socio economic indicators into measure of human development ,This was in contrast to the perceived prevailing wisdom in development economics as embodied in the World Development Reports, Yet the transformation from a normative theory of capabilities into a quantitative variable was by no means an obvious task. The use of life expectancy, literacy, and GDP. Components of a Human Development Index admittedly constitutes a rough proxy and simplification of the original capabilities theory, The impact of economic growth on a nation's human development level, of course, also depends on other conditions of the society. One important component here is the role of the distribution of income, both at a micro level within a household as well as at a macro level across households. 1-The micro level; individual and household consumption can be an important element in increasing human development and may respond more closely to the real needs of the population than do government programs. However, individual consumption may not always go towards goods which contribute maximally to human development.

In societies where women contribute more to family income and have more influence on household decision-making expenditures on human development-oriented goods are likely to be relatively higher. 2-The macro level; the distribution of the increased income from economic growth will also have a strong impact on human development. Since poorer households spend a higher proportion of their income on goods which directly promote better health and education, economic growth whose benefits are directed more towards the poor will have a greater impact on human development, via increased food expenditure as well as on education.

(c) Education and health may also have strong indirect impacts on economic growth through their effect on the distribution of income, and education even more so through its impact on health, As education and health improve and become more broadly based, low income people are better able to seek out economic opportunities , The relationship between what is known as human development and economic development is a two-way relationship, as each of them is reflected negatively and positively on the other, that economic growth takes place through improving human capabilities, and achieving the desired growth reflected in human development as it expands options in front of human resources in particular for individuals in general, Investing in human capital is one of the most important factors that affect economic growth in the national economy or society. The formation of human capital does not depend only on education and training, but also on the amount of health and social services that work on building and maintaining human capital, as health and education are the main factors determining the composition of growth in production and exports

(d) find that most of the effects of economic growth on HD are likely to flow through government budgetary expenditures, central or local. However, the strength of this effect depends entirely on the effectiveness of expenditure targeting and delivery. The government must identify priority sectors such as primary education and health that have the highest potential for HD improvement. Government expenditures for HD should be distributed predominantly to low income groups and areas since it is here that the highest marginal impact will be had. Government must also have the institutional capacity to efficiently allocate these expenditures.[7]

Conclusion

In conclusion, we discussed the definition of human development and economic performance, and explained how to measure them using the Human Development Index (HDI) and the Gross Domestic Product (GDP). Previous studies indicate that there is a relationship between human development and economic performance.

Chapter 2

Literature Review

Introduction

These studies aim to understand the relationship between human development and economic growth and vice versa, with a focus on evidence derived from Arab and non-Arab countries. This section reviews the most prominent results and recommendations of previous research.(table 01)

2.1 Empirical Studies in Arab countries

2.1.1 Badwan,N.(2022)

Titled The Impact of Human Capital Investment on Economic Growth Arab Countries Evidence from 2001 to 2021 The study aimed to measure the impact of investment in human capital on economic growth in a group of Arab countries during the period (2001 to 2021) usin static panel models. We used a set of independent variables to express the investment variable in human capital for Arab countries represented in the enrollment ratio in the primary stage, secondary school enrollment ratio, higher education enrollment ratio, life expectancy rate, and education expenditure. Also, we used per capita GDP as a variable representing economic growth. The study found a set of results, the most important of which is the absence of the impact of the enrollment rate in primary and secondary education on the per capita share of GDP. The study also found the a presence of significant and negative impact of the enrollment rate in higher education on the per capita share of GDP and in addition

to a positive morale effect on spending on employment and education, life expectancy on per capita GDP. [8]

2.1.2 Altyar,AR. Habeeb FJ. Sedeeq MM.(2020)

Titled the Impact of KNOWLEDGE AND HUMAN RESOURCE MANAGEMENT ON THE ECONOMIC GROWTH OF ARAB COUNTRIES: A PANEL GMM AND ROBUST STANDARD ERROR APPROACH The aim associated with this article is to examine the impact of knowledge and human resource management on the economic growth of Arab countries. The knowledge management is one of the aspects of the world economy, which contributes significantly to the advancement of economic development in the world, knowing that the Arab countries are suffering from delays in this area, so the problem of research was the delay of the Arab countries from keeping up with the development in the field of knowledge management. The research sample is represented by the United Arab Emirates, Saudi Arabia, Oman, Qatar and Bahrain. STATA was used to check the hypotheses with the help of the Generalized Method of Movement (GMM), and Robust Standard Error approaches. The results show that knowledge management and human resource management have a significant role in achieving their economic goals. These results are helpful for the policymakers while formulating policies related to knowledge management that enhance the economy of the country. [9]

2.1.3 Al-Shimari,k.Jawad. Jihad,FJ.(2021)

Titled ANALYSING THE RECIPROCAL RELATIONSHIP BETWEEN THE BANKING SECTOR AND THE HUMAN DEVELOPMENT INDEX IN ARAB ECONOMIES This study aims to highlight the concept of the banking sector and human development. We also try to test the reciprocal relationship between the banking sector and human development in a sample of Arab countries (Algeria, Saudi Arabia, Kuwait). The study is scientifically based on the statistical package program (SPSS.V.25). Some statistical tools, such as testing the normal distribution of data, and the simple correlation test (Pearson), were used for the purpose of testing the main hypotheses for Arab countries, the study sample for the period (2010-2018). The results showed a statistically significant correlation between the banking sector and (HDM) Human Development Index in the Arab countries, the sample of the study for

the period 2010 to 2018. There is also an inverse correlation between the Bank nonperforming loans index and the human development index. There is correlation between the two indicators: Domestic credit provided by banking sector, Bank capital to assets ratio, and Human Development Index. The importance of this study lies in assessing the relationship between the banking sector and human development in Algeria, Saudi Arabia and Kuwait, given that the economies of these countries are rich in natural resources, which is reflected in their receipt of large financial resources that can be invested in the banking sector to achieve human development. The study relies on a set of recent literature in analyzing the theoretical side, in addition to linking variables related to the banking sector with the Human Development Index, which generally works to stimulate economic development in the Arab countries, the sample of the study [10]

2.1.4 Ranis,G.(2004)

Titled Human Development and economic growth Recent literature has contrasted Human Development, described as the ultimate goal of the development process, with economic growth, described as an imperfect proxy for more general welfare, or as a means toward enhanced human development. This debate has broadened the definitions and goals of development but still needs to define the important interrelations between human development (HD) and economic growth (EG). To the extent that greater freedom and capabilities improve economic performance, human development will have an important effect on growth. Similarly, to the extent that increased incomes will increase the range of choices and capabilities enjoyed by households and governments, economic growth will enhance human development. This paper analyzes these relationships and the two-way linkages involved. [7]

2.1.5 Omar DA,P.(2020)

Titled Inter-Relationship between Economic Development and Human Development An alytical Study of selected Arab Countries The research aims to study the inter-relationship between economic development and human development indicators for a selected countries (Jordan, Egypt, Kingdom of Saudi Arabia and Bahrain) by using two stage least Square Test. The results of the test showed that there is a causality relation between the economic development and human development. We found

economic development has clear effect on human development indicators in the selected Arab countries. [2]

2.1.6 Boozer,M. Ranis,G.Frances S. Suri,T.(2003)

Titled Paths to Success: The Relationship Between Human Development and Economic Growth This paper explores the two-way relationships between Economic Growth (EG) and Human Development (HD), building on an earlier work by Ranis, Stewart, and Ramirez (2000). Here, we show that HD is not only a product of EG but also an important input to it. The paper develops new empirical strategies to estimate the strength of the two-way chains connecting HD and EG. Building on existing growth literature, we explore the empirical determinants of positive growth trajectories running from HD to EG and find that HD plays an essential role in explaining growth trajectories. Our findings point to the empirical relevance of endogenous growth models in general, and threshold effect models in particular. We also develop a measure of the strength of the EG to HD relationship and explore some ofits empirical determinants. A strong sequencing implication of our findings is that HD must be given priority for the achievement of both higher EG as well as HD. [11]

2.1.7 Ranis,G. STEWART,F. (2000)

Titled Economic Growth and Human Development The connections between economic growth (EG) and human development (HD) form two chains. Cross country regressions show a signi cant relationship in both directions, with public expenditures on health and education, notably female, especially important in the chain from EG to HD; and the investment rate and income distribution signi®cant in the HD to EG chain. This gives rise to virtuous or vicious cycles, with good or bad performance on HD and EG reinforcing each other. Evidence over time has strong sequencing implications: countries initially favoring economic growth lapse into the vicious category, while those with good HD and poor EG sometimes move into the virtuous category. Where choice is necessary human development should be given sequencing priority.[12]

2.2 Empirical studies in other countries

2.2.1 Nainggolan,LE.Lie,D. Tua Siregar,R. and Nainggolan,NT.(2022)

Titled RELATIONSHIP BETWEEN HUMAN DEVELOPMENT INDEX AND ECONOMIC GROWTH IN INDONESIA USING SIMULTANEOUS MODEL This research aims to provide contribution for the success of the development process that can done by local and central governments, which are basically the regulator of economic activity. Full commitment of the government as a facilitating institution in the economy perfectly understands the need for human resources to increase quality of life so that the goal of human development can be successful. This research was performed on problems that occur in various regions of Indonesia, for example, the inequality of economic growth and development of human quality in the western and eastern regions of Indonesia. A more visible phenomenon can also be found in the various regions of Indonesia, which has experienced looped economic growth and human development. This was a quantitative research and the subjects were all provinces in Indonesia. The type of data used were secondary data using panel data from 34 provinces in the 2015-2019 period. Data were collected using observation and documentation techniques, and then the data were analyzed using simultaneous analysis (2SLS) technique. The results indicated that education, public expenditure on education, economic growth and poverty provided a significant effect on the human development index, so total government expenditure and the human development index provided a significant effect on economic growth.[13]

2.2.2 Michael,B.Gustav,G.Frances,S. and Tavneet,S. (2003)

Titled The Relationship Between Human Development and Economic Growth This paper explores the two-way relationships between Economic Growth (EG) and Human Development (HD), building on an earlier work by Ranis, Stewart, and Ramirez . Here, we show that HD is not only a product of EG but also an important input to it. The paper develops new empirical strategies to estimate the strength of the two-way chains connecting HD and EG. Building on existing growth literature, we explore the empirical determinants of positive growth trajectories running from HD to EG and find that HD plays an essential role in

explaining growth trajectories. Our findings point to the empirical relevance of endogenous growth models in general, and threshold effect models in particular. We also develop a measure of the strength of the EG to HD relationship and explore some of its empirical determinants. A strong sequencing implication of our findings is that HD must be given priority for the achievement of both higher EG as well as HD. [11]

2.2.3 Engineer,MH. Roy,N and Fink,S. (2009)

Titled "Healthy" Human Development Indices In the Human Development Index (HDI), life expectancy is the only indicator used in modeling the dimension 'a long and healthy life'. Whereas life expectancy is a direct measure of quantity of life, it is only an indirect measure of healthy years lived. In this paper we attempt to remedy this omission by introducing into the HDI the morbidity indicator, "expected lost healthy years" (LHE), used in the World Health Report Though LHE is only weakly correlated with life expectancy and displays considerable variation across countries, the ranking of nations using the adjusted HDI is very similar to that from the HDI. Nevertheless, there are some outlier countries (including large countries like China and the United States) that experience notable changes in rank. Given the considerable variation in the morbidity data across gender, we also adjust the Gender-related Development Index (GDI) in a similar fashion. The ranking using the adjusted GDI is very similar to that from the GDI, but it has a lower rank correlation with the HDI.[14]

2.2.4 Arceulus,I and G.Srinivasan(1998)

Titled An Assessment of the Measuremet properties of the human development index One of the more important determinants of the competitiveness of a nation is the quality of its human capital. The Human Development Index (HDI) is the most widely used yardstick of human development. It measures human development for all the countries of the world, through the use of three factors – longevity, knowledge and GDP measured in purchasing power. This paper evaluates HDI's contribution towards measuring the quality of the human capital component of a nation's competitiveness. Two primary issues under study are the HDI's information properties vis-a-vis its components and its measurement properties as an index. The primary conclusion of the study is that the HDI carries useful information about a country's current

development, but not about the future level of development. Hence, further refinements in its construction as well as additional theoretical support as a quantitative measure are needed. [15]

2.2.5 Mukherjee,S. and Chakraborty,D.(2010)

Titled Is there any relationship between Economic Growth and Human Development Evidence from Indian States,The paper attempts to analyse the relationship between economic growth and human development for 28 major Indian States during four time periods ranging over last two decades 1983, 1993, 1999-00 and 2004-05. To construct Human Development Index for Indian States, we consider the National Human Development Report 2001 Methodology. The objective of this exercise to understand at what degree and extent the per capita income (as an indicator of economic growth) has influenced the human development across Indian States. To understand the rural – urban disparity in the achievement of human development, the Human Development Index is constructed for rural and urban areas separately for each of the States. The result shows that that per capita income is not translating into human well being. This perhaps in another way might signify the rising influence of other variables in determination of the HD achievements of a state. The result shows the need for further investigation to determine the underlying factors (other than per capital income) which influence HD achievements of a State. [16]

Conclusion

Previous studies showed a positive relationship between human development and economic performance in Arab and non-Arab countries. Some studies, such as Dina Omar, have shown that there is a causal relationship between economic development and human development. Economic development has a clear positive impact on human development indicators in selected Arab countries.

Chapter 3

Data and Econometric Framework

Introduction

This chapter included an analysis of the economic factors that affected human development and economic growth during the period 1990-2022 using statistical tests.

3.1 Data Description and Sources

This empirical study relies on a collective data set collected from various data sources from 1990 to 2022, so we obtained GDP data from the World Bank and HDI from United Nations Development Programme UNDP(2022)

3.1.1 Descriptive Statistics

Table 3.1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP	726	4.204	8.507	-64.047	86.827
HDI	726	0.638	0.147	0.318	0.937

- The GDP growth rate has an average of 4.204 with a standard deviation of 8.507. The range of GDP growth rates is from -64.047

to 86.827. The average GDP growth rate of 0.04204 indicates a moderate level of economic growth in Arab countries over the period. This growth rate is in line with the global average for emerging markets, suggesting that, on average, the economies of these countries have been expanding at a healthy pace. The standard deviation of 0.8507 shows significant variability in GDP growth rates across the Arab countries and over time. This high variability could be attributed to several factors, including:

  - Some countries in the region are highly dependent on oil and gas exports, which can lead to volatile economic performance due to fluctuating global oil prices.
  - Political upheaval and conflicts in some countries have disrupted economic activities and led to sharp declines in GDP.
  - Countries undergoing significant economic reforms may experience varied growth rates as they transition towards more diversified and stable economies.

- The Human Development Index (HDI) has an average of 0.638 with a standard deviation of 0.147. The range of HDI values is from 0.318 to 0.937. The average HDI of 0.638 suggests that, on average, Arab countries fall into the medium human development category. The standard deviation of 0.147 indicates moderate variability in HDI scores among Arab countries. This variability can be attributed to differences in:
  - Countries with higher oil revenues typically have higher HDI scores due to better-funded health and education systems.
  - Countries with stable governments and effective governance structures tend to have higher HDI scores due to consistent investment in social infrastructure.
  - Regions affected by conflict or political instability often show lower HDI scores due to disrupted social services and economic activities.

The mean GDP of 4.204 suggests that, on average, the GDP values in the dataset are positive, indicating economic activity. The mean HDI of 0.638 suggests an average level of human development across the observations, but the range from 0.318 to 0.937 indicates a wide variation in development levels among the countries or regions represented in the dataset.

3.1.2 Human development in Arab countries

Understanding Covid-19's impacts on human development index; The core premise of this Report is that human capabilities and human freedoms are enhanced by accountable and responsive governance, diversified and resilient economies, and cohesive and inclusive societies , Across the Arab States, as in all countries, power dynamics and the interaction between institutions, economies and societies affect human capabilities and can increase or reduce many forms of inequality. Unbalanced power structures give rise to rules, policies and outcomes that favour those with more power. This nexus between power and development underpins citizen–state relations, the processes that form and reform these relations and the trajectory of human development along the spectrum between conflict and peace. As power relations change, so do social contracts, depending on many factors. The perceptions, preferences and priorities of citizens condition their expectations for state actions as does their capacity The human development context in the Arab States region;

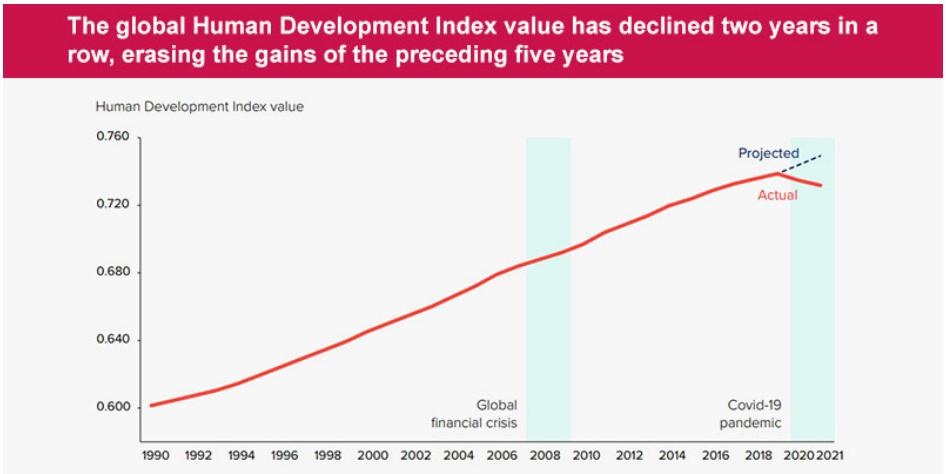

Figure 3.1: Some countries are witnessing a decline in their Human Development Index score [1].

The United Nations Development Programme posits that global human development suffered a steep and unprecedented decline in 2020, equivalent to erasing all the progress in human development over the past six years the largest such setback since it introduced the concept of human development in 1990 When the Covid-19 pandemic reached

the Arab States, the region was already struggling with multiple weaknesses and fragilities. Economic inequality threatened inclusive human development, while spatial inequality created structural impediments to accessing basic services and coping mechanisms during the pandemic. All these factors added to and were exacerbated by the forces of conflict, political instability and unaccountable governance. The pandemic exposed the fault lines of the social contract in Arab States The impact of the Covid-19 pandemic on the dimensions of human development; We discuss the impact of the COVID-19 pandemic on the dimensions of human development (Health, Education ,Income). Health; Before the Covid-19 pandemic, several health indicators were steadily improving in the Arab States region: • The maternal mortality ratio fell from 168 maternal deaths per 100,000 live births in 2000 to 99 in 2017. But the improvement has not been uniform. The maternal mortality ratio was below 15 deaths per 100,000 live births in the Gulf countries in 2017, but above 150 in Djibouti, Somalia, Sudan and Yemen, including a staggering 829 in Somalia. • Child mortality declined from 7 percent in 1990 to 2.5 percent in 2019. The child mortality rate is below 1 percent in Gulf countries and Lebanon but above 5 percent in Djibouti, Sudan and Yemen. • The mortality rate for cardiovascular disease, cancer, diabetes and chronic respiratory disease, similar across countries, has held fairly steady, with a slight reduction from 23.2 percent in 2000 to 21.6 percent in 2015. These numbers reflect that the Arab States region's struggle with high health inequality even before the pandemic. Many countries had weak and fragmented healthcare systems, creating disparities in life expectancy and health outcomes Within countries. By early June 2022, the Covid-19 pandemic had caused about 13 million officially reported infection cases in the region and about 170,000 reported Covid-19 deaths. Regional averages are somewhat lower than world averages, but the rates per million people range from 380 officially reported cases in Yemen to 324,000 in Bahrain (compared with a global average of almost 69,000) and from 69 officially reported deaths per million in Yemen to 2,376 in Tunisia (compared with a global average of 11) Education; Although the Arab States region has made remarkable gains in educational attainment and more equitable access to formal education since 2000, the region was not on track even before the Covid-19 pandemic and was lagging behind the global average in performance and progress;

• More than 16 million children in the region were out of school before the pandemic, including 10 percent of primary school age children and 32 percent of upper secondary school age children.22 • Girls were

more likely than boys to be out of school, especially at higher levels of education. • At the lower secondary school age, 15.7 percent of male adolescents were out of school, compared with 19.9 percent of female adolescents, though gender parity was mostly achieved across the region in primary and secondary enrolment. • The adult literacy rate in the region rose from 65.3 percent in 2000 to 75.1 percent in 2019, while the youth literacy rate rose from 82.1 percent to 86.2 percent. Despite this progress, adult and youth literacy rates lagged behind the world averages of 86.5 percent and 91.7 percent. • Students performed poorly on international assessments of learning outcomes even before the pandemic, and in some Arab States more than half the children did not meet the lowest benchmark. In 2018 the proportion of students achieving at least a minimum proficiency level in reading at the end of lower secondary education was 32 percent in Lebanon, 49 percent in Qatar, 57 percent in United Arab Emirates and 59 percent in Jordan. Additionally, the heavy reliance on remote learning during the pandemic has exposed the stark digital divide in the Arab countries. Income; Income poverty; The Arab States include countries with high poverty levels and countries in which extreme poverty has seemingly been eradicated. Based on national definitions of poverty, about 56 percent of the region's poor people live in fragile and conflict-affected countries, and about 42 percent live in middle-income oil-importing countries. Iraq, Sudan and Yemen are home to about 46 percent of people classified as poor by national poverty lines, Just before the pandemic, in 2019, about 29 percent of people in the Arab States region were estimated to be poor, as defined by national poverty lines. The national poverty rate in Egypt rose from 25.2 percent during 2005-2010 to 32.5 percent during 2011-2017. The national poverty headcount ratio also increased over the period in conflict-affected countries and territories such as State of Palestine and Yemen. However, some countries, such as Iraq, Morocco and Tunisia, reduced poverty over the same period.

3.1.3 economic performance based on the GDP growth index in Arab countries

The Gross Domestic Product (GDP) is a critical indicator of economic health and growth. Analyzing GDP growth over a prolonged period provides insights into the economic development, structural changes, and the effectiveness of economic policies. This analysis focuses on the GDP growth in Arab countries from 1990 to 2022, exploring trends, key

drivers, and challenges faced during this period.

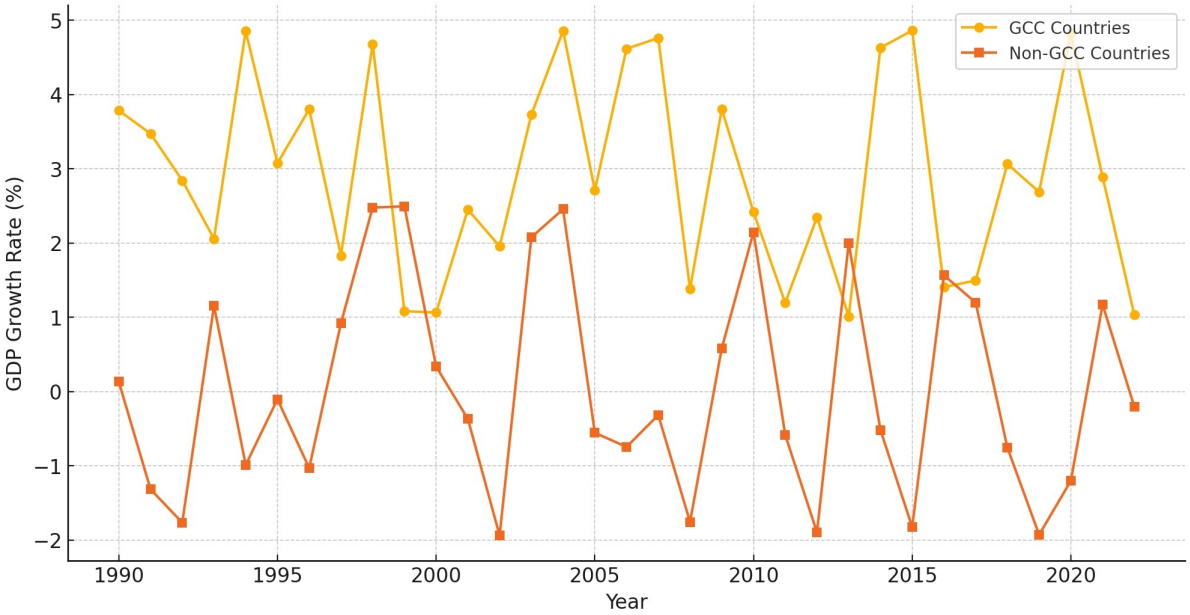

Figure 3.2: GDP Per Capita Growth in Arab Countries, 1990 – 2020[1].

The GDP of Arab countries has shown varied growth patterns with significant fluctuations due to regional conflicts, global economic crises, and oil price volatility.
Oil-exporting countries experienced robust growth during periods of high oil prices, particularly in the early 2000s and mid-2010s.
The oil and gas sector remains a dominant contributor to GDP in many Arab countries, particularly in the Gulf Cooperation Council (GCC) countries.
Non-oil sectors such as services, tourism, and manufacturing have shown gradual growth, especially in countries like the UAE and Morocco.
GCC countries generally exhibit higher GDP growth rates compared to non-GCC countries, attributed to substantial oil revenues and investments in infrastructure.
Conflict-affected countries like Syria, Yemen, and Iraq have experienced negative growth rates and significant economic contractions during periods of instability.

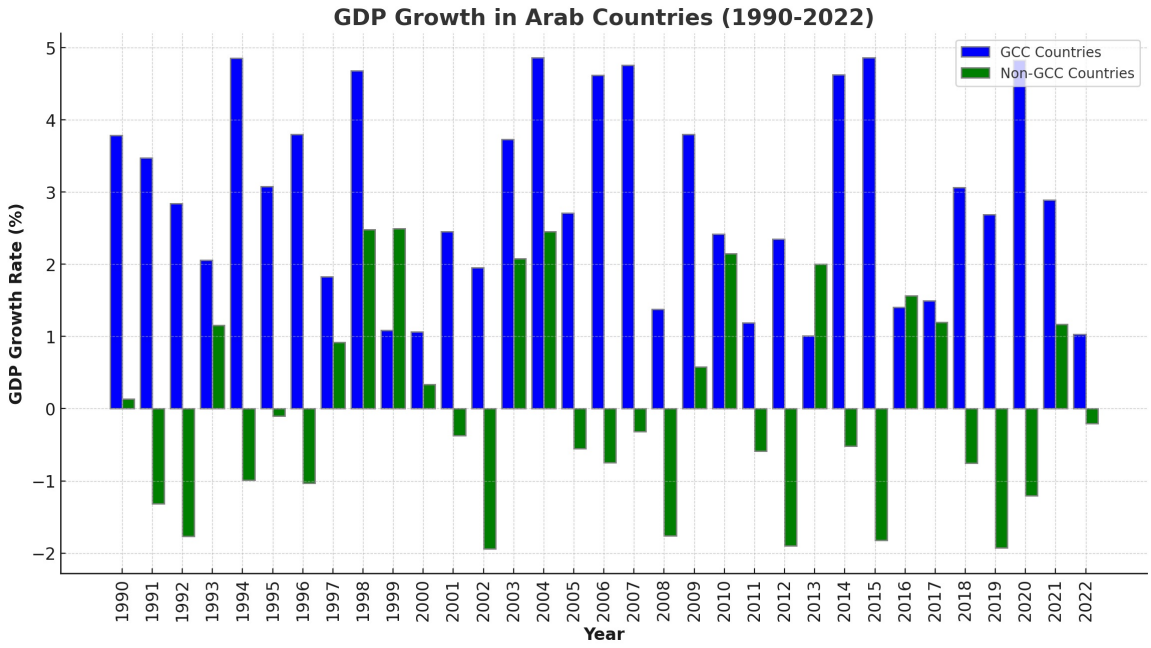

Figure 3.3: GDP Per Capita Growth in Arab Countries, 1990 – 2020[1].

The GDP growth in Arab countries from 1990 to 2022 has been influenced by a complex interplay of factors including oil prices, political stability, and economic reforms. While there have been periods of robust growth, particularly in oil-rich countries, challenges such as political instability, high unemployment, and the need for economic diversification persist. Future growth prospects hinge on the ability of these countries to navigate these challenges and implement sustainable economic policies.

3.2 Econometric Methodology

3.2.1 Definition of panel data

The term panel data refers of the pooling of observation on a cross-section of households, countries, firms, ect. . . over several time periods. The letter are known as micro panel and are collected for are large number of individuals (usually in the hundreds or thousands) over short time period T(varying from a minimum of two years to a maximum rarely exceeding 10 to 20). Macro panel usually involve a number of countries over time, these may have a moderate size N, these are usually observed annually over 20 to 60years .Micro and macro panel require

different econometric care.[17]

3.2.2 Panel Cointegration

- Unit Root Tests:
  - The Levin Lin (LL) Tests: the model incorporates a time trend as well as individual and time specific effects, with the inclusion of lagged first differences as in the ADF test, provided the number of lagged differences increase with sample size. Levin and Lin consider several sub cases of this model. In all cases the limiting distributions are as N →Infinity and T→ Infinity.
  - The Im Pesaran Shin (IPS) Test (1997): is that the IPS test is a way of combining the evidence on the unit root hypothesis from the N unit root tests performed on the N cross-section for individual series, IPS also suggest an LR-bar test based on likelihood ratio statistics, but we shall concentrate our discussion on their t-bar test. The same arguments apply to the LR-bar test
  - Fisher's Test: this test is that it does not require a balanced panel as in the case of the IPS test. Also, one can use different lag lengths in the individual ADF regression [18]
- Cointegration Tests:
  - Residual-based cointegration tests:
    - Kao (1999) test: Kao presents Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) (Dickey - Fuller,) type tests for the null hypothesis of no cointegration in panel data in the special case where cointegration vectors are homogeneous between individuals.
    - Mc Coskey - Kao (1999a) tests: proposed by Mc Coskey - Kao (1999a) is based on an average of the Phillips Zt statistics across the cross-sections.
    - Pedroni (2004) tests: proposes a residual-based test for the null hypothesis of co- integration for dynamic panels with multiple regressors in which the short-run dy namics and the long-run slope coefficients are permitted to be heterogeneous across individuals. The test allows for individual heterogeneous fixed effects and trend terms, while no exogeneity requirements are imposed on the regressors of the cointegrating regressions.

* Westerlund (2005b) tests presents two new simple residual-based tests for the null hy-pothesis of no cointegration which may be regarded as panel generalizations of Breitung's univariate unit root test. Both tests are extremely easy to implement and do not require any correction for the temporal dependencies of the data. Each test is able to accommodate individual specific short-run dynamics, individual specific intercepts and trend terms, and individual specific slope parameters. The limiting distributions of the tests are derived and are shown to be free of nuisance parameters. In order to construct the test statistics

- Likelihood-based cointegration tests:
  * Groen - Kleibergen (2003) test: propose a likelihood-based framework for the panel cointegration analysis of a fixed number of vector error correction (VEC) models .They calculate cointegrating vectors using maximum likelihood by means of iterated generalized method of moments (GMM) estimators.
  * Larsson - Lyhagen (1999) test: Is a LR panel test for the existence of a common cointegrating rank in heterogeneous panel models. This test is based on the average of the individual rank trace statistics developed by Johansen (1995) and is very similar to the IPS- bar statistic [19]

3.2.3 Panel causality

Granger causality actually measures the statistical dependence between the past of one process and the present of another process. In this regard, the word causality in Granger causality takes on the usual meaning that the cause occurs before its effect. However, there is nothing in the definitions that we will mention that prevents that signal x can simultaneously be a cause of y and be a cause of y! This lies in the close connection between Granger causality and feedback between time series. Granger causality is based on the usual concept of conditioning in prospect theory, while the approaches that have been developed have relied on the causal calculus and the concept of intervention. In this sense, the intervention is closer to experimental science, where we imagine that we can actually, p It is now known that causality in the sense between random variables can only be unambiguously inferred in limited cases, such as directed acyclic graph models. In the context of Granger causality, there is no such ambiguity and restriction.[20]

Conclusion

The results that used cointegration and causality tests showed that there is a strong relationship between human development and economic performance in Arab countries. It shows a long-term balanced relationship between the human development index and economic growth rates, which emphasizes integration to achieve comprehensive development in Arab countries.

Chapter 4

Empirical Results and Discussion

Introduction

Since we are dealing basically with macroeconomic variables that spans over a relatively long period 1990-2022, and hence are often found to be nonstationary, we first take panel unit root tests to evaluate their order of integration. Next, we apply panel cointegration tests to ascertain whether there are long-run relationships amongst the variables of interest. In the final step, we estimate the long-run and short-run relationships using the relevant and efficient techniques.

4.1 Panel Unit Root Testing

To study the stability of study variables, we relied on test results Fisher test, IPS test and LLC test. This table presents the results of panel unit root tests applied to the Gross Domestic Product (GDP).
The table shows the following results:

- Fisher Test
  According to Fisher's test: In the case of a constant and trend the test value is 447.8929, in the case of a constant the test value is 480.4665, P value in both cases the results show that the P value is 0, indicating rejection of the null hypothesis at the 0.01, 0.05 and 0.1 significance levels, i.e. the GDP is stationary.
- IPS (Im, Pesaran and Shin Test)

Table 4.1: Panel Unit Root Tests Results for GDP

	Fisher		***IPS***		***LLC***		
	With constant and trend	*With constant*	*With constant and trend*	*With constant*	*With constant and trend*	*With constant*	*With out constant and trend*
At Level							
GDP	447.8929	480.4665	-12.6583	-11.5326	-6.8364	-7.7116	-6.2194
Pvaleur	0 ***	0 ***	0 ***	0 ***	0 ***	0 ***	0 ***
*Notes: *, ** and *** represent significance at the 10%, 5% and 1% levels respectively*							

In the case of a constant and trend the test value is -12.6583, in the case of a constant the test value is -11.5326, P value in both cases the results show that the P value is 0, indicating rejection of the null hypothesis at the 0.01, 0.05 and 0.1 significance levels, i.e. the GDP is stationary.

- LLC (Levin, Lin Chu Test)
  In the case of a constant and trend the test value is -6.8364, in the case of a constant the test value is -7.7116, in the case of Without constant and trend the test value is -6.2194, P value in all cases the results show that the P value is 0, indicating rejection of the null hypothesis at the 0.01, 0.05 and 0.1 significance levels, i.e. the GDP is stationary.

The table shows the following results:

- At Level
  - Fisher Test
    According to Fisher's test: In the case of a constant and trend the test value is 26.5125 with P value is 0.9829, indicating to accept of the null hypothesis at the 0.01, 0.05 and 0.1 significance levels, i.e. the HDI is nonstationary. But in the case of a constant the test value is 64.3748 with P value is 0.0242 indicating rejection of the null hypothesis at the 0.01, 0.05 and 0.1 significance levels, i.e. the HDI is stationary.
  - LLC (Levin, Lin Chu Test)
    In the case of a constant and trend the test value is -0.6210 with P value is 0.2673, in the case of a constant the test value is -2.5283 with P value is 0.0057, in the case of Without constant and

Table 4.2: Panel Unit Root Tests Results for HDI

	Fisher		***IPS***		***LLC***		
	With constant and trend	*With constant*	*With constant and trend*	*With constant*	*With constant and trend*	*With constant*	*With out constant and trend*
At Level							
HDI	26.5125	64.3748			-0.621	-2.5283	8.8708
Pvaleur	0.9829	0.0242 **			0.2673	0.0057 ***	1.00
At First difference							
HDI	335.4015	384.3071			-5.2589	-6.4439	-6.9725
Pvaleur	0.0000 ***	0.0000 ***			0.0000 ***	0.0000 ***	0.0000 ***
*Notes: *, ** and *** represent significance at the 10%, 5% and 1% levels respectively*							

trend the test value is 8.8708 with is 1.00, indicating rejection of the null hypothesis at the 0.01, 0.05 and 0.1 significance levels, i.e. the HDI is stationary in case constant and trend and case without constant and trend but case with constant i.e. the HDI is nonstationary.

- At First difference
  - Fisher Test
    According to Fisher's test: In the case of a constant and trend the test value is 335.4015, in the case of a constant the test value is 384.3071, P value in both cases the results show that the P value is 0, indicating rejection of the null hypothesis at the 0.01, 0.05 and 0.1 significance levels, i.e. the GDP is stationary.
  - LLC (Levin, Lin Chu Test)
    In the case of a constant and trend the test value is -5.2589, in the case of a constant the test value is -6.4439, in the case of Without constant and trend the test value is -6.9725, P value in all cases the results show that the P value is 0, indicating rejection of the null hypothesis at the 0.01, 0.05 and 0.1 significance levels, i.e. the GDP is stationary.

4.2 Panel Cointegration Testing

This table presents the results of panel cointegration estimation for GDP using two methods: Mean Group (MG) and Pooled Mean Group (PMG).

4.2.1 Mean Group (MG)

Table 4.3: Mean Group Estimation: Error Correction Form

	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]
hdi					
L1.	-21.84597	12.27473	-1.78	0.075	[-45.904, 2.212063]
SR					
ec	-0.8810034	0.064224	13.72	0.000	[-1.00688, -0.7551266]
hdi					
D1.	420.5104	103.9972	4.04	0.000	[216.6795, 624.3412]
_cons	9.087285	5.521509	1.65	0.100	[-1.734673, 19.90924]

The Mean Group Estimation results are presented in the context of an Error Correction Model (ECM), which is used to assess the short-term dynamics and long-term relationships between variables.

The error correction term (L1) has a coefficient of -21.84597. This value is significant at the 0.1 level (p-value = 0.075), suggesting that the long-term equilibrium relationship between GDP and HDI is adjusting. Specifically, about 0.2185 of the deviation from the equilibrium is corrected each period, indicating that the adjustment speed to the long-term equilibrium is relatively moderate.

The short-run coefficient for the error correction term is -0.881, highly significant with a p-value of 0.000. This indicates a strong short-term adjustment mechanism. Approximately 0.881 of the disequilibrium from the previous period is corrected in the current period.

4.2.2 Pooled Mean Group (PMG)

This table presents results of a Pooled Mean Group (PMG) regression model, we have results for both long-term and short-term dynamics along with the error correction term:

The error correction term is highly significant (p-value < 0.001), indicating a strong adjustment mechanism to correct any disequilibrium.

Table 4.4: Pooled Mean Group Regression Results

	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]
hdi					
L1.	-4.880477	2.27845	-2.14	0.032	[-9.346158, -0.4147974]
SR					
ec	-0.8278823	0.0706178	-11.72	0.000	[-0.9662906, -0.689474]
hdi					
D1.	407.4994	101.6627	4.01	0.000	[208.244, 606.7547]
_cons	4.055575	0.4065039	9.98	0.000	[3.258842, 4.852308]

The negative coefficient suggests that deviations from the long-term equilibrium are corrected by approximately 0.828 in the next period.

The coefficient of HDI in the long-term relationship is negative and statistically significant at the 0.05 level (p-value = 0.032). This indicates that in the long term, an increase in HDI is associated with a decrease in GDP. Specifically, a unit increase in HDI leads to a decrease of approximately 4.88 units in GDP.

The short-term coefficient for HDI is positive and highly significant (p-value < 0.001). This suggests that in the short term, changes in HDI have a substantial and significant positive impact on GDP. Specifically, a unit change in HDI leads to an increase of approximately 407.5 units in GDP.

4.2.3 Hausman Test: MG vs PMG

Table 4.5: Hausman Test Results

	(b) mg	**(B)** pmg	**(b-B) Difference**	**S.E.**
hdi L1.	-21.84597	-4.880477	-16.96549	12.6976
Test:	Ho: Difference in coefficients not systematic			
	chi2(1) = 1.79			
	Prob>chi2 = 0.1815			

The Hausman test follows the Chi-square statistic (Chi2) and its value is 1.79. The p-value (Prob > Chi2) is 0.1815. Since the p-value is greater than the joint significance levels (0.05, 0.01), we fail to reject the null hypothesis. This indicates that the difference in coefficients between the MG and PMG estimators is not systematic, suggesting that the PMG estimator is more efficient and preferable for this analysis.

4.3 Testing for Granger causality

Table 4.6: Granger Causality Test Results

Test	Chi-Square	df	Prob > Chi-Square
GDP does not Granger-cause HDI	15.34	2	0.0004
HDI does not Granger-cause GDP	8.22	2	0.0164

For the first test (whether GDP Granger-causes HDI), the chi-square statistic is 15.34 with a p-value of 0.0004. Since the p-value is less than 0.05, you reject the null hypothesis and conclude that GDP Granger-causes HDI.
For the second test (whether HDI Granger-causes GDP), the chi-square statistic is 8.22 with a p-value of 0.0164. Again, since the p-value is less than 0.05, you reject the null hypothesis and conclude that HDI Granger-causes GDP.

4.4 Discussion of Results

4.4.1 Panel unit root test result

The results in (Table 4.1) indicate that the p-values for all tests are zero, rejecting the null hypothesis of a unit root. This implies that the GDP series is stationary in the panel data, both with constant and with constant and trend, Therefore the GDP is integrated of degree zero I(0). GDP stationary I(0) indicates that GDP levels return to the long-run average over time. Economic shocks to GDP are temporary and have no permanent effects. Policymakers can use this information to design stabilization policies.
The results in (Table 4.2) indicate HDI being non-stationary at levels but stationary at first differences, implying it is integrated of order one (I(1)). HDI stationary at first differences implies that changes in HDI are more predictable than levels. Long-term policies aimed at improving human development should focus on sustained improvements rather than short-term fluctuations.

4.4.2 Panel Cointegration Estimation Results

The Hausman test results indicate that the difference between the MG and PMG coefficients is not systematic (p-value = 0.1815). Thus, the

PMG estimator is preferred for its efficiency.
The Pooled Mean Group (PMG) estimator provides estimates for both long-run and short-run relationships between variables in panel data. The results from (Table 4.3) indicate:

- The convergence coefficient (also known as the error correction term) indicates how quickly the system returns to equilibrium after a shock. A negative and significant coefficient (p-value = 0) confirms the presence of a long-run relationship and shows that deviations from the long-run equilibrium are corrected over time. The value -0.8278823 implies a high speed of adjustment towards equilibrium.
- This coefficient measures the long-run impact of HDI on GDP. A coefficient of -4.880477 (p-value = 0.032) suggests a statistically significant negative relationship in the long run. For every unit increase in HDI, GDP decreases by 4.880477 units in the long run, holding other factors constant.
- The short-run coefficient indicates the immediate effect of changes in HDI on GDP. A coefficient of 407.4994 (p-value = 0) shows a positive and significant impact of changes in HDI on GDP in the short run. This suggests that a unit increase in the change of HDI results in a 407.4994 unit increase in GDP.

Conclusion

At the end of the chapter, some results were reached by testing MG and PMG. This indicates that the difference in coefficients between MG and PMG estimators is not systematic, which suggests that the PMG estimator is more effective and preferable.

Conclusion

In conclusion, In this study, we analyze the relationship between gross domestic product (GDP) and the Human Development Index (HDI) using panel data from Arab countries (22 countries) over several years 1990-2022. Our analysis included descriptive statistics, Granger causality tests to determine the direction and strength of the causal relationship between these two indicators, and a cointegration test to test a long-run relationship two important economic indicators:

i. **Results**:

- The mean GDP of 4.204 suggests that, on average, the GDP values in the dataset are positive, indicating economic activity. The mean HDI of 0.638 suggests an average level of human development across the observations, but the range from 0.318 to 0.937 indicates a wide variation in development levels among the countries or regions represented in the dataset.
- The finding that GDP Granger-causes HDI suggests that changes in GDP precede and predict changes in HDI. This implies that economic growth plays a significant role in enhancing human development. The finding that HDI Granger-causes GDP suggests that improvements in human development precede and predict economic growth. This highlights the importance of human capital in driving economic performance.
- The positive and significant short-run coefficient indicates that changes in HDI have a strong positive impact on GDP in the short term. This suggests that improvements in human development, such as better education and health outcomes, can lead to immediate economic benefits. Policymakers should focus on short-term interventions that improve HDI to stimulate economic growth quickly.
- Panel Cointegration Estimation Results for GDP indicates The

negative long-run coefficient suggests that higher levels of human development (HDI) are associated with lower GDP in the long run. This counterintuitive result could be due to various factors, such as the potential trade-off between social spending (which improves HDI) and economic growth, or structural issues in the economy where increases in HDI do not translate directly into economic productivity. Policymakers need to explore these dynamics to ensure that human development improvements also support sustainable economic growth.

ii. **Recommendations:**

- To achieve more stable and sustainable growth, Arab countries need to focus on diversification, political stability, effective reforms, and regional cooperation.
- To improve HDI scores and ensure sustainable development, Arab countries need to invest in human capital, address inequality, enhance political stability, resolve conflicts, and diversify their economies. Regional cooperation can further support these efforts, leading to more balanced and inclusive development across the Arab world.
- This bidirectional relationship between GDP and HDI highlights the importance of a holistic development approach that integrates economic and social policies. By focusing on sustainable economic growth and investing in human capital, Arab countries can achieve higher levels of prosperity and well-being for their populations.
- The PMG results provide valuable insights into the relationship between GDP and HDI in Arab countries. The significant convergence coefficient indicates a robust long-term equilibrium, while the long-run negative relationship between HDI and GDP suggests the need for careful consideration of social spending and economic growth policies. In the short run, improvements in HDI can lead to immediate economic gains, highlighting the importance of policies that enhance human development to drive short-term economic growth.

iii. **For future prospects** In existing studies, we were not able to calculate the economic performance index comprehensively due to the limited information and data available. Therefore, we hope that in future studies, more accurate and comprehensive data on economic performance indicators in Arab countries will be collected. This will help conduct more detailed and accurate analyses, and

contribute to a better understanding of the relationship between human development and economic growth. Structural equation models can also be used to examine the relationship between economic performance and human development variables.

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