From Potential to Growth: Human Capital, Population Growth, and Economic Development in Emerging Nation's

A Dissertation for

Course Code and Course Title: ECO-651 Dissertation

Credits: 16

Submitted in partial fulfillment of Master of Arts in Economics

by

SAPNA PASSI

22P0100038

919744988365

201901333

Under the Supervision of

MS. SUMITA DATTA

Goa Business School

Economics

GOA UNIVERSITY

Date: April 2024

Examined by:

Seal of the School

DECLARATION BY STUDENT

I hereby declare that the data presented in this Dissertation report entitled, "From Potential to Growth: Human Capital, Population Growth and Economic Development in Emerging Nations" is based on the results of the investigation carried out by me in the Economics Discipline at the Goa Business School, Goa University under the Supervision of Ms. Sumita Datta and the same has not been done submitted elsewhere for the award of a degree or diploma by me. Further, I understand that Goa University or its authorities will not be responsible for the correctness of observations / experimental or other findings given the dissertation.

I hereby authorize the University authorities to upload this dissertation to the dissertation repository or anywhere else as the UGC regulations demand and make it available to anyone as needed.

Passi

Sapna Passi

Seat no: 22P0100038

Date: 6th May 2024

Place: Goa University

COMPLETION CERTIFICATE

This is to certify that the dissertation report "From Potential to Growth: Human Capital, Population Growth and Economic Development in Emerging Nations" is a bonafide work carried out by Ms. Sapna Passi under my supervision in partial fulfillment of the requirement for the award of the degree of Master of Arts in Economics at the Goa Business School, Goa University.

Sumita Datta 6/5/24

Ms. Sumita Datta

Signature and Name of the Supervising Teacher

Date: 06/05/2024

Signature of Dean of School/HoD of Dept

Date: 11/5/2024

Place: Goa University

Goa Business School ★ Goa University ★

School/Dept Stamp

ACKNOWLEDGEMENT

I would like to convey my heartfelt appreciation to my supervisor, Ms. Sumita Datta, for her continuous support, advice, and invaluable comments throughout this research. The experience, patience, and encouragement have helped shape this dissertation.

I also want to thank the World Bank for supplying important information and data that went into this dissertation research. The analysis provided here has benefited immensely from the insights gained from their research and databases.

My heartfelt gratitude goes to my family and friends for their unfailing support, understanding, and encouragement along this journey. Finally, I want to express sincere appreciation to all of the participants who kindly offered their time and insights into this study.

PREFACE

The idea for this thesis came from a deep interest in the complex relationships that emerge between population growth, human capital, and economic development in developing countries. Comprehending the crucial function of human capital becomes even more necessary as economies and society develop. The dynamics of population expansion and how they affect economic development offer a complex field ready for investigation.

The present paper undertakes a thorough investigation to examine the complex interrelationships among the development of human capital, changes in the population, and the economic development trajectory of emerging nations. Based on extensive empirical investigation and theoretical frameworks, it aims to explain the complex processes by which these variables intersect and influence the development setting.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS USED

Entity	Abbreviation
Gross Domestic Product	GDP
Gross National Product	GNP
Organization of Economic Cooperation and Development	OECD
Human Development Index	HDI
World Development Indicators	WDI
Ordinary Least Squares	OLS

ABSTRACT

This study began with the aim of analyzing the impact of human capital and population growth on the overall economic development of emerging nations in Asia. Quantitative data was collected from the World Bank database which contributed immensely to this study. Further, using the panel data from 2011 to 2020 with 10 nations of Asia this study moved forward. For the selection of the best model for the required objectives, various tests were conducted wherein the Random effect model was found to be the most useful one in presenting the results. The analyses were found to be very much bound with the study objectives which fulfilled the requirement of the study stating that overall human capital indicators and population growth were significantly having an impact on the economic development of the selected nations.

CHAPTER 1: INTRODUCTION

The demographic dividend is a vital concept that is looked upon by any economy for its growth. The growth potential might arise from changes in a country's population's age distribution, which is referred to as a demographic dividend. This occurs when the working-age population of the country (15-64 years) is much higher than that of the non-working-age population (14 and younger – 65 and above). If the policies are implemented significantly and strategic investments are made in fields such as investment in human capital, especially among the youth then there is an enormous potential for benefits to the economy (*Demographic Dividend*, 2014).

In any country or nation with a rise in youth population, the dependence ratio – the ratio of the non-working population to that of the working-age population - would reduce. Assuming that if the working-age population is fully utilized in productive activities all other things being constant as the result the average income per capita would rise tremendously. It is the demographic benefit to that country and its economy. Although it can have a negative outcome if a substantial percentage of the young working generation is unable to get themselves employed and earn the required income, this youth will then become a demographic bomb, because the frustrated youth is more likely to become the source of social and political instability to the economy. Therefore the fundamental requirement for the country's success is turning the young youth into a demographic dividend through an increase in the employment rate (*Youth Bulge*, 2012).

It is mentioned that in the long term welfare declines but in the short term welfare rises due to demographic dividends from a slowing population growth rate. There is a higher or lower optimal degree of education and technological change associated with each higher or lower growth rate of

the dependency ratio (Ziesemer & Von Gässle*r, 2021)*. According to a recent study, one of the main factors influencing a country's ability to expand economically is its population (Sarker et al., 2016).

India a country of diverse cultures is one of the developing nations in the Asian continent with a population above 1.4 billion. It is also considered to be the largest democracy in the world. The nation's economic growth has been associated with its indulgence in the global economy over the past ten years. India as a nation has emerged as a major player in the world market (*India : Development News, Research, Data | World Bank*, n.d.).

The age composition of India's population has evolved due to its declining fertility rates, causing a bulge in the working-age population. The most recent data for employment rate shows that the rate at which the working-age population is absorbed in the labor market is not as high as one would anticipate. There could be several reasons for low employability which is greatly impacted by the inadequate levels of health and educational attainments which is nothing but part of human capital (*The "Demographic Dividend" and Young India's Economic Future : | Economic and Political Weekly*, n.d.).

In developing nations, the need to employ people in the agricultural sector to produce the essential food for sustenance pushes children to work. Where regrettably health conditions have not reached the basic level, due to the realistic fact that current children have so little opportunity to break free from this cycle of poverty and improve both their health and financial condition. This outcome does lead to a decrease in wages and a rise in poverty. In particular, it will negatively affect health and the level of educational attainment (Bhargava et al., 2001).

A wide definition of human capital is the accumulation of information, abilities, knowledge, and other qualities that an individual possesses which helps them to be productive. Many countries are advised to maintain and modify their education and training system which is commonly referred to as the investment in human capital by economists. Also adding up to this it states that investing in human capital is an essential contribution that needs to be done by the nations for their economic growth and development through formal education (early school education, formal school system, adult training programs, and so on), as well as informal and on-the-job training and work experience (*Productivity, Human Capital and Educational Policies - OECD*, n.d.).

According to the human capital theory, people can become more productive and efficient by emphasizing education and training. The study of human resources is known to be human capital. It looks into how societal dynamics shape the creation of economic value. The fundamental theory of human capital works like this i.e. firstly invest in the company's tangible assets such as technology and machinery as a result of this it can produce stocks or products and make money through it; similarly, there is ought to make the same kind of investment in human capital and that is through education and training.

By investing in human capital, the country can track its progress which is based on the competencies, morals, and overall skill set of the employee, this will further boost income, awareness about the brand, and business productivity over a while. Adam Smith, a Scottish economist from the eighteenth century, wrote the first book on human capital. However, Greg Becker, an American economist, is perhaps most known for being the main proponent of the human capital hypothesis or theory. He stated the concept of investing in people through his work in the economic sciences (*Human Capital - an Overview | ScienceDirect Topics*, n.d.).

People's contributions to the economy through their human capital are a significant factor that greatly aids in developing the country. Education and health are the two main pillars of human capital, and both are thought to contribute positively to economic development and growth (Colantonio et al., 2010).

The focus must be placed on education, which is seen as a fundamental and necessary aspect of life since it increases per capita income. Health is another important component of human capital, as it influences economic performance at the macro and micro levels. The most important factor is that productivity can only be achieved in a healthy population. The industries that produce the most human capital collectively are healthcare and education (Barro, n.d.).

GDP growth alone is not the only criterion of economic growth; economic development encompasses even more. The idea is complex and encompasses several welfare metrics like life expectancy at birth, infant mortality, and educational attainment rates in addition to social and economic advancement.

The crucial part is investment in human capital which is expected to boost individual productivity and spur further economic growth (Adeli Nik et al., 2013). When the population and economic development of a society are correctly addressed, the standard of life and economic growth of that society can improve quickly. Xu's 1984 study (as cited in Kumari, 2022) stated that "Man is a producer as well as a consumer, and to balance the rate of production and the rate of consumption, a certain population level must be maintained". It is not stated anywhere that a country's inability to progress economically is due to overpopulation; rather, it is a result of ineffective management and policies (*The Advantages of Overpopulation | Synonym*, n.d.).

There are several ways in which population expansion influences economic development. A greater population means higher levels of output. The population has direct contributions to national capital which is made by labor productivity, which is the highest. Through this, both buyers and producers are increased by a large proportion. Products get cheaper as the number of purchasers increases in the market. The services offered will also be less expensive than just the goods. In simple words, there won't be as high of a rate, and resources will be available more quickly, which will lead to faster sales which will eventually boost the economy (Kumari, 2022).

A country must emphasize its expanding population. The issue doesn't end here; in this cutthroat society, population management is necessary. Prioritizing essential components of human capital, such as education, healthcare, training, and other aspects that contribute to the country's economic growth, is crucial. Most importantly, developing countries must deal with the problem of population rise, and as a result, proper management of these countries will eventually result in the prosperity of their economies.

1.1. BACKGROUND

As many of the world's countries struggle with high population densities, therefore addressing the issue of population growth is crucial. Human capital is the main focus since it has the potential to alleviate overpopulation if given high priority. These factors are the main emphasis of the study "From Potential to Growth: Human Capital, Population Growth, and Economic Development in Emerging Nations," which incorporates the aforementioned variables to examine the effects on the economy across different nations.

Considering the idea of human capital and population increase, numerous ideas and studies have been conducted in this field. The concept of division of labor was first proposed by classical economist Adam Smith in his work "Wealth of Nations." Smith also noted that worker skills are a critical source for economic growth that population growth drives growth in output and that each individual becomes more efficient in their roles (Vaggi & Groenewegen, 2005, p. 108). Thomas Robert Malthus, another renowned economist from the classical schools, is credited with developing the well-known Malthus theory of population. In his view, the population is growing far more quickly than the available resources, causing an imbalance in the economy and positive and preventive controls would address this issue (Vaggi & Groenewegen, 2005, p. 129).

Several notable individuals, including Gary Becker, Adam Smith, Alfred Marshall, Frank Knight, T.W. Schulz, and Edward Denison, contributed to the theory of human capital when it was first proposed in 1964. From their prominent positions, the economy places greater importance on human capital, which is why education, training, and skill development are necessary. To achieve the maximum rate of economic growth, it is also crucial to invest in these areas (Becker, 1965).

The current study examines the analysis of the effects of population expansion and human capital on the economic development of emerging nations. Although the majority of research in this field has taken place in wealthy nations, there have been a few research studies conducted in developing nations.

Therefore, by focusing on the ten densely populated developing Asian countries—India, China, Indonesia, Vietnam, Thailand, Malaysia, Nepal, Sri Lanka, and Cambodia—this study aims to close this gap (*Asia Population 2024*, n.d.). Furthermore, this research will contribute to the body of existing knowledge and can raise new questions that require further investigation.

1.2. OBJECTIVES

This study undertakes a parallel inquiry to understand better the complex dynamics impacting economic development in emerging nations, emphasizing population growth and human capital. The hypotheses of this study are as follows:

- **To study the impact of human capital on economic development in developing countries.**

According to the first hypothesis, emerging countries benefit greatly from large expenditures in human capital, which includes skill development, education, and health. This is predicated by the idea that a workforce with education and skill promotes creativity, productivity, and flexibility which in turn serves as an accelerator for long-term steady economic growth.

- **To analyze the effect of population growth on economic development in developing countries.**

On the other hand, the second hypothesis posits that in developing nations, economic development may face different pressure levels due to uncontrolled population growth. The hypothesis acknowledges the potentially dual nature of population growth, noting that while a demographic dividend can boost economic productivity, unrestrained and rapid growth may strain resources, making it more difficult for economies to offer enough chances for employment, healthcare, and education.

Examining these hypotheses, the study aims to provide significant insights that might guide based on data strategies and measures for promoting sustainable economic growth in various developing countries.

1.3. SCOPE OF THE STUDY

The main objective of this research is to investigate the relationship between population growth and human capital, and how this impacts on economic development of developing countries, specifically focusing on Asia. Understanding the effects of population growth and human capital indicators on the world's expanding economies will be aided by this research. This study would help to identify which indicators are most crucial for a nation's overall growth and development and which developing nations should focus on more than others.

1.4. RESEARCH QUESTIONS

The human capital and population growth in emerging nations remain the exclusive focus of this study, so the subsequent research questions are formulated in that regard. The questions framed for this research study are as follows:

- How do the indicators of human capital relate to the economy's advancement?
- What effect has human capital had on developing nations?
- How has an explosion in population affected the economic development of a country?
- What relationship exists between the factors of economic development and population growth?

1.5. HYPOTHESIS

This study outlined two hypotheses for this investigation, and as a result, the following two hypotheses are being formulated for each objective:

(To study the impact of human capital on economic development in developing countries.)

- Null Hypothesis: there is no impact of Human Capital on Economic Development.
- Alternate Hypothesis: there is an impact of Human Capital on Economic Development.

(To analyze the effect of population growth on economic development in developing countries)

- Null Hypothesis: there is no effect of population growth on Economic Development.
- Alternate Hypothesis: there is the effect of population growth on Economic Development.

1.6. LIMITATIONS

The fact that this study will only examine qualitative data from secondary sources raises several potential issues, including data quality. The comparability and reliability of the analyses may be impacted by variations in the quality of data for the human capital indicators of healthcare and education across national borders. Measuring consistency across national borders may also present challenges and the possibility of bias or limitation in the analyses. The findings may not generalize to other developing countries due to cultural and geographical differences in the value and use of human capital. On the other hand, concentrating only on population growth may ignore the

population's level of education and ability; depending on the socioeconomic status of the population, rapid population increase may have both positive and negative consequences.

Oversimplification could result from ignoring the possibility that the dependence ratio and the age distribution of the population have a greater influence than population increase as a whole. Urbanization and migration patterns may cause population increase to be distributed unevenly. Additionally, international relations and trade policies might have an impact on how population expansion affects economic development; hence, this study's explanatory value may be limited as the external factors are not taken into account.

1.7. CHAPTER LAYOUT

Regarding this, Chapter 2 summarizes pertinent literature that has already been published. To examine and determine the effects of population growth and human capital on the economic development of developing nations, panel data will be analyzed in Chapter 3 using different methods such as pooled OLS, fixed effect, and random effect methods. The study's methodology is outlined in chapter 4. The final views on the investigation's initial findings will be revealed in Chapter 5.

CHAPTER 2: LITERATURE REVIEW

(Čiutienė & Railaitė, 2015) The economy suffers from population aging because it lowers the number of people in the labor force who are actively employed, which lowers a nation's human capital. In light of the aging population, this study examined the characteristics of human capital. The findings indicated that human capital is made up of many components, including knowledge, experience, health, and so on. As a result, emphasis must be directed to these aspects of human capital accumulation. The development of these features could help older people feel more capable of doing their professions, which would be beneficial given the aging population.

(Ziesemer & Von Gässler, 2021) A study on aging, human capital, and demographic dividends examined labor supply and foreign capital in OECD nations using the Uzada-Lucas endogenous growth model. This study's primary goal was to determine the best response of labor force growth engaged in either production or education to an aging population, as well as the ideal proportion of that labor force to be employed in either field. The study's model's growth is significantly impacted by the results, which show that human capital depreciates as age increases.

(Noghanibehambari, 2021) Another American study examined the impact of early exposure to Medicaid implementation, which took place between 1966 and 1970, on the outcomes of the job market in later life. They continued to concentrate on people who were born between 1950 and 1982—before and after Medicaid's introduction—and who were observed in their adult years (1980 – 2018). It was discovered that children (0–5) exposed to Medicaid had better labor market outcomes. The findings also showed that Medicaid had a statistically and economically significant influence on labor force participation, income, education, and employment.

(Sycheva et al., 2019) A key component of the nation's improvement is economic growth and development. To consider the labor market trends observed in the regional agricultural sector, a case study was conducted that examined human capital as the foundation for regional development. The study's conclusions included the need for public authorities or the government to give huge attention to the development of human capital, particularly in rural areas, as well as the need to address transportation issues and the need for infrastructure in education and health. According to the author's well-thought-out reasoning, raising the pay of agricultural laborers can enhance their standard of living and address the issue of rural population exodus while also increasing the efficiency of human resources in these areas.

(Gruzina et al., 2021) Research is conducted to understand the evolution of the improvement of human capital in economic growth since the term “human resource” refers to human capital in general. The components of convergence, divergence, and differentiation resulting from changes in characteristics like size, territory, population size, the total volume of economies, and various other parameters of investigated states were included in the Mankiw-Romer-Weil model of the Cobb-Douglas function in this study. This led to the conclusion that the nation’s ability for innovation is fostered by an upsurge in its human capital, which in turn makes positive economic growth achievable. To increase the new attributes of human capital, nations must concentrate on increasing worker productivity.

(Diebolt & Hippe, 2019) In several European locations, a related study on the long-term impacts of human resources on technological advancements and economic development was conducted utilizing data on current innovations, historical human capital, and economic development in the various regions. The study employed standard OLS regression models to examine the relationship between human capital, age, patents, GDP, and per capita patent applications. The results indicated

that literacy is a highly significant factor and that human capital is another important historical factor related to GDP per capita and per capita patent applications.

(Cinnirella & Streb, 2017) Another study that considers innovation and human capital, demonstrating from post-Malthusian Prussia, examines the impact of these two factors in economic progress—investigating the intricate link that exists between money, inventions, and human capital. A study that examined the relationship between human capital, innovations, and income used individual data on valuable patents granted in Prussia in the late 19th century along with national data on a variety of topics, including secondary schooling, literacy, craftsmanship, and income tax revenues. In this work, the scale effect method, standard negative binomial model, standard OLS model, horse race model, and Poisson model were used as methodologies. The research revealed compelling empirical evidence supporting the idea that education influences Prussia's growth through both direct and indirect channels of innovation, including literacy and patenting activities, which are independently correlated with income. By quickening structural change and the reduction in childbearing, the variable literacy has significantly aided economic growth.

(Awogbemi, 2023) An investigation of the connection between economic development and human capital—two crucial elements of the economy—was carried out in Nigeria. The research took into consideration the Johanson cointegration method, the error correction model, and the OLS approach. Several variables were employed, including trade balance, GDP per capita, GDP per capita growth, money supply, and secondary school enrolment. All of the variables included in this analysis were found to be cointegrated with order one, and the error correction model revealed that the explanatory factors explained almost 73.3% of the variation in economic development. These findings concluded the research.

(A. Shobande et al., 2014) An analogous investigation was carried out, examining the impact of developing human capital on Nigeria's economic expansion. The study was more descriptive. According to this study, the two industries that contribute most to a nation's creation of human capital are healthcare and education. This study established a strong and positive relationship between the development of human capital and economic growth in Nigeria, demonstrating the impact of human capital on growth.

(Poças, 2014) The research that was conducted looked at the importance of health and education for a country's economic development, as it was indicated in the previous research. The objective of the study was to present empirical evidence about the relationship between human capital and the economic performance of industrialized nations. This investigation took into consideration the Fixed effect model which stated better health would result in higher productivity, higher accumulation of human capital, and ultimately stronger economic growth, according to the study's conclusion. Improved education also has a positive impact on overall health. The economy's success is crucial to achieving growth, as it allows for investments in health and education.

(Zolkover et al., 2021) Another study was carried out using data from the country Ukraine to determine the impact of human capital on economic development while accounting for the state of healthcare and education at the time. It used a variety of analysis techniques, including the Dickey-Fuller test, the Granger test, and the Cognitive Modeling method. The analysis's findings demonstrated a strong positive correlation between the GDP volume and the index of human capital per person, as well as a negative correlation of 0.11% between household income and expenses by 0.04% and savings by 0.06%. In Ukraine, the growth of human capital is determined by the healthcare system.

(Southwest State University et al., 2016) It is said that human capital plays a key role in a nation's progressive economic development. A study along these lines attempted to determine the contribution of human capital to the economic development of global power by conducting a comparative analysis of nations with extremely high HDI scores, including Russia. This study over here concentrated on the Russian Federation and eight other countries. This study led to the conclusion that highly educated and innovative individuals are key components of human capital, which is a tool for forward-thinking economic development. Additionally, it was discovered that, in terms of certain metrics such as average length of schooling and education period expectancy, the Russian Federation did not lag much behind the other global leaders. Significant changes have occurred in several indices, including life expectancy and others.

(Afolayan et al., 2020) An additional aspect concerning carbon emissions, investments in human capital, and economic development in Nigeria was the focus of the study. Scholars examined the causal relationship between carbon emissions and healthcare outcomes in Nigeria, as well as the long-term implications of health factors and carbon dioxide on economic development. A range of approaches were employed in this work, such as co-integration analysis, unit root, Granger causality test, and others. They were, therefore, able to draw a conclusion that emphasized the significance of worker productivity and health in raising the standard of human capital and promoting economic growth. A long-term investigation showed that electric power consumption is directly connected with economic progress, but not significantly correlated with it. On the other hand, economic progress can be explained by the completion rate, fossil fuel consumption, government health expenditure, and carbon dioxide emissions. The variable Carbon dioxide emissions and the use of fossil fuels have been demonstrated to be unrelated. Fossil fuel consumption is acknowledged to be the main source of carbon dioxide emissions.

(Benhabib & Spiegel, 1994) An analysis of the role of human capital in economic development using aggregate cross-country data was carried out. The main goal of the paper is still to model the technological progress of total factor productivity as a function of education level, with the assumption that an educated labor force is better at developing, implementing, and embracing new technologies, which can lead to growth. The model's results indicate that the accumulation of human capital has a role in economic development, as demonstrated by the application of the OLS approach. Furthermore, supporting the notion that the accumulation of human capital does not substantially predict economic growth is the discovery that human capital has a highly positive relationship with total factor productivity.

(Ismayilzade et al., 2021) Another study that looked at how COVID-19 affected the quality of human capital for Azerbaijan's economic development attempted to develop a method for using Azerbaijan as an example to empirically assess the impact of human capital quality on developing economies during economic crises. A quantitative evaluation of the qualitative aspects of human capital development was obtained through the use of questionnaires. Ten economic regions were covered, and among many other things, the questions in the questionnaires focused on initiative, activity, inventiveness, and adaptability. They used the principal component approach to measure the qualitative aspects of the growth of human capital. The findings demonstrated that, in the context of the COVID-19 epidemic, the qualitative rather than the quantitative aspects of human capital have a greater influence on Azerbaijan's economic progress.

(KILIÇ & Ozcan, 2018) Research was done to examine how financial development affects human capital, with an emphasis on developing market economies. Its objective was to examine, using panel data analysis as a framework, how financial development affected human capital in the combining market economies between 1990 and 2015. It adopted several methods and instruments,

including cross-sectional dependence testing, long-run parameter estimations, Dumitresc – Hurlin panel causality testing, and co-integration testing. According to the study's conclusions, economic expansion and financial development significantly and favorably affect human capital metrics. The findings also show a bidirectional causal relationship between government spending on education and financial development, as opposed to a unidirectional relationship between the number of tertiary students enrolled and financial development. The study also discovered that the development of finance and the accumulation of human capital both precede and follow economic expansion.

(Adeli Nik et al., 2013) Another very similar investigation was conducted in Iran, examining the correlation between financial development metrics and human capital. Its goal was to use a vector auto-regressive model to examine how financial development affected human capital between 1977 and 2010—utilized variance decomposition and the unit root test as well. The findings demonstrated that, in Iran, domestic credit supplied by the banking industry and broad money harmed human capital, whereas domestic credit to the private sector had a favorable effect. The variance decomposition revealed that each of these variables is becoming more significant over time.

The second part of the study demonstrated the connection between economic development and population growth. (Kumari, 2022) The purpose of this research study was to determine how the country's population contributes to its economic development and to demonstrate the mutual support that exists between the population and the economy. To arrive at its conclusion, this study took a descriptive technique and entirely relied on secondary data. Population growth is said to be crucial for the development of a country because a larger population would increase the output of products, and higher labor productivity would raise the national capital immediately. The study's

concluding statement stated that a nation's ability to go forward depends on the quality of its population. The requirement for strict laws and government actions hinders the nation's economic development. The distribution, mobility, quality, and amount of people can all influence how quickly the economy develops. Thus, a larger population and proper management would result in the nation's advancement.

(Yao et al., 2013) This study examined the effects of demographic changes on economic growth during the years 1952 to 2007 and recommended population- and economic-related initiatives for China. It made use of time series data, the Vector error correction model, and the augmented Dickey-Fuller unit test. After conducting an inquiry, the research study concluded that China's population has a long-term impact on the country's economic development. However, population growth harms economic growth even when it has improved the country's rate of savings, degree of technical innovation, and labor force composition.

(Sibt e Ali et al., 2018) Another empirical study that was carried out in emerging nations examined the relationships between poverty and population growth as well as how these factors affect the economic development of various developing nations. This study uses panel data from 2002–2005 for 26 developing nations worldwide. It uses the Hausman methodology and a fixed effect model and test for causality. The study's findings indicate that while population and poverty have a negative influence on economic growth, government consumption, exports of goods and services, industrial value added, and gross capital formation have positive effects. According to the panel causality test, there is a bidirectional causal relationship between poverty and the overall population. However, there is a unidirectional causality link between GDP per capita and population, meaning that as the population grows, poverty also rises and has a direct impact on how quickly emerging countries' economies are affected.

(Sinding, 2009) A research combining the comparable indicators of economic development, poverty, and population. The subject of whether lower fertility could result in higher incomes and better living conditions was explored. Utilizing a descriptive methodology, the study's findings revealed the relationships between demography and economies, specifically how declining fertility ratios of the dependent to working-age population create new avenues for economic growth and the alleviation of poverty. Based on empirical research, it has been suggested that nations that have integrated family planning and population policy into their overall economic development have not only reduced poverty but also had high and consistent rates of economic growth.

(Befikadu & Tafa, 2022) To understand the relationship between population growth and economic development, both in the short and long terms, as well as to determine the causal relationship between the two indicators, the most recent study conducted an empirical analysis using the Augmented Dicky-fuller test, Error correction model, and Autoregressive Distributed lag models in Ethiopia. The population's growth rate, rate of inflation, foreign direct investment, real gross GDP, total population, and gross capital creation are the variables used in this study. According to the data, personal remittances and the inflation rate are stable, but the growth of the GDP, population size, foreign direct investment, population growth, and gross capital creation are all stationary, but only after the first difference. It went on to say that there was a long-term relationship between the study's factors.

(Department of Economics, Faculty of Business and Economics, Mettu University, Ethiopia & Singh, 2019) An investigation was conducted in Ethiopia's Meto Town to discover the causes of the country's high population expansion as well as the effects it has on socioeconomic advancement. In addition to using secondary data for tables and graphics, it used original data from a questionnaire that selected 100 samples. The findings indicated that early marriage, polygamy,

having more than one wife, a lack of education, the influence of religion, and reliance on religious dogma are the variables contributing to population growth. The primary cause of the rapid population rise and other social attitudes was thought to be family planning. Overall, significant land fragmentation, a high dependency ratio, and a high unemployment rate are the main effects of population growth.

(Essien, 2016) Looking into how population growth affects economic performance and evaluating how population quality affects economic growth in Nigeria. Time series data spanning from 1981 to 2013 has been integrated. Inflation, real expenditure, consumption, real expenditure within a growing population, labor within a growing population, and exchange rate were the study variables. Various methodologies were used, including the Johnson cointegration test, the Durbin-Watson statistic, the augmented dickey-fuller test, the Phillip-Perron test, the Cobb-Douglas production function, and the Error Correction Model. Population growth has the potential to stimulate economic growth, according to the study's conclusion. The statistical properties' significance indicates that, despite the abundance of human resources, the economy's critical factor is sub-standard. The model's insignificance, however, indicates that human capital development is a crucial variable if population growth is to benefit the country.

(Sarker et al., 2016) This study focused on six nations in South Asia: Bangladesh, India, Sri Lanka, Nepal, Bhutan, and Pakistan. Due to data availability, Afghanistan and the Maldives were excluded from the study. It used panel data analysis from 1980 to 2014 to determine the relationship between South Asia's urban population and economic growth. They used a variety of techniques, including the Pearson and Fisher approach for the panel unit root test, the Phillips-Perron, the enhanced Dickey-Fuller test, and the Panel Vector Error Correction model, to arrive at their result. Their study variables were the gross domestic product and the urban population. In South Asia, urban

population expansion and economic growth have a long-term causal relationship, according to the final results; nevertheless, there is no correlation between the variables in the short term. Although urban population growth is growing at a far quicker rate than economic growth, this does not always translate into slower economic growth.

(Karim & Amin, 2018) The purpose of this study is to identify any causal relationships between the variables by looking at the long-term co-integration influence of population growth rate on economic growth rate in South Asian countries. The variables included in the time series data for the years 1980–2015 were life expectancy at birth, fertility rates, urban population, and population growth rate. The data came from the WDI. Bangladesh, India, Pakistan, Nepal, and Sri Lanka are the nations that made up the study's sample. Unit root tests, co-integration tests, Granger causality tests, and the Vector Error Correction Model were used to examine the data for these nations. According to the final findings, there is neither a long-term nor short-term causal association between the population growth rate and economic growth rate in the chosen countries.

(Mason, 2003) This study looks at the relationship between East Asian economic growth and demographic shifts. Six East Asian economies—Japan, South Korea, Taiwan, Singapore, Thailand, and Indonesia—were studied between 1960 and 1990. According to the study's findings, population growth was a major concern in the 1960s. Over the following decades, countries were able to successfully lower their overall fertility rates from six to two births per woman, or even lower. In industrialized nations, social and economic development contributed significantly to the decline in fertility, with the government playing a major role by facilitating access to contraceptive technology. In East Asia, the rapid demographic transition had a significant impact on development. Furthermore, the gap between labor force growth and population growth was advantageous as it allowed the rapidly expanding labor force to find gainful employment.

(Jha et al., 1993) The study, conducted in Asia, examined the effects of population growth on key components of economic development, such as income distribution, poverty, human capital accumulation, the environment, and sustainable economic growth. It took into account GDP per capita, GNP per capita, human development index, annual percentage growth in GDP per capita, and population growth rate. The results of the study showed a significant negative correlation between the population growth variable and the following variables: poverty, the accumulation of human capital, environment quality, income distribution, and growth in per capita income. Population expansion is one factor contributing to the economy's problems, but there are other factors as well, such as poverty, poor economic growth, human capital contraction, and environmental degradation.

(Colantonio et al., 2010) A study named "On Human Capital and Economic Development: Some Results from Africa" was carried out in Sub-Saharan African countries to ascertain the interactions between economic development, health, and education. In this instance, health and education were considered to be the two primary components of human capital. A multidimensional scaling technique was used to determine the relationships among the metrics. Economic development was measured by GDP per capita and GDP annual growth, while health and education were measured by life expectancy at birth, health spending per capita, primary completion rate, and student-teacher ratio. In this investigation, every variable listed above was employed. The final finding indicated a strong association between the economic development, health, and education indicators, proving beyond a doubt that human capital and economic development are closely related in sub-Saharan African nations.

This work is being replicated in the current dissertation study, which includes all of the variables and indicators from the original study except the school completion rate variable, which is proxied

by school enrollment primarily due to data availability. The purpose of the study, which was conducted in a developed African country, was to determine the relationship between health and education, and development in the economy. The current study will use panel data and choose between pooled OLS, fixed effect, and random effect models conducting various tests to reach its outcome in the selected ten developing Asian countries.

(Ali et al., 2013) Another study was carried out in Pakistan titled "Impact of Population Growth on Economic Development in Pakistan" wherein it examined the effect of population growth on economic development. The country Pakistan is said to have the highest birth as well as fertility rate among all the nations in Asia. Several variables for the study were GDP growth, population growth, unemployment rate, human resource development, and trade openness. Auto-regressive distributive lag Cointegration technique was employed in this study. The findings claimed that population growth has a positive impact on economic growth. The problem has not been population rather it is the unemployment and development policies that are not effective which leads to further problems.

(Wako, 2012) A study titled "Demographic Changes and Economic Development: Application of the Vector Error Correction Model to the Case of Ethiopia", aimed to evaluate the causal relationship between population growth and economic development, as well as the relationship between population growth and the HDI. The study period covered the years 1950 to 2011 and used time series data on several variables, along with the Vector Error Correction Model. The variables included in the study were real gross domestic product per capita, population growth rate, growth rate of total employment, human capital, domestic investment, and trade openness. The findings showed that people of working age made up around half of the nation's overall population and that foreign migration was a significant factor during the period of political unrest.

Moreover, the real GDP and population growth rate indicated a two-way causal relationship between the economic and demographic factors.

The current dissertation study revolves around these two papers one in the case of Pakistan and the other of Ethiopia. Through the reference of these two papers, this study has framed its model by using the following variables that is GDP growth rate, population growth rate, growth rate of employment, gross capital formation, trade openness, and human resource development. Again, it's the use of panel data for ten developing nations of Asia that face the problem of population growth in their economy.

All of these are being taken into consideration as the reference research paper for the current dissertation study, which will increase the influence of this work in the field of knowledge. The journey through the content of existing literature has illuminated many aspects of the current study, "From Potential to Growth: Human Capital, Population Growth, and Economic Development in Emerging Nations," but it also approaches this study to go further and explore the undiscovered lands that lie ahead.

CHAPTER 3: METHODOLOGY

3.1. INTRODUCTION

This section outlines the systematic approach undertaken to investigate the impact of two important components of the economy that is human capital and population growth and analyzes their impact on economic development in developing Asia. Both population growth and human capital will be examined, with a focus solely on quantitative data. This section serves as a blueprint for the data collection, analysis, and interpretation processes employed in this study. By delineating the methodological framework, including the research design, data sources, and analytical techniques, this section aims to ensure transparency, replicability, and rigor in the investigation. Through the collection of quantitative data, this study endeavors to capture the multifaceted dimensions of the impact of human capital, population growth, and their implications for economic development in the diverse and evolving landscape of developing Asia.

3.2. DATA

In the framework of developing Asia, examining the relationship between human capital, population increase, and economic development in this study. Based only on secondary sources of data, panel data for the ten years from 2011 to 2020 has been included in this analysis. To conduct a thorough investigation of this link gathered data from the World Bank database. Further, compiling quantitative information about the chosen Asian countries. Human capital indices from several countries were considered, including life expectancy at birth, health expenditures, student-teacher ratio, and primary schooling. To better understand population changes and other variables

also collated demographic statistics. In addition, economic metrics like GDP growth rates and GDP per capita will be incorporated to evaluate the course of these countries' economic development. Through the integration of data, the objective is to clarify the complex relationships among the development of human capital, population patterns, and economic advancement in regions of developing Asia.

3.3. VARIABLES

For objective 1, the following factors would aid in the examination of the relationship between human capital and economic development: GDP per capita as a dependent variable followed by all other independent variables that is life expectancy at birth, health spending per capita, primary school enrollment, and the student-teacher ratio.

- **Gross Domestic Product (GDP) per capita:** This is considered a dependent variable that serves as an indicator of economic development. GDP per capita is calculated by dividing the total gross value contributed by all producers who are residents of the country by the mid-year population, plus any product taxes that were not factored into the output valuation.

3.3.1. Independent Variables for Model 1

- **Life Expectancy at birth, total years:** This is the independent variable that is used to calculate human capital. The number of years that a newborn baby would live if the mortality rates that were in place at the time of the newborn's birth continued to remain the same is known as the life expectancy at birth.

- **Health Expenditure per capita:** The total amount spent on health care, as a percentage of the population, is the total of all governmental and private health spending.
- **School Enrollment, primary:** The ratio of all enrolled people, regardless of age, to the population in the age group that officially corresponds to the shown level of education is known as the gross enrollment ratio.
- **Pupil-teacher ratio, primary:** The primary pupil-teacher ratio is the average number of students to teachers in a primary school.

To examine the impact of population on economic development, the second objective takes into account several variables, including trade, the human capital index, employment to population ratio, a population growth rate which acts as the independent variable, and GDP growth rate as the independent variable.

- **Gross Domestic Product growth (annual %):** GDP growth rate is expressed as a percentage per year at market prices using constant local currency. The aggregates are provided in US dollars and are based on constant prices from 2015. GDP is the total of the gross value added by all producers who are residents of the country, plus any product taxes and minus any subsidies that aren't factored into the product value. It is computed without accounting for the depletion and deterioration of natural resources or the depreciation of artificial assets.

3.3.2. Independent Variables for Model 2

- **Population Growth rate (annual %):** The exponential rate of the midyear population growth from year t-1 to year t, expressed as a percentage, is the yearly population growth rate for year t.

- **Employment to population ratio (total %):** The percentage of a nation's population that is employed is known as its employment to population ratio.
- **Gross Capital Formation (annual % growth):** GCF consists of outlays in addition to the fixed assets of the economy plus net changes in the level of inventories.
- **Trade (% of GDP):** Trade is the total of products and services exported and imported expressed as a percentage of GDP.
- **Human Capital Index (0-1):** The HCI determines how much education and health contribute to worker productivity. The final index score, which goes from zero to one, measures a child born today's potential productivity as a worker in the future in comparison to the standard of perfect health and education.

The variables listed above are the study variables incorporated in this research study which will help achieve the study objectives stated above for both the indicators that are human capital and population growth and look at how these individually have an impact on the economic development of the selected nations.

3.4. METHODOLOGY

Panel data is the attempted data that is used in this investigation. Over time, the same cross-sectional unit is detected in the Panel data. This study takes into account a variety of factors for ten developing nations over ten years, from 2011 to 2020. More variability in the variables and less variable collinearity, a greater degree of freedom, and increased efficiency are all provided by panel data. For this reason, the model in this study uses panel data regression. Fixed effect model, random effect model, and pooled OLS will be used to obtain more accurate results.

- **Pooled Ordinary least squares (OLS)**

Regression is estimated using pooled ordinary least squares, which involves combining all of the study's observations. Time series and cross-sectional features are disregarded.

- **Fixed Effect Model**

An approach for examining the effects of factors that change over time is the fixed effect model. The fixed effect model is used to evaluate the impact of independent factors on the dependent variable since it removes the influence of time-invariant characteristics.

- **Random effect model**

When there are time-invariant variables, the random effect model technique is applied. Time-invariant variables may be utilized as independent variables since it indicates that the error term does not correlate with the independent variables.

TESTS FOR SELECTION OF MODEL

To find out the appropriate model for this data, the following tests will be conducted.

- **BP-LM (Breusch-Pagan Lagrange Multiplier test)**

This test will be conducted to see which model is better for the study that is either the fixed effect model or the Pooled OLS model.

H_0: Pooled OLS is appropriate

H_A: The random effect model is appropriate

- **F test**

This test is similar but different in command and this will help in the selection of an appropriate model between the Random effect model and pooled OLS model.

H_o: Pooled OLS is appropriate

H_A: The fixed effect method is appropriate

- **Hausman Test**

This test will help is done to select the most appropriate model between the fixed effect and random effect models in this study.

H_o: The random effect model is appropriate

H_A: The fixed effect model is appropriate

For all the above-mentioned, looking at the results of p-values. If the p-value is less than 0.05 failing to reject the Null Hypothesis (H_o), and if not, that means if the p-value is greater than 0.05, failing to reject the Null Hypothesis (H_o) means that the alternate hypothesis (H_A) is true. This will help this study select the most appropriate model required for further analysis.

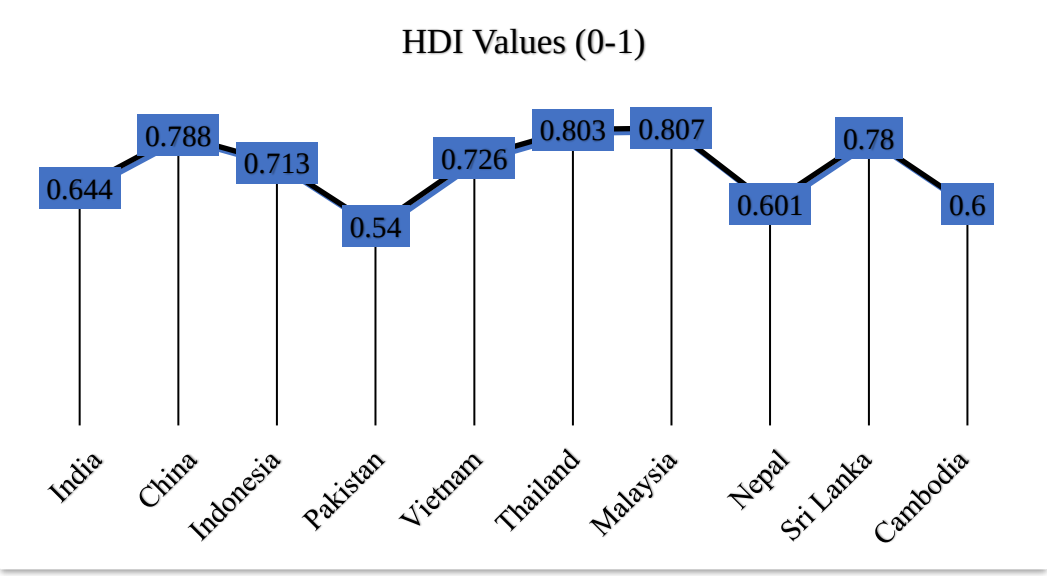
CHAPTER 4: DATA ANALYSES

4.1. INTRODUCTION

It is a well-established truth that investing in human capital is crucial for developing nations, as it enables them to concentrate on transforming their working population into more productive members of society by providing education and healthcare. As has been mentioned in numerous publications previously, if a nation's working population increases in terms of education, skill, and training relative to other nations that are dealing with population expansion, that issue is also resolved because the population now can meet its needs. In the end, there is a connection between population increase and the idea of human capital and the nation's economic success. Increased productivity among the population will raise living standards and add to the nation's GDP per capita by increasing earnings. Almost 60% of the world's population lives in Asia, where there are roughly 4,927,748,740 people (4.9 billion) in total. The investigation's present focus is on 10 developing Asian countries: Vietnam, Thailand, Malaysia, Nepal, Sri Lanka, Cambodia, India, China, Indonesia, Pakistan, and Vietnam. These nations are selected based on the highest population and they are further divided into developing Asian countries.

To start, this study attempts to visually portray a few sections of the dissertation, which will provide this study with a summary of the analysis that will be presented later. The World Bank database and Human Development Reports, United Nations Development Program are the sources of data used in the following graph, which gives the most recent information on trends and patterns in several key variables examined in this dissertation study. The analysis of models in the subsequent section will obtain useful results and bring this study to a successful end.

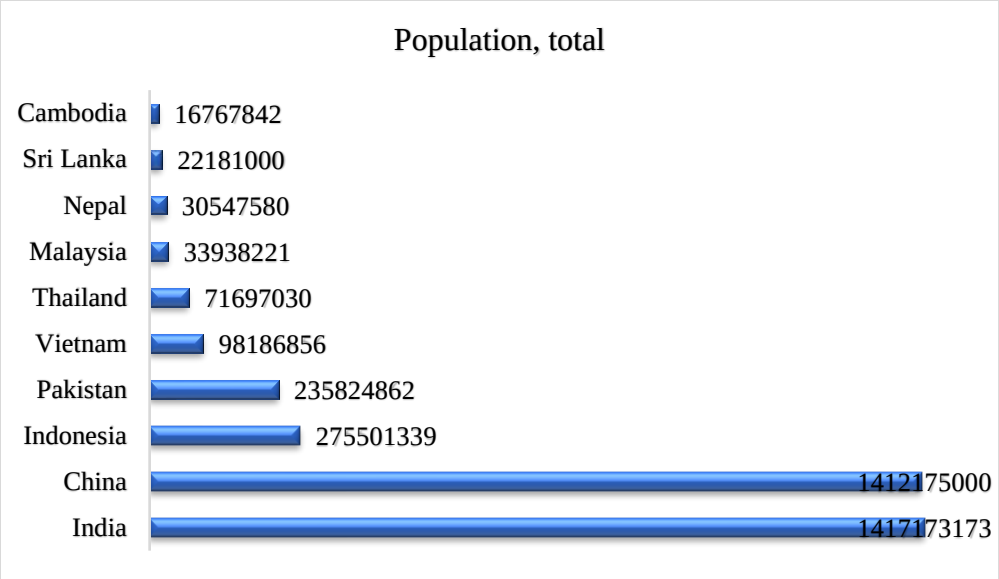
Figure. 4.1. Graphical Representation of Developing Nations



Source: Human Development Reports, UNDP

The HDI values are summarized in the above graph, which will assist in classifying the selected country as a low-, medium-, or highly developing country on the Asian continent. With a very high HDI score of 0.807, Malaysia is ranked 63rd out of 193 countries in the world. Thailand is ranked 66th and is considered a highly developing country. In addition, Sri Lanka comes in at number 78 with an HDI score of 0.780, while China comes in at number 75 with a rating of 0.788. Vietnam comes in at position 107 with an HDI rating of 0.726, following Indonesia at position 112 with a value of 0.713. India is categorized as a medium developing nation with a rank of 134 and an HDI score of 0.644. Nepal and Cambodia follow with ranks of 146 and 148, respectively, and HDI values of 0.601 and 0.600. Last but not least, Pakistan's HDI score of 0.540 places it at position 164, making it a low-developing country.

Figure. 4.2. Total Population of Each Country

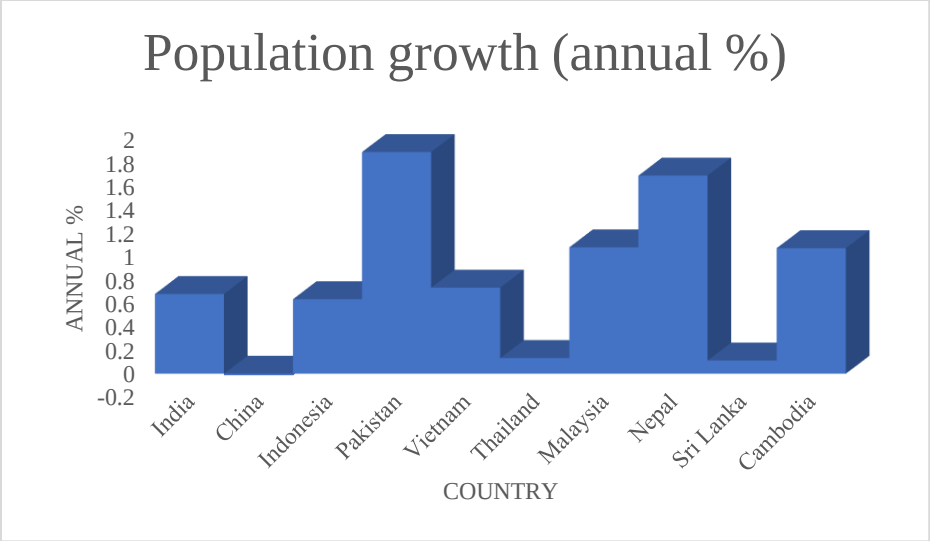


Source: World Bank

The population of each country which is highlighted in this study is presented in the graph above. With the highest population of about 1.417 billion, India stands first among the rest of the world, followed by China with a population of 1.412 billion, these two nations are amongst the most populated countries. Further Indonesia has a population of 275.501 million individuals residing in this country, similarly, Pakistan has a population of 235.82 million people.

In Asia after India and China, these countries are Indonesia and Pakistan which are highly populated. Further, the country Vietnam has a population of 98.186 million after this follows Thailand which has 71.69 million. The country Malaysia has a 33.93 million population and Nepal has a total population of 30.54 million. This follows up with Sri Lanka and Cambodia which have 22.18 million and 16.76 million population respectively.

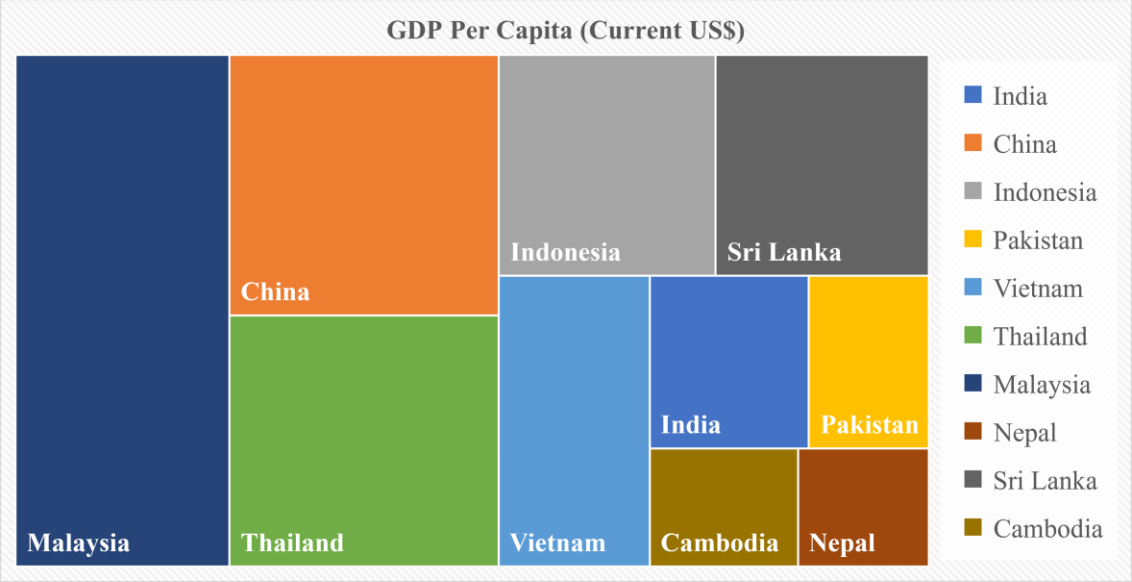
Figure. 4.3. Population Growth (annual %)



Source: World Bank

An overview of the annual percentage population growth rate for each of the developing countries selected for this dissertation study is given in Figure 4.4. Pakistan currently has the fastest population growth in percentage terms as of 2022 out of all the countries shown above in the graph, with an annual growth rate of 1.89 percent. Nepal comes in second with an annual growth rate of 1.692%. Malaysia and Cambodia have roughly comparable population growth rates, with 1.079% and 1.076% growth, respectively. Vietnam has experienced a growth rate of 0.734 percent in its economy, with India following closely behind with a population growth rate of 0.68%. Indonesia stands after India with a figure of 0.636 %. On the other side, the population growth rates of Thailand and Sri Lanka, which are 0.133% and 0.112%, respectively, have also shown a similar trend. Last but not least, China's economy has experienced negative growth at a rate of -0.013 percent. This might be attributed to the abolition of the one-child policy, which was prohibited since the country's population was more senior than working age.

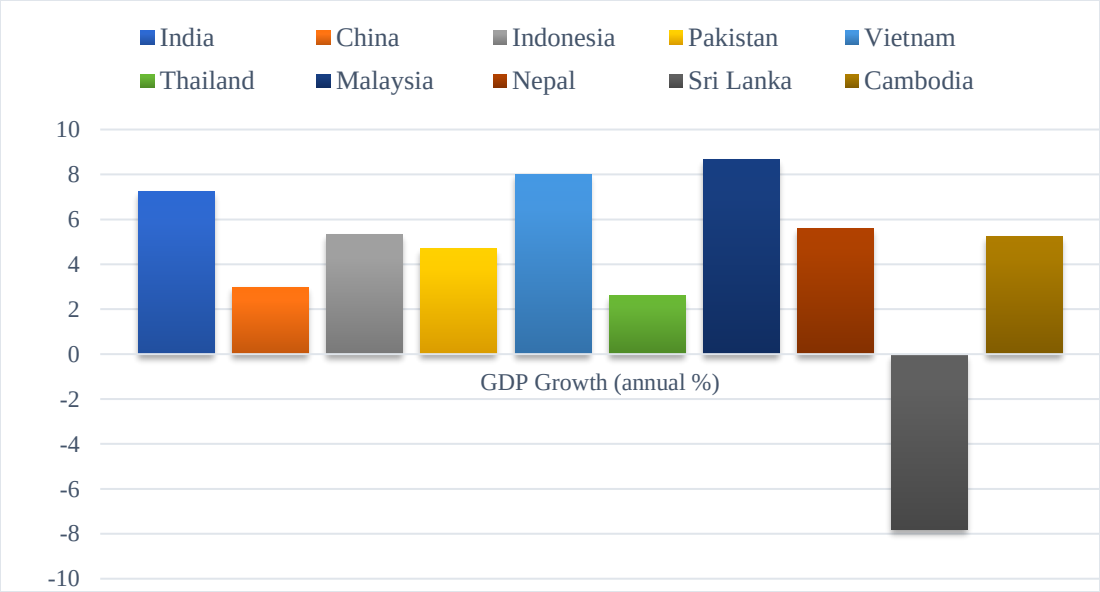
Figure. 4.4. GDP Per Capita of Nations (Current US$)



Source: World Bank

The GDP per capita of each country included in this study is summarized in the graph above. China comes in second with $21482.56 GDP per capita, and Malaysia has the highest GDP per capita at $33525.30 out of the chosen nations. Thailand has a GDP per person of $20679.11. With relative GDPs per capita of $14410.18 and $14657.78, Indonesia and Sri Lanka are roughly equivalent. Vietnam presently has a GDP per person of $13461.00. In comparison to the other countries on the list above, the GDP per capita of all the other countries—India, Pakistan, Cambodia, and Nepal—is significantly lower. At $8400.38, India is higher than Pakistan ($6351.00). In the same manner, $5355.17 for Cambodia and $4726.60 for Nepal.

Figure. 4.5. The Annual GDP Growth Rate (%)



Source: World Bank

The GDP growth rates of the aforementioned nations are displayed as an annual percentage growth in this graph. Malaysia's GDP has grown by 8.65%, making it the country with the highest growth rate. Vietnam has experienced a comparable growth rate of 8.019 percent. As of 2022, India is still growing at a rate of 7.239 percent. Next is Nepal, whose GDP has grown by 5.613% annually. Similar growth rates have been observed in Indonesia, whose annual GDP growth has been 5.308%. Cambodia's annual GDP growth has been 5.239%. Pakistan, an Islamic country, has seen yearly GDP growth of 4.705 percent. China and Thailand, with GDP growth rates of 2.989% and 2.597%, respectively, are the countries with the slowest yearly growth rates. This country in the southern region of Sri Lanka has had negative GDP growth, indicating a fall in the economic value of products and services produced in the country. This could be attributed to the country's ongoing debt issue.

4.2. MODEL 1

The first objective is to examine the impact of human capital on economic development. To fulfill this the following model estimates the needful.

$$\textbf{Log (GDPPC)} \sim \beta 0 + \beta 1\ \textbf{(LIFEEXP)} + \beta 2\ \textbf{Log (HEALTHEXP)} + \beta 3\ \textbf{(SE)} + \beta 4\ \textbf{(PTR)} + \mu$$

Where,

GDPPC – Gros Domestic Product Per capita

LIFEEXP – Life Expectancy at Birth

HEALTHEXP – Health Expenditure Per Capita

SE – School Enrollment, Primary

PTR – Pupil Teacher ratio

μ - Residuals

HYPOTHESIS OF THE MODEL 1

1. Life Expectancy at birth

H_o: $\beta 1=0$ (Life expectancy at birth does not have any impact on GDP per capita)

H_A: $\beta 1>0$ (Life expectancy at birth has a positive impact on GDP per capita)

As a result of the model analysis, the β1 coefficient revealed a p-value of 0.623122, which is significantly less than 0.05. This means that the Null hypothesis cannot be rejected, indicating that the dependent variable, GDP per capita, is not significantly impacted by life expectancy at birth.

2. Health expenditure per capita

H_o: β2=0 (Health expenditure per capita does not have any impact on GDP per capita)

H_A: β2>0 (Health expenditure per capita has a positive impact on GDP per capita)

The independent variable, health expenditure per capita, is the β2 coefficient. Analysis of the data revealed a p-value of 6.617e-14, which is significantly less than 0.05, rejecting the null hypothesis and demonstrating a positive relationship between health expenditure per capita and GDP per capita.

3. School enrollment, primary

H_o: β3=0 (School enrollment does not have any impact on GDP per capita)

H_A: β3>0 (School enrollment has a positive impact on GDP per capita)

Furthermore, the p-value for the school enrollment β3 coefficient was 0.337729, which is greater than 0.05. The null hypothesis, according to the β3 coefficient's p-value, could not be rejected, indicating that school enrollment had no observable effect on GDP per capita, the dependent variable.

4. Pupil-teacher ratio

Ho: β_4=0 (Pupil-teacher ratio does not have any impact on GDP per capita)

HA: β_4<0 (Pupil-teacher ratio has a positive impact on GDP per capita)

The β4 coefficient, or pupil-teacher ratio, is the final variable in the model mentioned above. Again, less than 0.05, the p-value statistic was determined to be 1.206e-05. The result indicates that the pupil-teacher ratio has a substantial impact on GDP per capita, which is the dependent variable of the aforementioned model, and the p-value is significantly less than 0.05, indicating to rejection of the null hypothesis.

To help decide which of the fixed effect, random effect, and pooled OLS models was the most beneficial this study conducted several tests. Through F test it revealed that it was needed to reject the null hypothesis (Ho) because the test statistic showed that the p-value was 2.2e-16, which is considerably less than 0.05. This indicates that the alternate hypothesis is reasonable. It is appropriate to go with the fixed effect model.

Using the BP-LM test (Breusch Pagan Lagrange Multiplier) and finding the p-value to be 2.2e-16 suggesting to reject the Null hypothesis (Ho), which claimed that the Pooled OLS is the ineffective model, and instead determined that the Random effect model is the most appropriate.

The Hausman test—the final test—was run to assist in selecting between the fixed effect model and the random effect model. The random effect model is the most appropriate model for the first objective, according to the null hypothesis, which failed to be rejected. The Hausman test's p-value was 0.5233, which is greater than 0.05, leading ahead with the random effect model for the first objective.

Table. 4.1. Results of random effect estimation for model 1

Variable	Coefficients	z-value	p-value
Dependent Variable GDP Per Capita			
Constant	6.9966749	8.2497	2.2e-16 ***
LIFEEXP	0.0058129	0.4914	0.623112
Log (HEALTHEXP)	0.3543092	7.4953	6.617e-14 ***
SE	-0.0222963	-0.9587	0.337729
PTR	-0.0079321	-4.3765	1.206e-05 ***

According to the outcomes of the most appropriate model, the random effect model using the Swamy-Arora transformation. The current model uses panel data with a balanced panel consisting of 10 countries, observed throughout 10 years, and totals up to 100 observations. The total sum of squares shown is 2.3349 and the residual sum of squares is 0.17242. The R squared value is 0.92616, indicating that the model explains approximately 92.62 % variation in the dependent variable which is GDP per capita.

For every 1 percent increase in health expenditure per capita, the estimation for the GDP per capita increases by 35.43%, holding all other variables constant. This coefficient is statistically significant with a very low p-value of 6.617e-14, which indicates that health expenditure per capita has a significant positive impact on GDP per capita. One possible explanation for this could be

that investing more money in health care will make people healthier and live longer, which will allow them to work longer hours and raise GDP per capita.

Similarly, for every 1 unit increase in the coefficient of pupil-teacher ratio, the estimation for GDP per capita decreases by -0.79 %, further the p-value was found to be very low that is 1.206e.05, indicating that a higher pupil-teacher ratio is associated with a lower GDP per capita. This change may have occurred because, as the student-teacher ratio rises, fewer teachers are available to teach the larger class sizes. This means that each teacher cannot attend to every student in the class, which could negatively impact the students' learning experiences. However, other factors, such as the quality of instruction and the classroom environment, may also have an impact. Additionally, it was discovered that neither life expectancy at birth nor primary school enrollment had a significant effect on GDP per capita neither at 0.01%, 0.05 %, or 0.1% significance levels.

To verify that the random effect model included heteroskedasticity and autocorrelation, further experiments were carried out. To investigate the possibility of an autocorrelation issue, this study performed the Breusch-Godfrey serial correlation test in the panel model. Discovered the p-value to be 4.6e.06 by the test statistic value, which is less than 0.05 indicating rejection of the null hypothesis, which means autocorrelation exists in the random effect model. Comparably using the Breusch-Pagan test to test for heteroskedasticity and discovered a similar issue, that the random effect model has a heteroscedasticity problem because the p-value, which is 0.01489, is less than 0.05. Realize that this needs to be fixed for the model to be reported correctly.

Executing the test to address the heteroskedasticity and autocorrelation issues with the random effect model. Conducting further tests to report the robust standard error, this study used the robust clustered standard error method wherein each variable's error term is reported more precisely. The

study's standard error results for each independent variable have demonstrated a noteworthy shift, indicating the inclusion of additional unknowns in the model.

Table 4.2. The model with Robust Standard error

Variables	Random Effect Model	Robust Errors
Dependent variable GDP Per Capita		
Constant	6.9966749*** (0.8481172)	6.9966749*** (1.0540883)
LIFEEXP	0.0058129 (0.0118281)	0.0058129 (0.0148676)
Log (HEALTHEXP)	0.3543092*** (0.0472711)	0.3543092*** (0.0585994)
SE	-0.0222963 (0.0232577)	-0.0222963 (0.0223229)
PTR	-0.0079321*** (0.0018124)	-0.0079321** (0.0026061)

Table 4.2 shows that there has been a considerable change in the standard error for each variable. As before, the life expectancy coefficient has a high p-value (0.6968) and a t-value of 0.3910, both of which are statistically insignificant, indicating that life expectancy may not significantly affect

GDP per capita in this model. With a t-value of 6.0463 and a relatively low p-value (3.715e-08), the coefficient for the log of health expenditure is however statistically significant and shows a considerable positive impact on GDP per capita. With a t-value of -0.9988 and a p-value of 0.3207, the school enrollment coefficient is still statistically insignificant, indicating that it might not have a meaningful effect on GDP per capita in this model. With a low p-value (0.0031) and a t-value of -3.0437, the pupil-teacher ratio coefficient is nevertheless statistically significant, suggesting a considerable negative effect on GDP per capita.

Overall, the conclusion is still in line with the earlier research, with certain variables having a considerable impact on GDP per capita and others not. Robust standard errors clustered at the group level have been employed to solve possible problems with autocorrelation or heteroscedasticity in this model. By reporting the standard error in the model for each coefficient more precisely, the robust clustered standard error method helps the model represent itself more accurately and capture a greater number of unidentified variables.

By examining the random effect model the analysis found that while school enrollment and life expectancy at birth do not exhibit any impact, health expenditure per capita—the health indicator—does show an impact on the dependent variable, GDP per capita. Similarly, the pupil-teacher ratio—the education indicator—also has a significant impact on the dependent variable. As a concluding remark for the model above this analysis stated that human capital does affect the economic development of the selected developing countries, which include Vietnam, Thailand, Malaysia, Nepal, Sri Lanka, and Cambodia, as well as India, China, Indonesia, Pakistan, and Vietnam.

4.3. MODEL 2

The second objective is to examine the effect of population growth on economic development. To fulfill this the following model has been estimated.

$$\mathbf{GDPGROWTH \sim \beta 0 + \beta 1\ (POPGROWTH) + \beta 2\ (EMPRATE) + \beta 3\ (GCF) + \beta 4\ (TRADE) + \beta 5\ (HCI) + \mu}$$

Where,

GDPGROWTH - GDP Growth (annual %)

POPGROWTH – Population growth rate (annual %)

EMPRATE – Employment to population ratio (total %)

GCF – Gross Capital Formation

Trade – Trade (% of GDP)

HCI – Human Capital Index (0-1)

μ – Residuals

HYPOTHESIS OF THE MODEL 2

1. Population growth rate (annual %)

Ho: $\beta 1=0$ (Population growth rate does not have any impact on GDP growth rate)

HA: $\beta 1>0$ (Population growth rate has a positive impact on GDP growth rate)

The model shown above displays the population growth rate, or β1 coefficient. The p-value was determined to be 0.03801, significantly less than 0.05, indicating the rejection of the null hypothesis and evidence that population expansion positively affects the GDP growth rate in the economy.

2. Employment Rate (total %)

Ho: β2=0 (Employment rate does not have any impact on GDP growth rate)

HA: β2>0 (Employment rate has a positive impact on GDP growth rate)

Second, the employment rate's β2 coefficient in the model was determined to have a p-value of 0.76426, which is substantially higher than 0.05. It shows that the employment rate has no noticeable impact on the GDP growth of the chosen countries and that the null hypothesis cannot be rejected.

3. Gross Capital Formation

Ho: β3=0 (Gross capital formation does not have any impact on GDP growth rate)

HA: β3>0 (Gross capital formation has a positive impact on GDP growth rate)

Referring back to the β3 coefficient indicated in the model above, the p-value was 2.678e-11, significantly less than the 0.05 value. As a result, the alternate hypothesis—which maintains that gross capital formation influences GDP growth across all of the chosen countries—should be considered, thereby rejecting the null hypothesis.

4. Trade (% of GDP)

Ho: β4=0 (Trade does not have any impact on GDP growth rate)

HA: β4>0 (Trade has a positive impact on GDP growth rate)

The β4 coefficient was the variable trade, and the study revealed a p-value of 0.50626, which is statistically greater than the significance level of 0.05. The null hypothesis mentioned above was found to be unsuccessful in rejecting, which leads to the conclusion that trade does not affect the GDP growth of the economies.

5. Human Capital Index (0-1)

Ho: β5=0 (Human capital index does not have any impact on GDP growth rate)

HA: β5>0 (Human capital index has a positive impact on GDP growth rate)

Finally, the Human Capital Index (HCI) was the β5 coefficient in the model. The study provided a p-value of 0.52956, which is considerably higher than the 0.05 value. Once more, it was unable to reject the null hypothesis and conclude that there was no connection between the human capital index and GDP growth in any of the countries included in the analysis.

Further, to check for the best model for the second objective, it was needed to choose between the pooled OLS, fixed effect, and random effect model. To choose between these models this conducted various tests. Running the F test to choose between pooled OLS and the fixed effect model, since the p-value stated in the result showed 5.712e-07 stating to reject the Null hypothesis means that the fixed effect model is appropriate.

Similarly, to choose between pooled OLS and random effect model this study conducted the BP-LM test (Breusch-Pagan Lagrange Multiplier), the result of the BP-LM test stated the p-value 3.637e-12 which is less than 0.05 stating to reject the Null hypothesis, choosing the random effect model to be the most appropriate model for this study's second objective. Now there was the need to choose between the random effect and fixed effect model, so the Hausman test was conducted. Through conducting this test, the p-value stated was 0.9935 which is more than 0.05, stating failure

to reject the Null hypothesis and the final model that is best suitable for the above model is the Random effect model.

Table 4.3. Results of Random effect estimation for model 2

Variables	Coefficients	z-value	p-value
Dependent variable GDP Growth			
Constant	0.0108476	0.3912	0.69567
POPGROWTH	1.2933462	2.0748	0.03801 *
EMPRATE	0.0141051	0.2999	0.76426
GCF	0.1101641	6.6633	2.678e-11 ***
TRADE	0.0077808	0.6647	0.50626
HCI	0.0171454	0.6287	0.52956

For the above-mentioned model, this study employed a random effect model with the Swamy-Arora transformation. This explains the relationship between GDP growth rate and several other independent variables. The panel data consisted of a balanced panel with 10 entities observed over 10 years, totaling 100 observations. For each of the coefficients, there is an estimate, standard error, z-value, and p-value indicating the variable's significance. Through the results the total sum

of squares is stated as 0.08657, and the residual sum of squares as 0.015766. The R-squared value was 0.81788, indicating that the above model explains a substantial portion which is approximately 81.8% of the variance in the dependent variable, GDP growth rate. The independent variable which is the β1 coefficient stated that for every 1 percent increase in the population growth rate, there would be a 1.2933 % change in GDP growth rate, holding all other variables constant. This means that a growing population can lead to the growth of the economy and may stimulate economic activities. Another coefficient that is statistically significant with a p-value of 0.03801 is Gross capital formation. The independent variable which is Gross capital formation was also found to be statistically significant since the p-value stated is very low which is 2.678e-11. The interpretation of this stated that for every 1 percent increase in the Gross capital formation, the estimation of GDP growth increases by 0.110 %. The variable Gross capital formation represents the investment in physical assets such as machinery, equipment, and infrastructure.

Therefore if countries have higher levels of investment it may contribute positively to economic growth by enhancing productivity and capacity. For the other variables which are employment rate, trade, and human capital index, the results found that these variables did not have any significant impact on the GDP growth rate in the selected nations. Overall in the above-stated model understanding the drivers of the GDP growth rate is needed as in the end, this is the indicator of economic development that contributes to the growth and prosperity of the nations.

Conducting other tests to check for the problem of autocorrelation and heteroskedasticity in the random effect model. Conducting the Breusch-Godfrey serial correlation in the panel data and found the p-value to be 0.6103 which is more than 0.05 failing to reject the Null hypothesis, meaning there is no problem of autocorrelation in this model.

Through this, it was found that for each independent variable, the errors of one time period are not dependent on the errors of another period for the same individual. Further, checked for heteroskedasticity in the above-presented model. Conducting the Breusch Pagan test to address this problem as the results can lead to inefficient estimations and can affect standard errors. The p-value for this test showed 0.07489 which is more than 0.05 stating that there is no problem of heteroskedasticity in this model.

Table 4.4. Model with Robust Standard Errors

Variables	Random Effect Model	Robust Errors
Dependent variable GDP Growth		
Constant	0.0108476 (0.0277313)	0.0108476 (0.0168471)
POPGROWTH	1.2933462* (0.6233722)	1.2933462* (0.5002270)
EMPRATE	0.0141051 (0.0470331)	0.0141051 (0.0363575)
GCF	0.1101641*** (0.0165330)	0.1101641*** (0.0169211)
TRADE	0.0077808 (0.0117061)	0.0077808 (0.0119510)
HCI	0.0171454 (0.0272720)	0.0171454 (0.0333096)

Through conducting the robust standard error testing method the results found are stated in Table 4.8. The coefficient for population growth rate is statistically significant with a t-value of 2.5855 and a p-value of 0.01143, indicating that population growth rate has a positive and significant effect on GDP growth rate. Similarly, the coefficient for gross capital formation (GCF) remains highly statistically significant with a t-value of 6.5105 and a very low p-value of 4.989e-09, indicating that increases in gross capital formation lead to a higher GDP growth rate.

The employment rate remains statistically insignificant with a t-value of 0.3880 and a p-value of 0.69902, indicating that the employment rate does not have a significant impact on the GDP growth rate. The variable trade is also statistically insignificant with a t-value of 0.6511 and a p-value of 0.51677, suggesting that trade does not have a significant impact on GDP growth rate.

Lastly, the coefficient for human capital investment is also statistically insignificant with a t-value of 0.5147 and a p-value of 0.60808, hinting that the human capital index does not have a significant impact on GDP. It was discovered that with small adjustments, the standard errors for the majority of the research variables had improved.

It is observed that the standard has slightly increased the values of the trade and human capital index, but the values of the other independent variables—population growth, employment rate, and gross capital formation—have declined. The model has been updated and the reported standard error has improved overall results due to the robust standard error. This indicates that it is reporting the elements of the model that are unknown and missing.

Analyzing Model 2 comes to an end and it has stated that population growth does have an impact on the overall economy which states that if the population grows at a much faster pace then there is a tendency for the economy to grow faster as it will contribute positively to the GDP growth of the nation. Fulfilling the second objective of this dissertation study.

CHAPTER 5: CONCLUSION

The investigation concludes by indicating whether or not it was successful in achieving its goals. Analyzing how human capital indicators affect emerging countries' economic development was the initial goal. Health and education were the human capital indicators. The variables that were selected were the student-teacher ratio, school enrollment, health spending per capita, and life expectancy at birth. This study's economic development indicator, GDP per capita, changed over time. The analysis of model 1 revealed, as indicated by the values of the coefficients, that health expenditure per capita and the pupil-teacher ratio were highly significant in explaining this change. Allowing this study to conclude that human capital as a whole influences economic development, and the study's initial goal of rejecting the null hypothesis for objective 1 has been accomplished.

In addition, the study's second objective was to examine how population expansion affects the economic advancement of Asia's developing countries. This study used Model 2 to achieve this goal, while R was used for the analysis. The GDP growth rate is one of the variables that is analyzed along with other independent variables to determine how it affects economic development. The model's findings indicate that population growth has a significant impact on GDP growth, the dependent variable. Specifically, growing populations are associated with higher GD growth in several chosen countries, which in turn boosts national prosperity. Lastly, affirming that the null hypothesis has been rejected and the study objective has been successfully attained.

Overall, the study was completed effectively, achieving its goals and demonstrating that the country must invest in its human capital and manage population expansion in a way that will ultimately lead to the economy flourishing.

5.1. SCOPE OF THE FURTHER RESEARCH

To obtain deeper insights into both the indicators—human capital and population growth, there could be future studies done that may address it in greater detail while maintaining focus on a few additional variables. This study examined population growth and human capital as two distinct phenomena and examined how they affected the economic development metrics that were employed. Long-term periods should also be considered to obtain more accurate results, which this study may not have accomplished because it only examined ten 10-year periods from 2011 to 2020. It is possible to modify the inclusion of various approaches to provide nuanced results that may be even more accurate than those of the present study.

5.2. SUGGESTIONS

The countries chosen for this analysis often have larger populations in Asia. Higher population numbers typically result in resource strain, poverty, problems with unemployment, and other issues. Consequently, the government must properly manage these issues by increasing spending on health and education, as this will lead the population to be educated and more healthy which will encourage the population to be more productive and advance the nation as a whole. Acknowledging that, provided the nation's government controls population growth carefully, it is not a problem. But the real issue lies in not appropriately managing the population. Thus, the study would like to propose this assertion.

REFERENCES

A. Shobande, O., T. Odeleye, A., & C. Olunkwa, N. (2014). Human Capital Investment and Economic Development: The Nigerian Experience. *World Journal of Social Science*, *1*(2), p107. https://doi.org/10.5430/wjss.v1n2p107

Adeli Nik, H., Sattari Nasab, Z., Salmani, Y., & Shahriari, N. (2013). The relationship between financial development indicators and human capital in Iran. *Management Science Letters*, *3*(4), 1261–1272. https://doi.org/10.5267/j.msl.2013.02.020

Afolayan, O. T., Okodua, H., Oaikhenan, H., & Matthew, O. (2020). CARBON EMISSIONS, HUMAN CAPITAL INVESTMENT AND ECONOMIC DEVELOPMENT IN NIGERIA. *International Journal of Energy Economics and Policy*, *10*(2), 427–437. https://doi.org/10.32479/ijeep.8476

Ali, S., Ali, A., & Amin, A. (2013). *The impact of population growth on economic development in Pakistan*. *18*, 483–491. https://doi.org/10.5829/idosi.mejsr.2013.18.4.12404

Asia Population 2024. (n.d.). Retrieved March 31, 2024, from https://worldpopulationreview.com/continents/asia-population

Awogbemi, T. O. (2023). HUMAN CAPITAL DEVELOPMENT AND NIGERIA'S ECONOMIC GROWTH. *Journal of Public Administration, Finance and Law*, *27*, 67–76. https://doi.org/10.47743/jopafl-2023-27-05

Barro, R. J. (n.d.). Economic Growth in a Cross Section of Countries. *QUARTERLY JOURNAL OF ECONOMICS*.

Becker, G. S. (1965). A Theory of the Allocation of Time. *The Economic Journal*, *75*(299), 493. https://doi.org/10.2307/2228949

Befikadu, A. T., & Tafa, B. A. (2022). An Empirical Analysis of the Effects of Population Growth on Economic Growth in Ethiopia Using an Autoregressive Distributive Lag (ARDL) Model Approach. *Discrete Dynamics in Nature and Society*, *2022*, 1–17. https://doi.org/10.1155/2022/3733243

Benhabib, J., & Spiegel, M. M. (1994). The role of human capital in economic development evidence from aggregate cross-country data. *Journal of Monetary Economics*, *34*(2), 143–173. https://doi.org/10.1016/0304-3932(94)90047-7

Bhargava, A., Jamison, D. T., Lau, L. J., & Murray, C. J. L. (2001). Modeling the effects of health on economic growth. *Journal of Health Economics*, *20*(3), 423–440. https://doi.org/10.1016/S0167-6296(01)00073-X

Čiutienė, R., & Railaitė, R. (2015). A Development of Human Capital in the Context of an Aging Population. *Procedia - Social and Behavioral Sciences*, *213*, 753–757. https://doi.org/10.1016/j.sbspro.2015.11.463

Colantonio, E., Marianacci, R., & Mattoscio, N. (2010). On human capital and economic development: Some results for Africa. *Procedia - Social and Behavioral Sciences*, *9*, 266–272. https://doi.org/10.1016/j.sbspro.2010.12.148

Demographic dividend. (2014, December 2). UNFPA Arabstates. https://arabstates.unfpa.org/en/topics/demographic-dividend-6

Department of Economics, Faculty of Business and Economics, Mettu University, Ethiopia, & Singh, S. (2019). Population Growths and Socio-Economic Development: An Analysis of Mettu Town of Ethiopia. *SocioEconomic Challenges*, *3*(1), 52–63. https://doi.org/10.21272/sec.3(1).52-63.2019

Diebolt, C., & Hippe, R. (2019). The long-run impact of human capital on innovation and economic development in the regions of Europe. *Applied Economics*, *51*(5), 542–563. https://doi.org/10.1080/00036846.2018.1495820

Essien, E. B. (2016). Population growth and economic growth performance in Nigeria (1981–2014). *Turkish Economic Review*, *3*(1), 143–159.

Gruzina, Y., Firsova, I., & Strielkowski, W. (2021). Dynamics of Human Capital Development in Economic Development Cycles. *Economies*, *9*(2), 67. https://doi.org/10.3390/economies9020067

Human Capital—An overview | ScienceDirect Topics. (n.d.). Retrieved February 18, 2024, from https://www.sciencedirect.com/topics/economics-econometrics-and-finance/human-capital

India: Development news, research, data | World Bank. (n.d.). Retrieved February 17, 2024, from https://www.worldbank.org/en/country/india

Ismayilzade, A. A., Guliyeva, S., Teymurova, V., Azizova, R., & Alishova, C. (2021). The impact of Covid-19 on the quality of human capital for the economic development of Azerbaijan. *Journal of Eastern European and Central Asian Research (JEECAR)*, *8*(1), 26–39. https://doi.org/10.15549/jeecar.v8i1.639

Jha, S. C., Deolalikar, A. B., & Pernia, E. M. (1993). Population Growth and Economic Development Revisited with Reference to Asia. *Asian Development Review*, *11*(2), 1–46. Scopus. https://doi.org/10.1142/S0116110593000077

Karim, A., & Amin, S. B. (2018). The impact of population growth on the economic growth of selected South Asian countries: A panel cointegration analysis. *Journal of Accounting,Finance and Economics*, *8*(3).

KILIÇ, C., & Ozcan, B. (2018). The Impact of Financial Development on Human Capital: Evidence From Emerging Market Economies. *International Journal of Economics and Financial Issues*, *8*(1), 258–267.

Kumari, P. (2022). Population and Economic Development. *International Journal of Humanities and Social Science*, *9*(6), 13–17. https://doi.org/10.14445/23942703/IJHSS-V9I6P103

Mason, A. (2003). Population change and economic development: What have we learned from the East Asia experience? *Applied Population and Policy*, *1*(1), 3–14.

Noghanibehambari, H. (2021). Labour market returns to health capital during childhood: Evidence from Medicaid introduction. *Economic Annals*, *66*(229), 99–118. https://doi.org/10.2298/EKA2129099N

Poças, A. (2014). *HUMAN CAPITAL DIMENSIONS - EDUCATION AND HEALTH - AND ECONOMIC GROWTH*. https://api.semanticscholar.org/CorpusID:154565045

Productivity, human capital and educational policies—OECD. (n.d.). Retrieved February 18, 2024, from https://www.oecd.org/economy/human-capital/

Sarker, S., Khan, A., & Mamur Mannan, M. (2016). Urban population and economic growth: South Asia perspective. *European Journal of Government and Economics*, *5*(1), 64–75.

Sibt e Ali, M., Raza, S. M. F., & Abidin, S. Z. (2018). *Population, poverty and economic development nexus: Empirical study of some selected developing countries*.

Sinding, S. W. (2009). Population, poverty and economic development. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *364*(1532), 3023–3030. https://doi.org/10.1098/rstb.2009.0145

Southwest State University, Emelyanov, S., Nekrasova, N., & Federal State Budgetary Institution of Higher Education Southwest State University. (2016). The leading role of human capital in the process of countries' progressive economic development. *Economic Annals-XXI*, *157*(3-4(1)), 19–21. https://doi.org/10.21003/ea.V157-0005

Sycheva, I. N., Chernyshova, O. V., Panteleeva, T. A., Moiseeva, O. A., Chernyavskaya, S. A., & Khout, S. Y. (2019). Human capital as a base for regional development: A case study. *International Journal of Economics and Business Administration*, *7*, 595–606. Scopus. https://doi.org/10.35808/ijeba/304

The Advantages of Overpopulation | Synonym. (n.d.). Retrieved March 2, 2024, from https://classroom.synonym.com/the-advantages-of-overpopulation-12083949.html

The "Demographic Dividend" and Young India's Economic Future: | Economic and Political Weekly. (n.d.). Retrieved February 17, 2024, from https://www.epw.in/journal/2006/49/special-articles/demographic-dividend-and-young-indias-economic-future.html

Vaggi, G., & Groenewegen, P. (2005). *A concise history of economic thought: From mercantilism to monetarism* (Repr.). Palgrave Macmillan.

Wako, A. (2012). Demographic changes and economic development: Application of the vector error correction model (VECM) to the case of Ethiopia. *Journal of Economics and International Finance*, *4*(10), 236–251. https://doi.org/10.5897/JEIF12.039

Yao, W., Kinugasa, T., & Hamori, S. (2013). An empirical analysis of the relationship between economic development and population growth in China. *Applied Economics*, *45*(33), 4651–4661. https://doi.org/10.1080/00036846.2013.795284

Youth Bulge: A Demographic Dividend or a Demographic Bomb in Developing Countries? (2012, January 5). https://blogs.worldbank.org/developmenttalk/youth-bulge-a-demographic-dividend-or-a-demographic-bomb-in-developing-countries

Ziesemer, T., & Von Gässler, A. (2021). Ageing, human capital, and demographic dividends with endogenous growth, labour supply and foreign capital. *Portuguese Economic Journal*, *20*(2), 129–160. https://doi.org/10.1007/s10258-020-00176-2

Zolkover, A., Kaplina, A., Loboda, O., Kyrychenko, N., & Chopko, N. (2021). Features of the Influence of Human Capital on Economic Development: The Case of Ukraine. *Journal of Eastern European and Central Asian Research (JEECAR)*, *8*(3), 425–437. https://doi.org/10.15549/jeecar.v8i3.763