IBN HALDUN UNIVERSITY
SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF ECONOMICS

MASTERS THESIS

EDUCATION EXPENDITURE AND ECONOMIC GROWTH NEXUS: EVIDENCE FROM THE MINT

ADEBAYO ABDULATEEF ODEYEMI

THESIS SUPERVISOR
ASSIST. PROF. ASAD UL ISLAM KHAN

ISTANBUL, 2022

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by
ADEBAYO ABDULATEEF ODEYEMI

A thesis submitted to the School of Graduate Studies in partial fulfillment of the requirements for the degree of Master of Arts in Economics

THESIS SUPERVISOR
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APPROVAL PAGE

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Arts in Economics.

Thesis Jury Members

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This is to confirm that this thesis complies with all the standards set by the School of Graduate Studies of Ibn Haldun University.

Date of Submission Seal/Signature

ACADEMIC HONESTY ATTESTATION

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all materials and results that are not original to the work.

Name Surname:

Signature:

ÖZ

EKONOMİK HARCAMALAR VE EKONOMİK BÜYÜME: MİNT ÜZERİNE BİR ÇALIŞMA

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Kasım 2022, 46 Sayfa

Meksika, Endonezya, Nijerya ve Türkiye, nam-ı diğer MINT, gelecek yıllarda önemli düzeyde iktisadi başarı kaydetmesi beklenen ülkelerdir. Coğrafi ve demografik nitelikleri baz alındığında bu ülkeler, küresel çapta rekabet edebilecek standardı yakalamaları adına gerekli ivedi atılımı sağlayacak potansiyeli barındırmaktadır. Mevzu bahis standardı tutturabilecek olmaları ihtimalini gerçeğe yakınsayan ön koşullardan birisi de beşeri sermayenin kalitesini eğitim yoluyla bilinçli yoldan geliştirmedir. İşbu çalışma MINT ülkelerinin sözü edilen senaryoyu, MINT unsuru ülkelerdeki eğitime olan yatırımın ekonomik büyümeyle olan ilişkisini irdelemeyi amaçlamaktadır. 1994 ve 2020 yılları arası veriler ışığında DOLS ve FMOLS metotlarına başvurarak eğitim harcamalarının ekonomik büyümeye olan etkisi incelenecektir. Çalışmanın bulguları bize eğitime olan mali yatırımla iktisadi kalkınmanın arasında uzun vadeli bir ilişki olduğunu Meksika, Endonezya, Nijerya ve Türkiye örneklerinde göstermektedir. Gözlem doğrultusunda eğitime yapılan her bir birimlik yüzdeki ek yatırımın ekonomik büyümende %3-4'lük artışa yol açtığı saptanmıştır. Literatür bulgularından yapılan çıkarımların bize telkin ettiği, söz konusu ülkelerdeki eğitime ve insana olan yatırımın teşvik edilmesi yönündedir.

Anahtar kelimeler: Beşeri Sermaye, DOLS, Eğitim Harcamaları, Ekonomik Büyüme, FMOLS, MINT.

ABSTRACT

EDUCATION EXPENDITURE AND ECONOMIC GROWTH:
EVIDENCE FROM THE MINT

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The MINT - Mexico, Indonesia, Nigeria and Turkey - are from the countries projected to attain a significant level of economic success in the years to come. As a result of the demographic and geographic characteristics of these countries, they have the potential to push their economies to a globally competitive standard that is suitable for rapid economic development and advancement. From the prerequisites for the actualisation of such standard is the improvement in the quality of labour and deliberate investment in human capital through education. This study examines the viability of such prospects for the MINT by investigating education expenditure and economic growth relationship in the MINT. Through the use of a panel data set ranging from the year 1994 to the year 2020, the study utilises panel Dynamic Least Squares (DOLS) and Fully Modified Least Squares (FMOLS) methods to examine the impact of education expenditure on growth in the MINT, and the finding from the study shows that there is a long-run relationship between education expenditure and economic growth. Expenditure on education positively affects economic growth in Mexico, Indonesia, Nigeria and Turkey. More specifically, according to findings in this study, it is observed that a unit increase in the percentage of education expenditure will result in a 3 - 4 per cent increase in economic growth in the MINT. Labour also significantly impacts economic growth in the MINT. The results for the countries imply that expenditure on education and human capital should be encouraged, as evidence from this study conforms to findings from the literature.

Keywords: DOLS, Economic Growth, Education Expenditure, FMOLS, Human Capital, MINT.

DEDICATION

This work is dedicated to the most valuable people in my life - my dear mother, my lovely wives and adorable children, my honourable father and brothers and the rest of my family and friends. The knowledge that I have you all renews my longing for a meaningful and purposeful life.

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Adebayo Abdulateef ODEYEMI

Istanbul, 2022

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LIST OF ABBREVATIONS

ADF	Augmented Dickey Fuller
CBN	Central Bank of Nigeria
CGE	Computable General Equilibrium
DF	Dickey Fuller
DFI	Development Finance International
DOLS	Dynamic Ordinary Least Squares
EFA	Educational for All
FMOLS	Fully Modified Ordinary Least Squares
GCF	Gross Capital Formation
GDP	Gross Domestic Product
GSW	Government Spending Watch
IIASA	International Institute for Applied Systems Analysis
MINT	Mexico Indonesia Nigeria Turkey
OECD	Ogranisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
PISA	Programme for International Assessment
SDG	Sustainable Development Goal
TURKSTAT	Turkish Statistical Institute
TÜİK	Türkiye İstatistik Kurumu (Turkish Statistical Institute)
UNESCO	United Nations Educational Scientific and Cultural Organization
USD	United States Dollar

CHAPTER I

INTRODUCTION

1.1. Introduction

The functionality and prosperity of an economy depend on a range of factors, among which is the physical and human capital stock. However, from all the factors, human capital stock is the primary driver. A broad spectrum of the available literature shows that the quality of human capital stock available to an economy is connected to the growth rate in such an economy's productive activities (see Akpan, 2005; Gonand, 2007; Schündeln & Playforth, 2014; Mercan & Sezer, 2014). Apart from being a factor, the coordination and operation of other production factors and aspects are directly linked to the human factor. Thus, investment in human capital is considered essential, and as Becker (1964) and Schultz (1961) pointed out, education and training are investments that increase the productivity of an economy. In that connection, the role of education in economic growth and development, particularly for developing nations, correlates to the quality of human capital and, by extension, the quality of ideas necessary to attain growth, whether catching up or cutting edge. Similarly, the difference in education and training is highlighted as the most significant gap between developed and developing nations; productivity tends to increase as the number of educated workers increases since higher efficiency in productivity is associated with better-skilled (educated) workers compared to their unskilled counterparts (Ahmed et al., 2020).

Over time, it is expressed that education and health care are vital components for improving human capital and increasing the economic output of the nation (Becker, 1993). In the new global economy, investing in tangible assets may not be as important as investing in human capital. Therefore, education is considered an engine of growth and key to development in every society (Almendarez, 2010). Furthermore, indicators such as health - mortality, fertility, birth rates, and even institutions and quality of a country's administration are related to educational

attainment (IIASA, 2008). Ziberi et al. (2020) proved that education impacts productivity and growth. It also provides a foundation for development - the foundations on which most economical and social well-being is built - and the key to increasing economic efficiency and social consistency. Through the increase in the value and efficiency of work, education lifts an economy out of poverty and improves the overall productivity and intellectual flexibility of the overall economic workforce. It also ensures that a country is competitive in the global markets, which are characterised by changing technologies and production methods (Ziberi et al., 2020).

More recently, the call for improved education and educational inclusion in poorer and developing nations has been rising. The fact that education is a crucial component of the Sustainable Development Goals (SDG) further stresses the importance of education towards the attainment of economic growth and development. Therefore, the education sector plays a leading role in shaping the ability of a developing country to absorb modern technology and develop production capacity to create growth as well as sustainable development (Todaro & Smith, 2006). However, for education to function as a tool for economic growth, the required focus must be placed on the quality and quantity of education. Quality education is that which provides all learners with capabilities that they need to become economically productive, develop sustainable livelihoods, contribute to peaceful societies and enhance individual well-being, while quantity - the number of years of education - refers to the duration in the acquisition of education; it is also crucial in the sense that a one-year education compared to a four-year education may not yield similar results. *Ceteris paribus*, the contribution of a primary-level education holder is expected to vary from that of a tertiary education holder. Quality education, therefore, is achieved through the combination of content, structure, and duration of learning which can drive developing nations through rapid economic growth and technological advancement.

Despite its importance to the economy, education is an economic good that needs optimal allocation. Education is regarded as both a consumer good and a capital good because of the utility it offers consumers and because it is an input in the production of human resources required for economic and social transformation (Almendarez,

2010). Becker (1993) stated that "people and society need to make it clear that education is a public benefit when all responsible persons benefit", and given the importance of education for a nation, spending on education is of great significance (Ziberi et al., 2020). It is, therefore, imperative for economic authority to be persistent in allocating resources for the development of education and health sectors, as the two affect the quality of human capital significantly. Public funding of education will afford children from poorer families the opportunity to acquire formal education. It will reduce inequalities in current and future generations by improving parenting skills and creating a positive intergenerational return on human capital for the development of the education and health sectors (Maitra et al., 2012). For instance, women with secondary education seek antenatal care and take better medical care and treatment of their children in general. Such women take more initiatives to improve their health and households, are more likely to send their children to school, and have more significant economic opportunities to alleviate poverty and hunger (UNESCO, 2010). Beyond that, spending on education has become a priority worldwide. In the campaign for increased spending on education, UNESCO launched its Education for All (EFA) movement and recommended that 20 per cent of total government spending should be on all levels of education, while generally, 6 per cent of the gross national product should be on education. In pursuit of a similar goal, Development Finance International (DFI) and Oxfam International jointly launched the Government Spending Watch (GSW) initiative, which monitors education spending and sources of funding, in 2013 (DFI, 2014). Additionally, the World Bank agreed to lend cover to education, especially in developing countries (Petrisor, 2014). This implies that education is a crucial factor in driving economic growth, and by extension, spending on education becomes imperative in the economy.

1.2. Motivation for the Study

Before the theorisation of human capital by Becker and Schultz in the 1960s, little or no attention was given to the measurement of the impact of investment in education, presumably not to the extent that researchers did afterwards. Education is the bedrock of every economy, irrespective of its developmental stage. Its potential to bring monetary and non-monetary returns to individuals and society is significantly

essential to an economy. Paulo Freire (1973) observed that education transforms people, who, in turn, change the world. In a study, Mercan and Sezer (2014) explained that public expenditure on education positively impacted Turkey's economic growth. Therefore, quality education can have a lot of impact on an individual. It also generates spillover effects on the economy and society. Investment in education benefits an economy in ways such as enhanced productivity, improved living standards, and reduction in crime and poverty. It can also spur the required level of innovation and creativity necessary to channel a pathway for a developing economy to catch up with developed ones.

As a result, government spending has become a pivotal component in ensuring public sector efficiency. Such spending has resulted in increased attention toward public sector performance and efficiency; hence the composition of this expenditure reflects the fiscal status of the economy (Afonso, 2004). Some key indicators of public sector performance include education, public infrastructure, health, and administrative capacities. Education and health, which are from the many factors that push an economy up, are the leading indicators of long-run efficiency as they reflect investment in human capital whose effect cannot be fully predicted in the short run. Thus, given the impact that education can have, expenditure on education and other vital economic components, such as defence, urbanisation, debt servicing, subsidies and anti-poverty schemes, become significant reasons for increased public expenditures used to alter aggregate demand to ensure macroeconomic growth and stabilisation. Since private institutions are incapable of financing such massive capital projects geared towards development, spending on education and other components will: (a) majorly be from the government and (b) need to be assessed from time to time to ensure that economic resources are allocated efficiently.

The MINT - four countries: Mexico, Indonesia, Nigeria, and Turkey - are emerging and rapidly growing economies that share heterogeneous characteristics and dynamism across borders. One of the factors driving growth is the unsaturated market. One of the distinguishing features of the MINT countries is the demographic composition. The MINT have a combined approximate population of 710 million, with Mexico ranking the 11th, Indonesia ranking the 4th, Nigeria as the 7th, and Turkey as the 18th most populated country in the world. Concerning their

economies' ranking, these four emerging economies are ranked 15th, 16th, 30th, and 19th, respectively.

Therefore, this study is carried out based on the economic potential of these countries, as it concerns attaining a consistent level of sustained economic growth required for a further economic drive (MINT: Sources of Economic Information, 2020).

1.3. Objectives of the Study

Existing theoretical arguments and empirical studies indicate that studying the relationship between education expenditure and economic growth is an area of research that should be observed and built upon from time to time. The reason for such is that spending on education directly affects the quality of human capital and, ultimately, economic growth.

This study investigates the impact of education expenditure on the economic growth of Mexico, Indonesia, Nigeria, and Turkey (the MINT). This investigation revolves around three objectives: first, to assess education expenditure-economic growth in the MINT quantitatively; second, to determine whether and how education expenditure impacts economic growth in the MINT; and third, to cross-examine the outcomes of education expenditure and economic growth among the countries to see what policy implications that can be derived from there.

1.4. Scope and Significance of the Study

After highlighting the significance of human capital (represented as education) and the importance of investment in human capital, this study aims to study the relationship between such investment and economic output in four countries that have the prospect of evolving significantly, given their sizes, in terms of the number of people living in them, and economic strengths of these countries. This study focuses on these countries due to their geographic information; they are situated in four continents - North America, Asia, Africa and Europe - and also because of the forecasted economic outcomes for them in the coming years. Also, studies on the

impact of education spending on economic growth in the MINT are few; therefore, more detailed enquiry and finding have more to reveal in that respect.

First, this study is significant because it aims to fill an essential gap in the literature. The scarce empirical evidence on the subject matter for the MINT makes this study important and, more so, duly timed. Second, the study deals with an important global issue in the developing world: an extension of the frontier of how some developing economies can attain a significant economic transition.

1.5. Organisation of the Study

This study will be under five chapters; the first chapter - the introductory chapter - will cover the background of the study, the motivation and objectives of the study, the scope and significance of the study, as well as the organisation of the study. The second chapter will focus on the empirical and theoretical framework of the study. The third chapter will be about the methodology of the study, data description, model specification and the estimation procedure. The fourth chapter will consist of descriptive statistics of the data used in the study. The chapter will be concluded with the analysis and interpretation results. The fifth chapter, which is the concluding chapter of the study, will include a summary of the entire study, a discussion of the study findings, a conclusion and recommendations for the study.

CHAPTER II

LITERATURE REVIEW

2.1. Theoretical Review

Human capital is a broad concept that represents human features that can be acquired and propel an increase in income. Due to its complementary nature with other forms of capital, it is established that more educated people earn more than less educated people. The emphasis is not just on investing in human capital, which is necessary, but focusing on the extent to which the human capital of a nation should be harnessed. The human capital theory holds that adequate investment in people will result in a growing economy. Some countries offer their citizens free college education because better-educated individuals earn and spend more. This category of people stimulates the economy much more than others.

As one of the most prominent financiers of education and human capital investment in the Global South, the World Bank stresses the importance of education. They see education as one of the most potent instruments for poverty reduction and one of the other things that cumulatively operate together to drive development in a country (World Bank, n.d.). Therefore, education should be funded appropriately by the government to achieve its economic goals and objectives. Since the advent of the human capital theory, education expenditure, like every other capital expenditure, has been an investment. Hence, the need to measure its impact on an economy concerns policymakers and researchers alike. In that regard, the subject of return on educational spending has been increasing. Quality education becomes necessary in transforming a developing economy into a developed one, given its impact on human capital development, which is the bedrock of any economic development (Perez, 2019). Blundell et al. (2001) noted three distinct ways of defining returns on education. These are the personal return, the social return, and the labour

productivity return. All these can trigger significant economic growth, especially the productivity return.

Education has never been a contentious issue, whether it impacts individuals or society. This is so because the impacts of education are felt in every aspect of life. Education benefits to individuals include increased productivity, earning, and improved health. At the same time, environmental improvement and spillover effects are some benefits of education that accrue to society. Together, these benefits translate to economic growth and development in the short and long runs. However, determining the required level of expenditure and estimating the impact of education spending on an economy are some of the significant challenges that researchers face in the assessment of the relationship between education expenditure and economic growth.

Despite the enormous impact that education can have on individuals and the country's economy, the quality and impact of education for developing economies are not the same when compared to developed economies. The situation is the same for the MINT. While the main reason for poor educational systems in some developing countries is inadequate funding, some are due to corruption and poor policy formulation and implementation. As such, making efficient investments in human capital development is pertinent in bringing about a high return on education and its overall impact on an economy, given that the development of human capital is critical for long-term growth and development. For instance, in countries such as Argentina, Brazil, Colombia, and Mexico, private returns on education exceed social returns. The outcome differs for countries like Austria, Belgium, the Netherlands, Norway, Singapore, and Spain, where social returns exceed private returns. Such disparities may be due to insufficient human capital investment or insufficient expenditure on education (Chika & Ogugua, 2014). In a regular economic model, the accumulation of human capital is seen as an investment decision where the individual gives up some proportion of income during the period of education and training in return for increased future earnings. Individuals will only undergo additional schooling or training activity if the cost is less than the increased future earnings they assume. However, in a competitive labour market where wages reflect the marginal product of workers, to command higher salaries, the better-educated or

more trained workers must be sufficiently more productive in employment than their less-skilled counterparts.

In the general sense, public expenditure has taken different forms in the MINT; over the last three decades, Mexico has been inconsistent regarding economic growth, poverty reduction and inclusiveness. The inconsistency has reduced the possibility of convergence in the long-run GDP growth rate in Mexico, which averaged 0.53 per cent from 1993 before reaching 13.80 per cent in 2020. The Indonesian government recorded a compound annual growth rate of 4.3 per cent between 2015 and 2019. Indonesia, as an emerging market, has placed education at the centre of its strategy as it accounts for 14.8 per cent of revenue accrued to the government. Mahmudah (2019) concluded that education value positively affected economic growth in Indonesia by 40.9 per cent between 2000 and 2015. However, the result of Suwandaru et al. (2021), which studied the relationship between public expenditure on education and economic growth for 32 years (1986 - 2018) in Indonesia, showed contradictory empirical results between long-term and short-term estimates of the relationship between public expenditure on education and economic growth.

Regarding Mexico, Villafaña et al. (2021) observed that the basic education budget as a percentage of GDP in Mexico showed a downward trend from 2.3 per cent to 1.9 per cent. Consequently, Mexicans were ranked below average in the latest OECD's Programme for International Assessment (PISA) test, which reflects a low performance compared to the OECD average. The objective of his study was to establish whether a relationship exists between public spending on primary education and the quality of education measured in terms of the PISA test scores in Mexico. He concluded that Mexico had not invested enough in education compared to other OECD countries since it is 2 per cent below the OECD average of 5 per cent.

Odigwe and Owan (2019) showed that Nigeria's average budgetary allocation to education between 2009 and 2018 as a percentage of the total budget stands around 7 per cent, ranging from 4 per cent to 9 per cent. However, this is an improvement compared to the average of 5.5 per cent between 1988 and 2007. Public expenditure on education was found to be fluctuating over these periods and below the UNESCO benchmark of 26 per cent for developing nations. The research concluded that the

fluctuations in the allocation towards education have contributed to the backwardness faced by the Nigerian educational system precisely, as well as the slow economic growth of the country generally. Obi and Obi's (2014) research results indicated that recurrent expenditure on education has no long-term relationship with economic growth. The finding, according to the researcher, is in line with the findings of Nurudeen and Usman (2010), which posit that there was no significant relationship between expenditure on education and economic growth in Nigeria. They further mentioned some reasons that may be attributed, such as labour market distortions, academic staff redundancy, brain drain, and corruption. However, the finding of Ayeni and Omobude (2018) was in contrast; it posits that recurrent expenditure on education has both a positive and significant impact on the real GDP in the short and long term, while capital expenditure on education was positive but insignificant. The author claimed that the reason for the result was that throughout the study, recurrent educational expenditure was prioritised over capital expenditure. The study concluded that the impact of education expenditure on economic growth is a function of the level of investment in education and expenditure type in Nigeria.

Similarly, Mercan and Sezer (2014) observed the relationship between expenditure on education and economic growth in Turkey. Their findings also confirm a positive relationship between both; they stressed the need for spending on education; higher education particularly, for the economy to be dynamic. Educational quality in Mexico, Indonesia, Nigeria, and Turkey (MINT) has considerably improved over the last 30 years, especially in total enrollment and even the share of expenditure that goes to education in some of these countries. However, the quality of education maintained a slow pace with educational spending. Education in Mexico, just like other MINT countries, has witnessed some significant reforms. Recent among them is the one by President Peña Nieto presented as "a change in the foundation" of Mexico's education system. In the reform, aside from having the right to education, students also have the right to maximise achievement in learning. Indonesia has experienced increased education spending of over 20 per cent of its total public expenditure and 3.6 per cent of GDP. Despite that, the quality of education has not been keeping up with the expenditure on education (Nurkolis, 2018). Despite the various problems facing the Nigerian educational system, the budget allocation to the sector is still abysmally low. In 2022, for instance, Nigeria allocated 7.9 per cent to

the education sector. This figure is below the UNESCO recommendation of 15-26 per cent for developing countries. Turkey has witnessed an outstanding improvement in her education in the last few decades in terms of an increase in enrolment, student performance, and reduced inequality (Patrinos et al., 2019). The fundamental education law (Law No. 4306) passed in August 1997 made eight years of schooling compulsory as against the previous five years. As a result of this reform, Turkey witnessed about 1.1 million enrollments of students in primary education. According to the World Bank (2005), between 1997 and 2002, Turkey's Ministry of National Education built 81,500 new primary-education classrooms and increased classroom supply by 30 per cent.

From all, we can conclude that:

1. Education is an essential instrument for poverty reduction, improving health and other development goals. It is a significant development driver and, therefore, should be funded by the government to attain economic goals and objectives.
2. It should not be assumed that a linear relationship exists between public spending on education and economic growth without considering an economy's expenditure pattern, educational policy, and the quality of education. According to UNICEF (see Villa, 2016), this cannot be simplified to a single indicator as it is affected by various political, cultural and economic factors.
3. The impact of education spending on economic growth in the MINT still requires more enquiries and findings to reveal.

2.2. Empirical Review

In previous studies, education was generally a key descriptive element, with higher education being the most relevant factor in developed countries. Economic growth and human resource development can have a causal relationship, as evidenced by the findings of Ranis *et al.* (2000), who found that human resource development has a significant impact on economic growth. That substantially robust economic growth paves the way for human resource development; as pointed out by another study (Patel & Annapoorna, 2019) with similar outcome.

Using a macro version of the Mincer relationship between education and salaries for individual employees, Chika & Ogugua (2014) presented new evidence on the social returns to education within a macroeconomic growth regression framework. Their findings showed that increasing worker productivity through education by a year would boost economic growth by 7 to 10 per cent in the short term and 11 to 15 per cent in the long run. However, when the estimated social returns are compared to the estimated private returns, it is concluded that the personal and social returns to education are roughly equal: no evidence for significant human capital externalities was discovered.

Canton (2007), in a study comparing women born just before and after the school enrollment date, found some policy-relevant evidence supporting the influence of education on baby health. The study aimed to see if wealthier families with better-educated parents spend more on private tutoring than their less affluent and less educated peers. Thirteen explanatory variables were developed to capture the level of household welfare and parental education. The outcome showed that children of higher-educated parents perform better than children of less-educated parents; social mobility is reduced across generations, which conforms to another study by Lange and Topel (2006). Devereux (2019) also observed that households are willing to devote a significant portion of their monthly money to their children's education. He argues that private tutoring expenses, particularly for examination-oriented courses, are not regular items in the budgets of many families. They are one-time expenditures and families seem to willingly shoulder these out-of-pocket education costs, even if they are substantial, in the hopes for their children's success in high level exams. Mothers with more outstanding education spend more time caring for their children than mothers without education.

Dauda (2010) carried out an empirical investigation on the relationship between investment in education and economic growth in Nigeria using annual time series data from ·1977 to 2007. The study, employing the Johansen cointegration technique and error correction model, observed a long-run relationship between investment in education and economic growth. In the study, gross fixed capital formation and educational capital were statistically significant, while the labour force was not a significant variable in the Nigerian economy. Mallick *et al.* (2016), using a balanced

panel data set for 14 Asian countries - among them was Turkey - from 1973 to 2012, investigated the impact of expenditure on education on economic growth. The results were similar to that of Dauda (2010) - the existence of a long-run effect of education expenditure on economic growth for all 14 countries. The implication from both findings suggests that an increase in educational investment should be encouraged in order to accelerate growth in the country.

Odeleye (2012) explained that disparities in economic growth could be explained by the difference in national knowledge capital. He explained that for a country to achieve its economic and societal objectives, there is a need for the government to achieve a level of economic growth that translates into GDP gains. He examined the effect of education and economic growth in Nigeria by adopting the OLS technique and Computable General Equilibrium (CGE) model. Findings from the study showed that economic growth is significantly affected by recurrent expenditure. Similarly, Hanushek (2017) also adopted two cointegration techniques of analysis, and the study employed the Fully Modified OLS and the Dynamic OLS approaches; these approaches corrected the standard OLS for serial correlation and endogeneity of regressors and results from there indicated that schooling is significant and impacts economic growth positively in Nigeria.

CHAPTER III

DATA AND METHODOLOGY

3.1. Data Description

To determine the relationship between expenditure on education and economic growth in Mexico, Indonesia, Nigeria, and Turkey, this study applies the Cobb-Douglas production function assuming constant return for technology.

In examining the relationship, panel data analysis is used in the study. This study combines data sources from the World Bank development indicators, the Turkish Statistical Institute, and the Central Bank of Nigeria statistical bulletin. Data for total gross domestic product per capita, gross capital formation, and total labour for all the countries were obtained from the World Bank development indicators (World Bank, 2022). Also, data for total expenditure on education (Mexico and Indonesia only) were obtained from the World Bank development indicators, while the data on Turkey's total spending on education was obtained from the Turkish Statistical Institute (TÜIK) while similar data for Nigeria were obtained from the Central Bank of Nigeria (CBN) statistical bulletin. The data set covers from 1994 to 2020 for the study area - Mexico, Indonesia, Nigeria and Turkey. It consists of gross domestic product per capita at constant, the gross capital formation as a percentage of the GDP, labour force and expenditure on education as a percentage of the GDP for each country.

Table 3.1. Variable Description

Variable	Description	Source
GDP per capita	The total market value of goods and services per head. It is the GDP divided by the total population.	World Bank
Gross Capital Formation	It is the economy's capital: total fixed assets combined with net changes in inventories. It is expressed as a percentage of the GDP	World Bank
Labour Force	The total number of active labour market participants	World Bank
Education Expenditure	The total public expenditure on education in the economy. It is also expressed as a percentage of the GDP	World Bank, TÜIK & CBN

3.2. Model Specification

To determine the effect of education expenditure on economic growth in Mexico, Indonesia, Nigeria and Turkey, this study relies on the Cobb-Douglas production function where output in an economy is a function of labour, capital stock and human capital is utilised with some of the following assumptions: (i) there is constant return technology (ii) increasing human capital affects an economy's economic growth positively (iii) human capital expenditure is on education and completely re-directed towards production in the economy. Therefore, the production function is expressed as:

$$y = f(l, k, h) \qquad (3.1)$$

Where;

y = the output in the economy (GDP per capita)

l = labour force

k = the physical capital in the economy

h = human capital input

With the assumption that human capital expenditure is on education, then;

$$h = f(eexp) \qquad (3.2)$$

Where $eexp$ represents public expenditure on education

Substituting for h in the equation (3.1), the production function is re-expressed as:

$$y = f(l, k, eexp) \quad (3.3)$$

Thus, the production function is given as follows:

$$Y = A L^{\alpha} K^{\beta} EEXP^{\lambda} \quad (3.4)$$

Equation (3.4) above is written as an econometric model to determine the impact of the dependent variables L, K and EEXP on the output Y. Therefore, the model is written as;

$$GDP_{it} = A\, LABOUR_{it}^{\alpha}\, GCF_{it}^{\beta}\, EEXP_{it}^{\lambda} \qquad (3.5)$$

Since our model is non-linear, it is expressed as;

$$ln\, GDP_{it} = A + \alpha ln\, LABOUR_{it} + \beta GCF_{it} + \lambda EEXP_{it} + \varepsilon_{it} \quad (3.6)$$

Where:

The subscript i = 1 to N denotes the countries (Mexico, Indonesia, Nigeria and Turkey), and subscript t represents time (1994 to 2020); $ln\, GDP_{it}$ is the natural log of GDP; A is the technology (assumed as constant); $LABOUR_{it}$ is the number of labour in the labour market in the countries over the study period; GCR_{it} is the gross capital formation in the countries; $EEXP_{it}$ is the education expenditure in the period for the

countries; and ε_{it} is the error term. The coefficients - α, β, and λ - are the parameters of the independent variables explaining the impact of labour, capital and education expenditure on the dependent variable GDP, in other words, economic growth in the MINT.

Since the study observes the impact of education expenditure on economic growth, the natural log of the real GDP is used in the model, following the examples found in literature and similarly, labour is logged. However, the variables for gross capital formation and education expenditure are not logged, as data regarding them have been expressed as a percentage of real GDP.

3.3. Estimation Procedure

3.3.1. Covariance Analysis

In this study, the estimation procedure will first start with checking for a correlation between the dependent and the independent variables. This will be done through the covariance analysis with p-values checked to see if there is any correlation between the variables. If there is a correlation, the panel unit root test will be conducted.

3.3.2. Panel Unit Root Test

To estimate our econometric model, some tests will be carried out, the first of which is the panel unit root test. The panel unit root test is a prerequisite for the cointegration test. The cointegration test is necessary to determine if there is an existence of a long-run relationship between all the variables. However, for cointegration tests to be possible, all variables must be stationary; first, to check whether they are stationary at level. If the variables are not stationary at level, it is required to check whether they are stationary at first difference. This check for stationarity is the purpose of the panel unit root test. Checking for stationarity is also a necessary condition to run a cointegration test. The panel unit root test in this study will follow that of Levin et al. (2002) and Im et al. (2003). It will also be based on the Augmented Dickey-Fuller (ADF) principle. The panel unit root test will be based on the equation:

$$\Delta \boldsymbol{X}_{i,t} = \propto_i + \boldsymbol{\beta}_i \boldsymbol{X}_{i,t-1} + \sum_{j=1}^{Pi} \boldsymbol{\mu}_{i,j} \Delta \boldsymbol{X}_{i,t-j} + \boldsymbol{\varepsilon}_{i,t} \qquad (3.7)$$

Where;

Δ is the first difference operator,

$X_{i,t}$ is the dependent variable - *i* over the period - *t*,

$\varepsilon_{i,t}$ is a white-noise disturbance with a variance of σ_i^2.

However, in the equation, βi and the lag order μ in this equation may vary across sections (countries). As such, the null hypothesis is given as H_0 is $\beta_i = 0$, and the alternative hypothesis H_1 is $\beta_i < 1$.

3.3.3. Cointegration Test

This study will adopt the Kao Residual Cointegration Test. The test aims to determine whether a long-run relationship exists between the variables. If the series are co-integrated, there is a long-run relationship between the variables. The cointegration test is a basis to examine the long-run relationship between the explained and the explanatory variables as a group. To explore panel cointegration, Kao follows two tests; the Dickey-Fuller (DF) test and the Augmented Dickey-Fuller (ADF) test; this study uses the latter (Kao, 1999).

For the Dickey-Fuller test, the cointegration equation is derived from equation (3.8) below, where *i* ranges from 1 to m - the total number of exogenous variables - *t* ranges from 1 to T – total number of observations over time and the numbers of individual members of the panel is N.

$$y_{it} = \propto_i + \sum_{i=1}^{m} \beta i x_{it} + e_{it} \qquad (3.8)$$

From equation 3.8 above, we have:

$$y_{it} = y_{t-1} + u_{it} \qquad (3.9)$$

$$x_{it} = x_{it-1} + e_{it} \qquad (3.10)$$

Thus, the estimated residuals are used for the estimated Dickey-Fuller test, which is given as:

$$\hat{e}_{it} = \rho \hat{e}_{it-1} + v_{it} \qquad (3.11)$$

As for the Augmented Dickey-Fuller cointegration test using estimated residuals following Kao, the equation is expressed as:

$$\hat{e}_{it} = \rho e_{it-1} + \sum_{j=1}^{k} \gamma_j \Delta \hat{e}_{it-j} + v_{itk} \qquad (3.12)$$

Where $\hat{e}_{it}$ is the estimated residuals and ρ is the number of lags in the ADF specification.

Testing for cointegration between independent and dependent variables using both Dickey-Fuller and ADF test statistics, the null and alternative hypotheses are H0: $\rho = 1$ and H1: $\rho < 1$.

3.3.4. Model Estimation Technique

This study uses the Panel Dynamic Least Squares (DOLS) and Fully Modified Least Squares (FMOLS) to determine the relationship between education expenditure and economic growth in the MINT.

CHAPTER IV

PRESENTATION AND INTERPRETATION OF RESULTS

4.1. Descriptive Statistics

Table 4.1. Descriptive Statistics

Variable	Mean	Std. Dev.	Maximum	Minimum
GDP	5503.543	3426.747	12038.63	1414.101
LABOUR	57283534	33162228	1.36E+08	20891389
GCF	25.95569	5.844671	42.08362	14.90391
EEXP	11.19314	6.978723	29.23802	0.785084

Note: GDP = Real Gross Domestic Product per capita; Labour = Labour Force; GCF = Gross Capital Formation; EEXP = Education Expenditure

The descriptive statistics of the panel series for the MINT are shown in Table 4.1 above. As shown in the table, the average GDP per capita (in millions of USD) for the MINT during 1994 - 2020 is USD 5504; the maximum real GDP per capita for all the countries observed together is USD 12039, while the minimum stands at USD 1414 for the sample period. The figures indicate that the countries are middle-income countries; while the minimum value of GDP per capita is within the World Bank classification for lower-middle-income countries, the maximum value aligns with the World Bank classification for upper-middle-income countries, which suggests that there is potential for economic growth in the MINT. Figures 4.1 to 4.5 show the graphical representation of the real GDP per capita. For the larger part of the period in focus, there is a continuous rise in real GDP per capıta in all the countries. However, Mexico and Turkey experienced major shocks between 2008 and 2010,

while Nigeria and Indonesia, despite having a larger population than Mexico and Turkey, have lower GDPs per capita. Mexico, Indonesia and Nigeria have also been experiencing a sharp decline in GDP per capita, as shown in Figure 4.5.

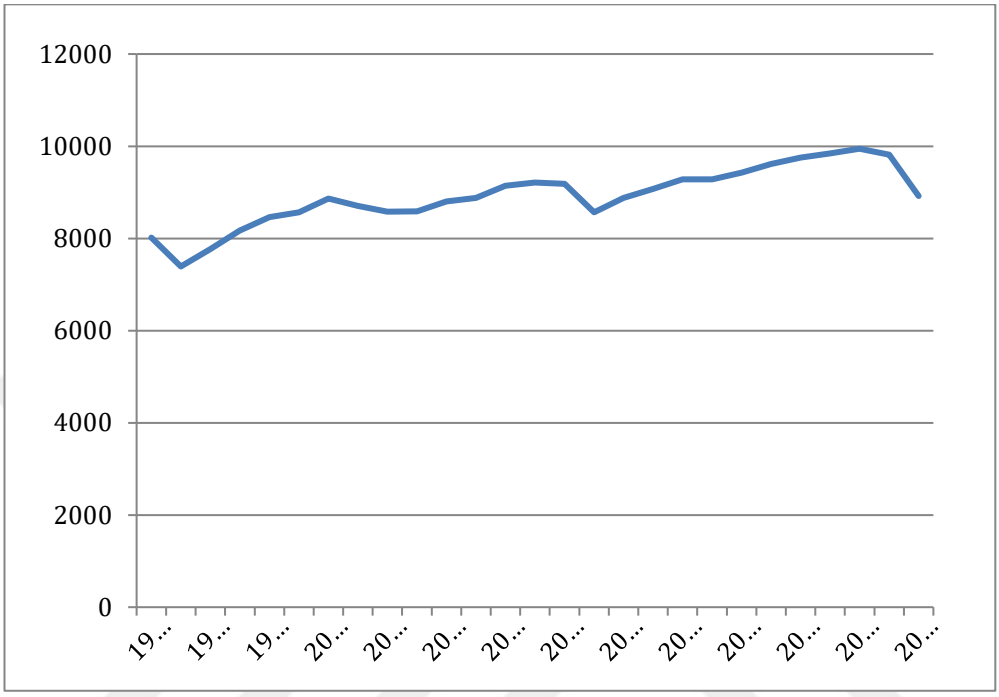

Figure 4.1. Real GDP per Capita (Mexico)
Source: World Bank

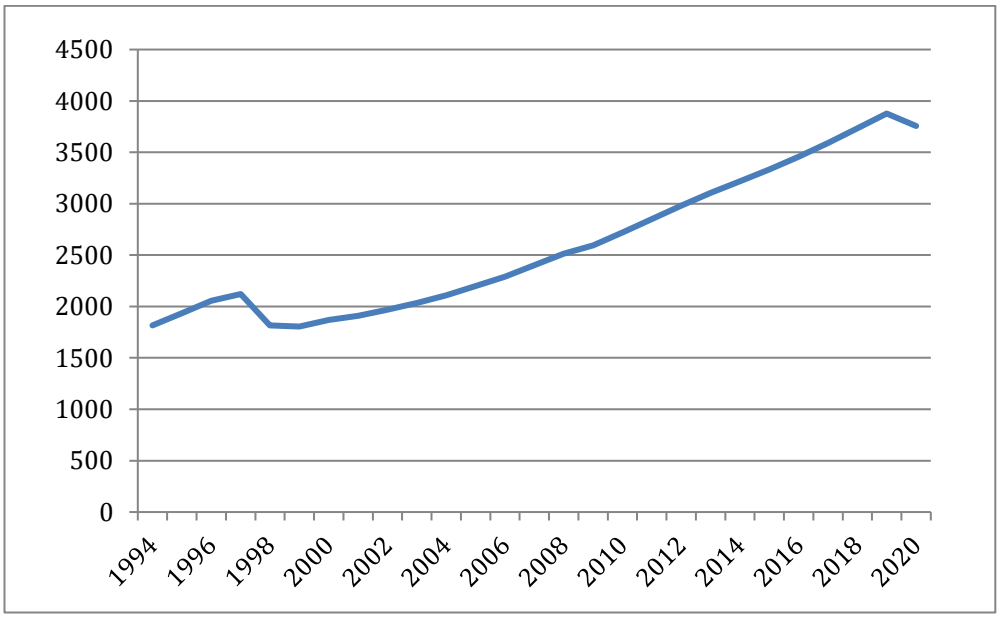

Figure 4.2. Real GDP per Capita (Indonesia)
Source: World Bank

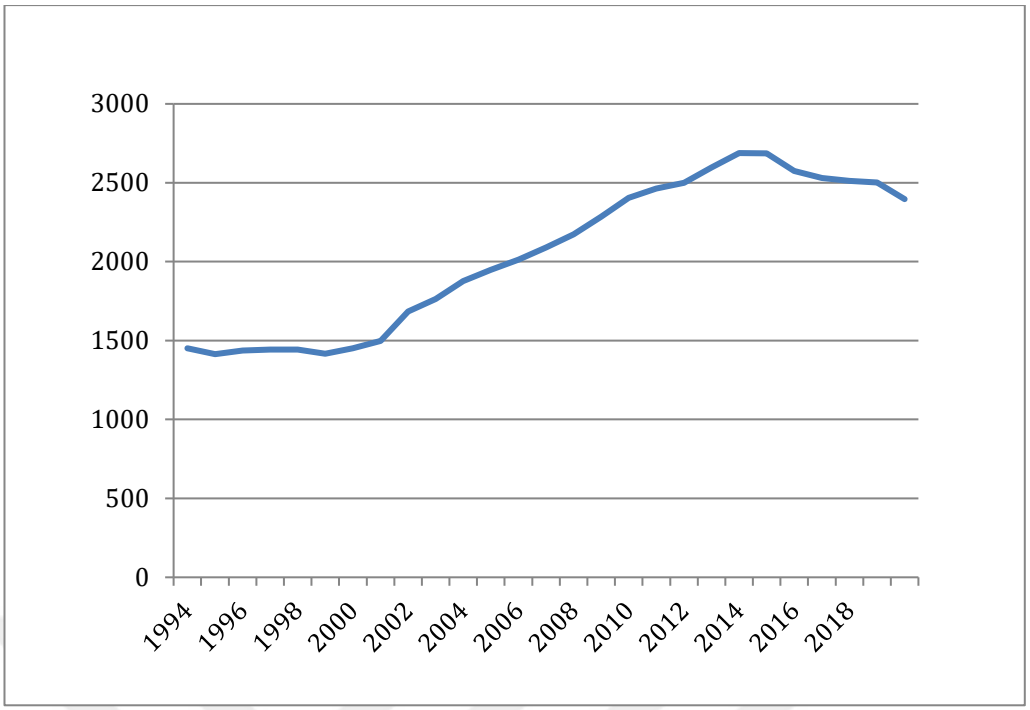

Figure 4.3. Real GDP per Capita (Nigeria)
Source: World Bank

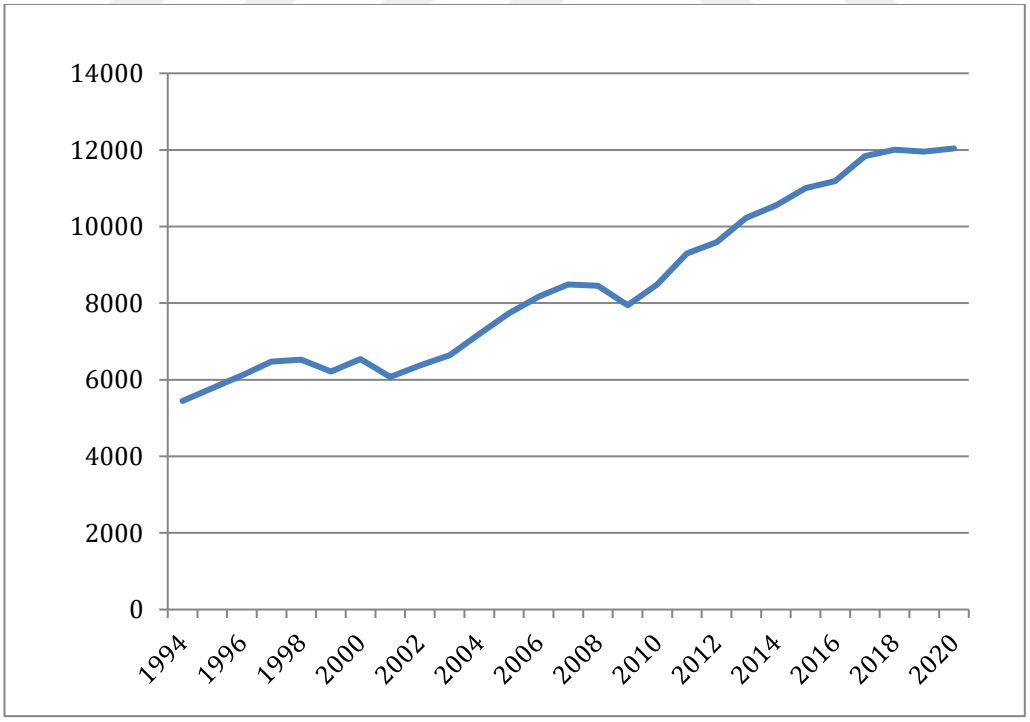

Figure 4.4. Real GDP per Capita (Turkey)
Source: World Bank

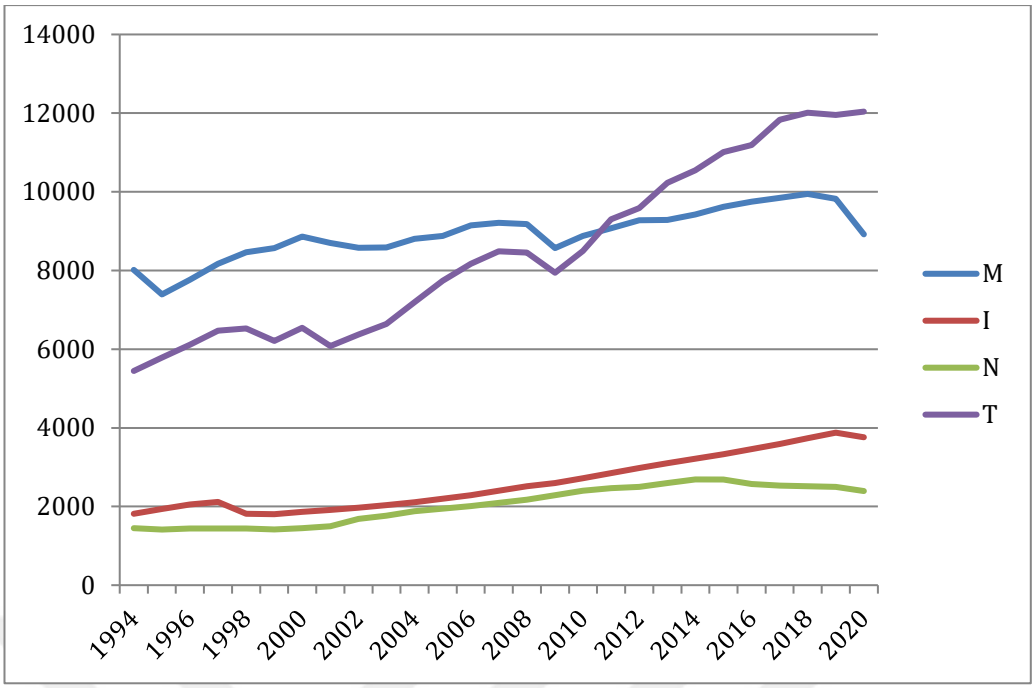

Figure 4.5. Real GDP per Capita (MINT - Combined)
Source: World Bank

The average labour force for all the countries combined is around 57 million, with a minimum value of approximately 21 million and a maximum of 136 million people in the labour force from 1994 to 2020. Given the demographic characteristics of these countries, it is easy to understand that human capital, if adequately invested in these countries, will provide an economic advantage for the MINT. Compared with their populations, the figures align with economic expectations for the countries. The figures below (4.6 – 4.10) show the total population of persons between the ages of 15 and 64. It also shows the percentage of the total population in the MINT that are within the 15 - 64 age brackets.

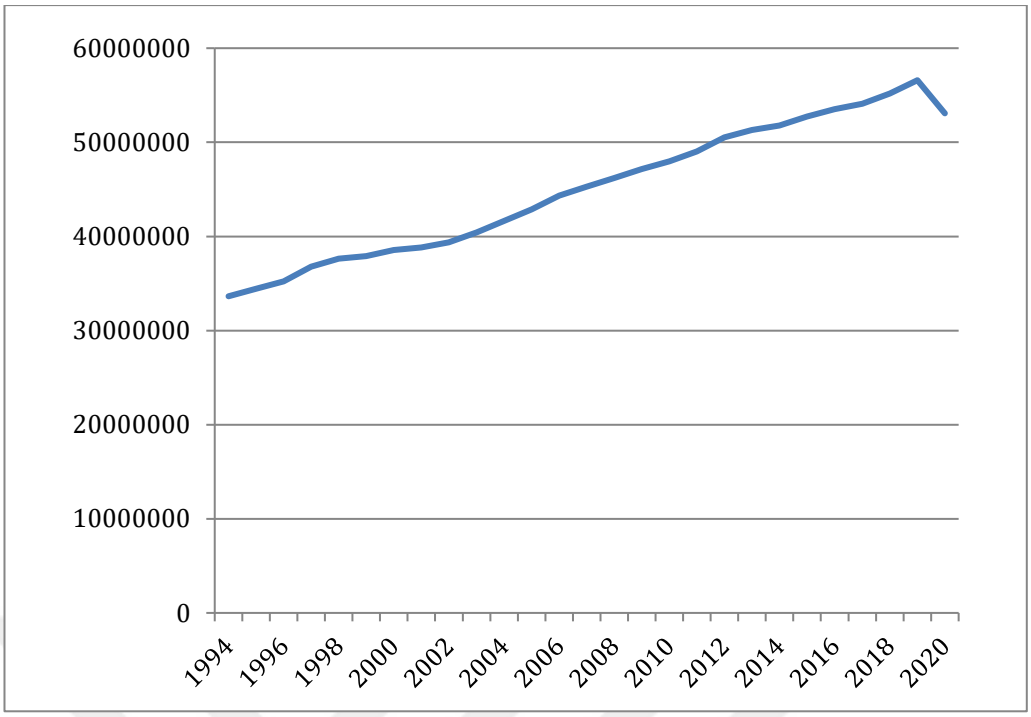

Figure 4.6. Total Labour Force (Mexico)
Source: World Bank

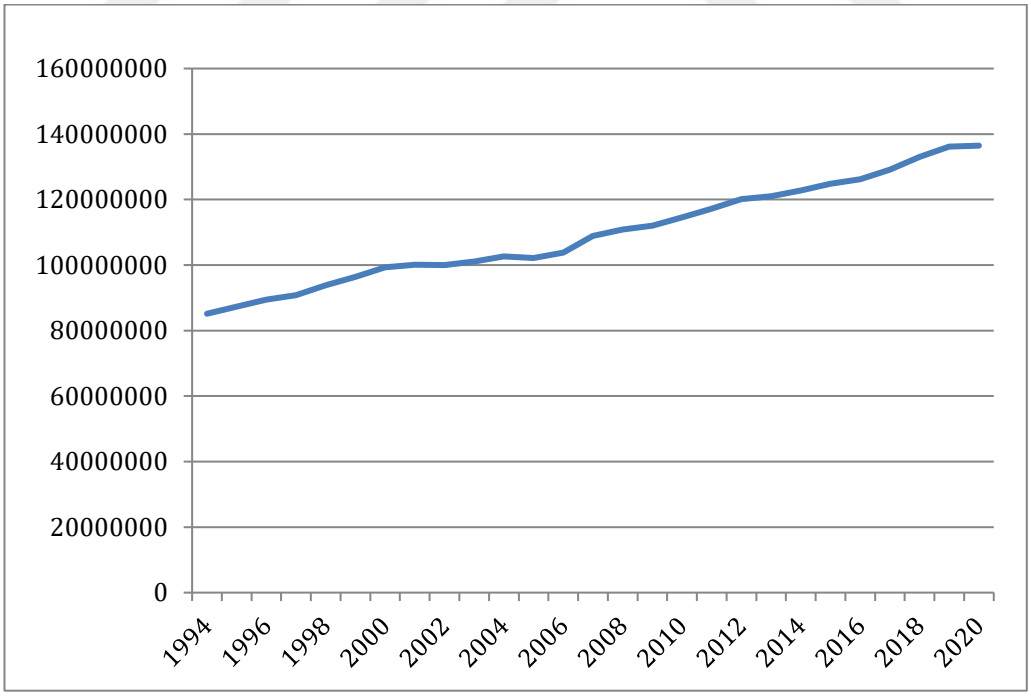

Figure 4.7. Total Labour Force (Indonesia)
Source: World Bank

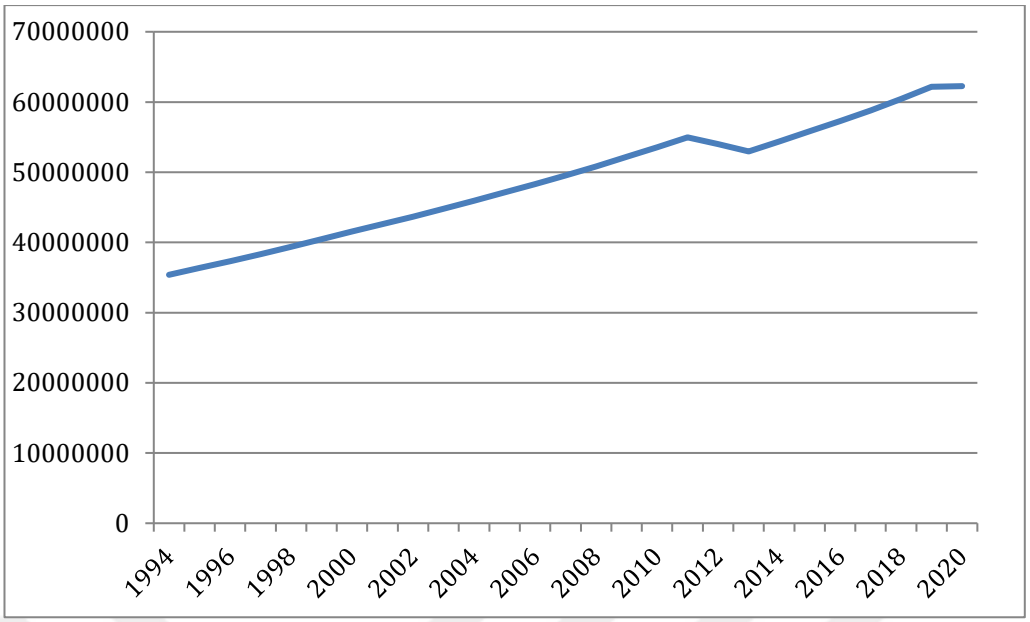

Figure 4.8. Total Labour Force (Nigeria)
Source: World Bank

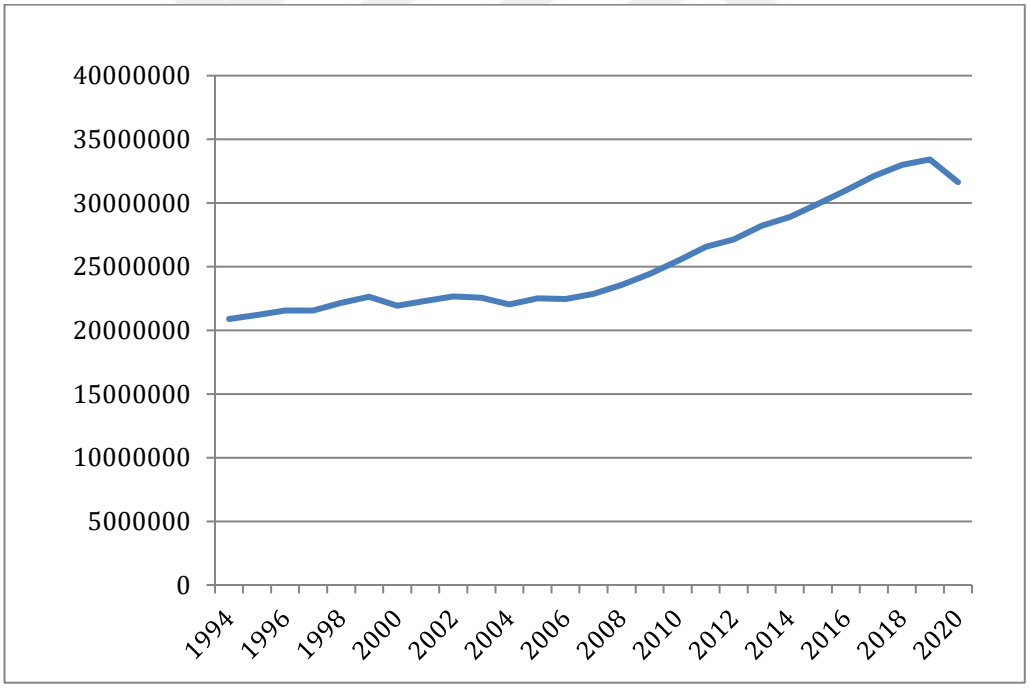

Figure 4.9. Total Labour Force (Turkey)
Source: World Bank

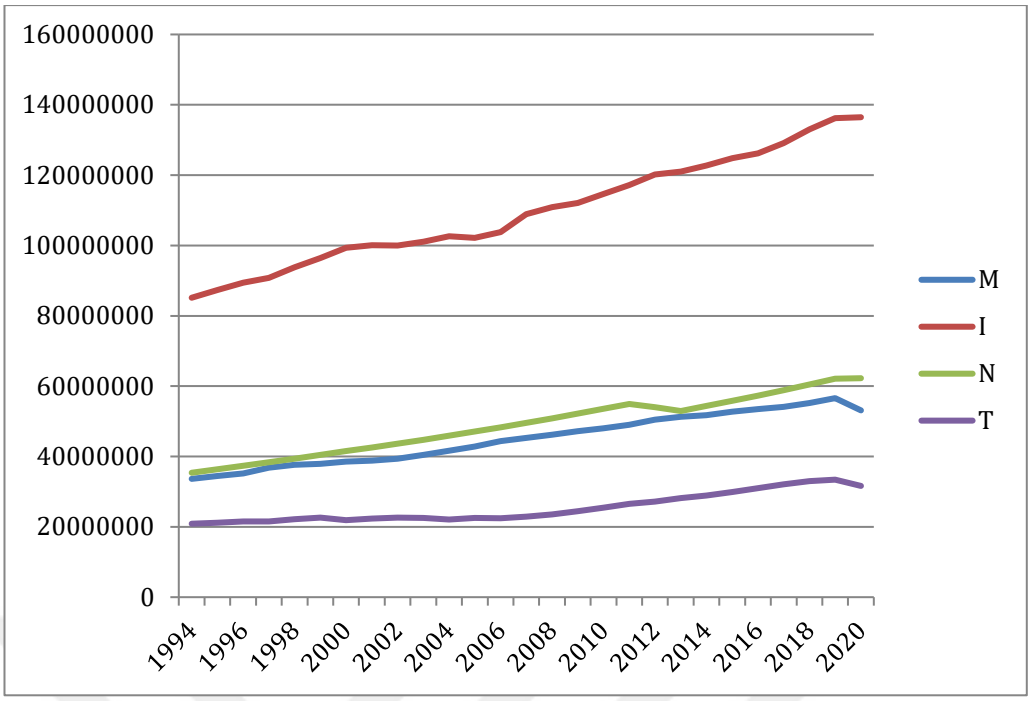

Figure 4.10. Total Labour Force (MINT - Combined)
Source: World Bank

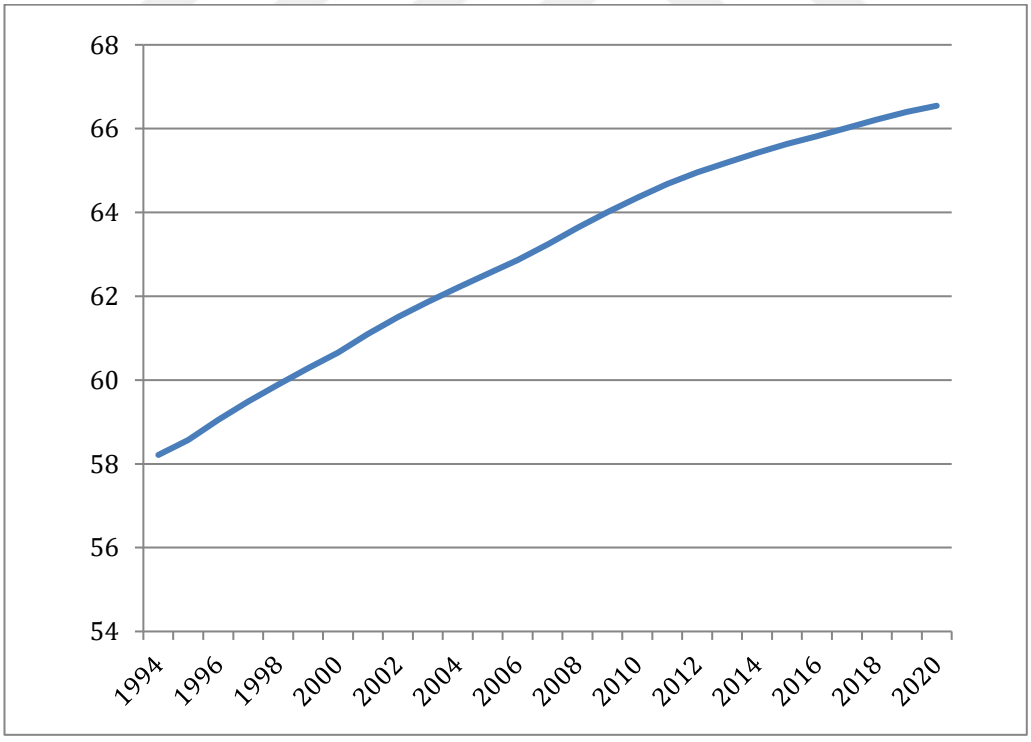

Figure 4.11. Total Population for Ages 15 – 64 in Mexico (% of Total Population)
Source: World Bank

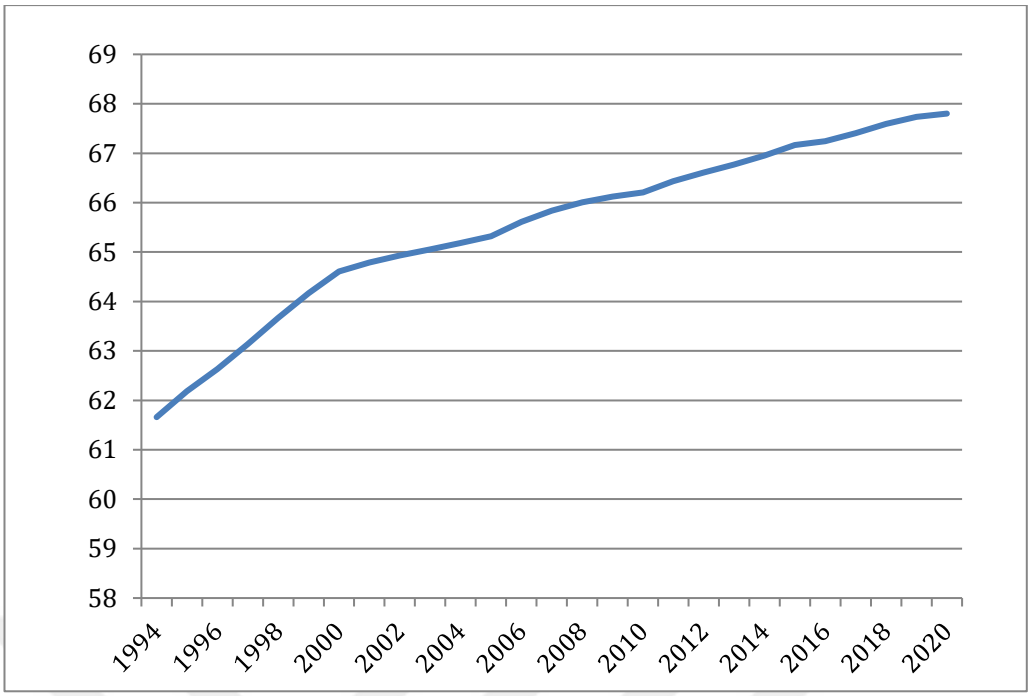

Figure 4.12. Total Population for Ages 15 – 64 in Indonesia (% of Total Population)
Source: World Bank

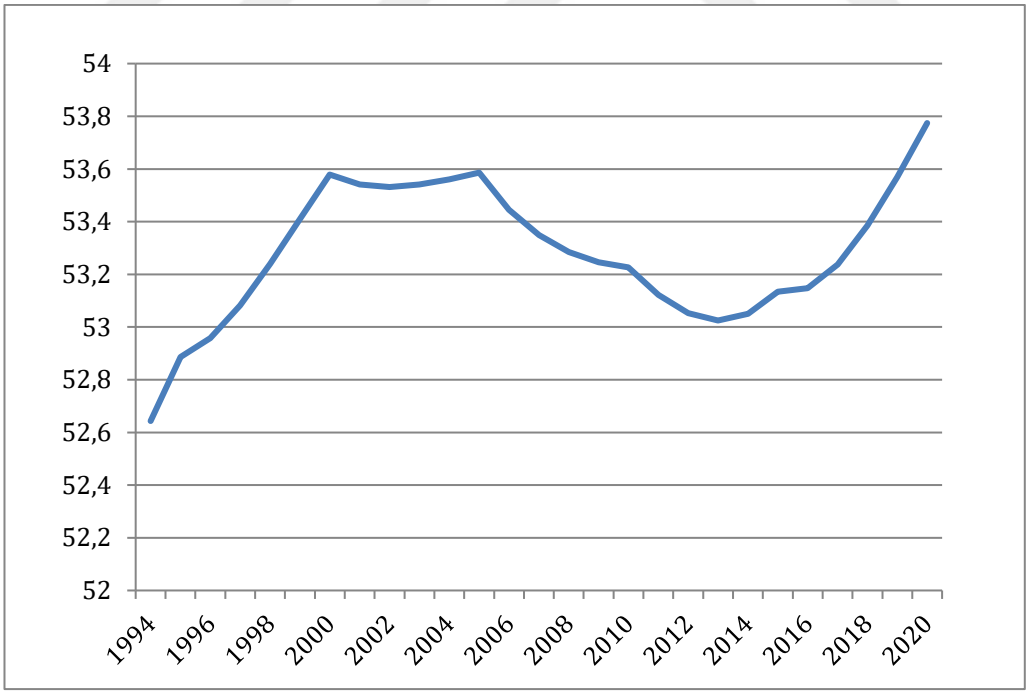

Figure 4.13. Total Population for Ages 15 – 64 in Nigeria (% of Total Population)
Source: World Bank

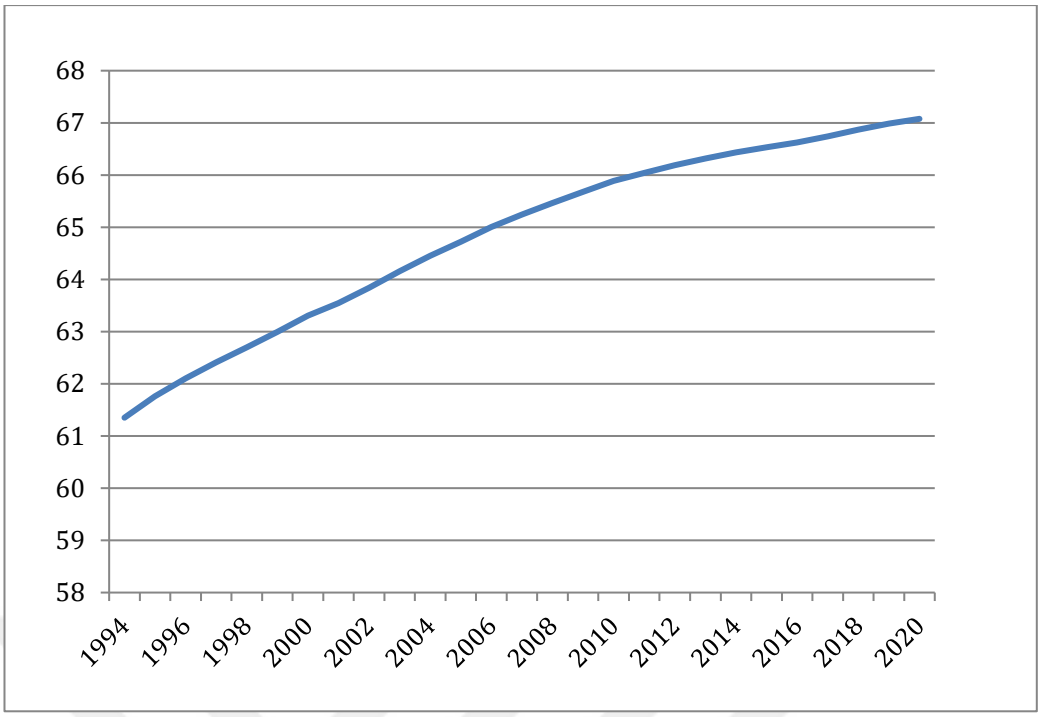

Figure 4.14. Total Population for Ages 15 – 64 in Turkey (% of Total Population)

Source: World Bank

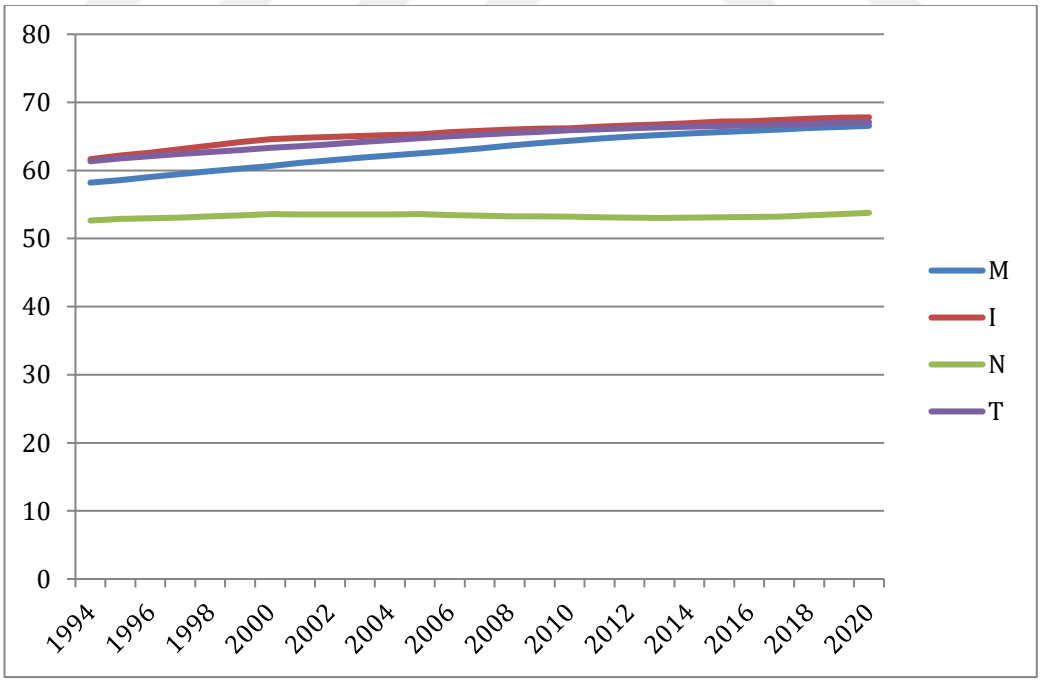

Figure 4.15. Total Population for Ages 15 - 64 (MINT - % of Total Population)

Source: World Bank

In Table 4.1, GCF gross capital formation (as a percentage of the GDP), which is the capital in our model, is also described. An average of 26 per cent was observed, with minimum and maximum at 15 per cent and 42 per cent. Another variable in the table is the education expenditure expressed as a percentage of the GDP. When observed together, the average rate of GDP expended on education in the MINT is 11 per cent. The minimum is 1 per cent, while the maximum is 29 per cent. In Figures 4.9 and 4.10, the percentage of GDP expended on education in the countries was observed. Mexico and Indonesia have performed better than Nigeria and Turkey, who have consistently spent less than 10 per cent of the GDP on education. The standard deviations for all the variables are relatively low and not far from the mean, which implies that the dataset is reliable.

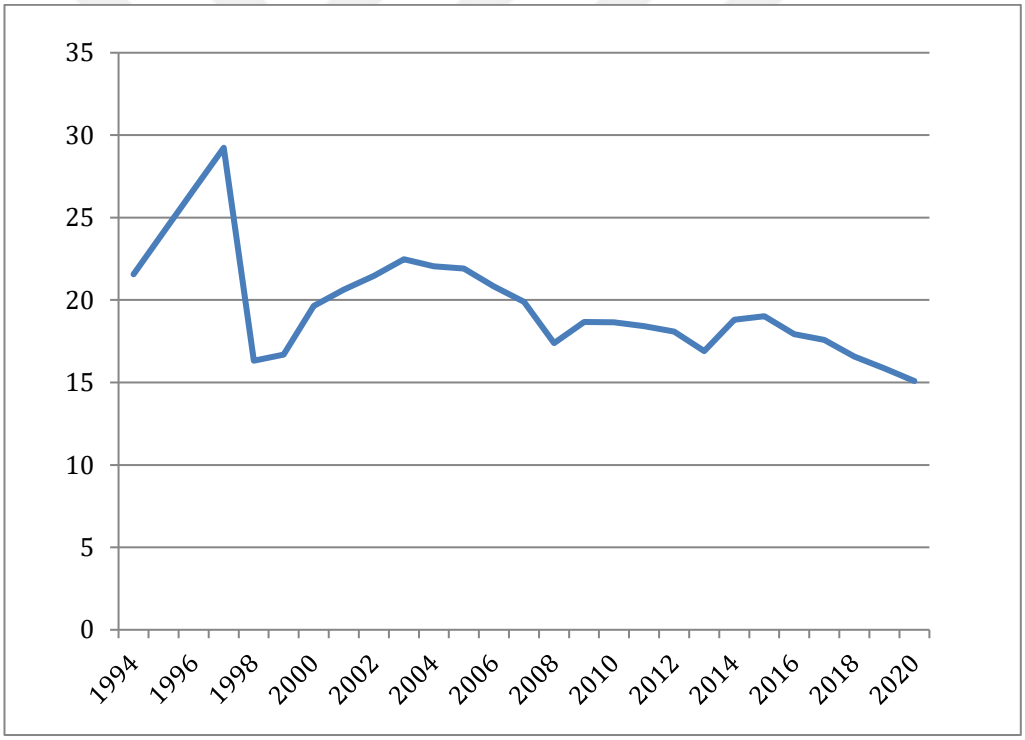

Figure 4.16. Education Expenditure (Mexico - % of GDP)
Source: World Bank

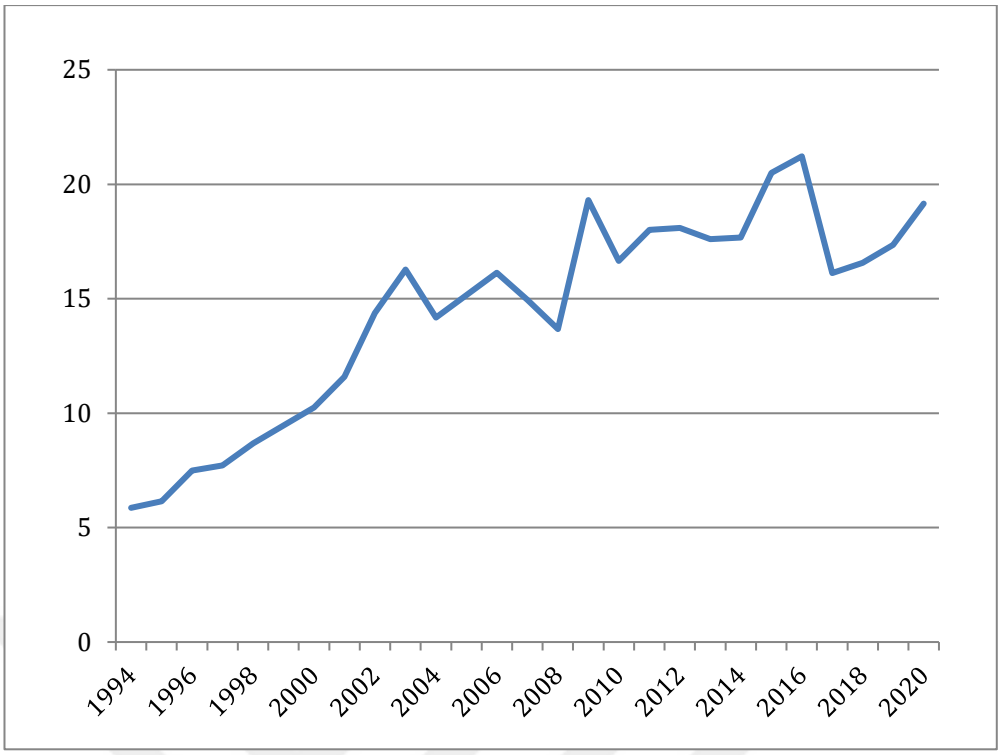

Figure 4.17. Education Expenditure (Indonesia - % of GDP)

Source: World Bank

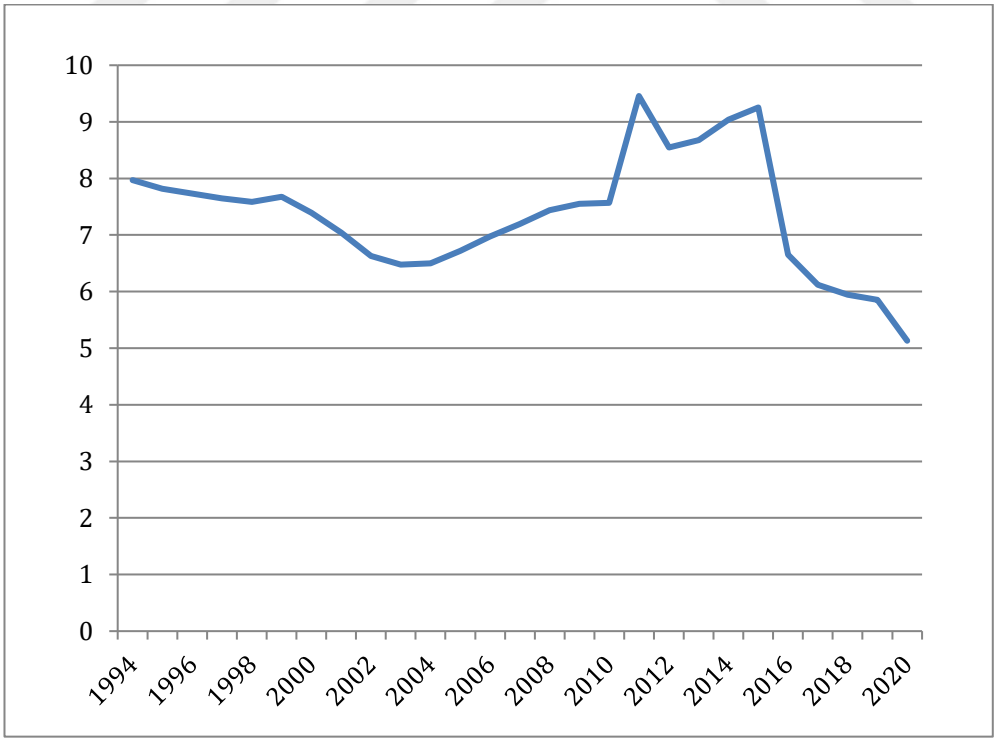

Figure 4.18. Education Expenditure (Nigeria - % of GDP)

Source: World Bank

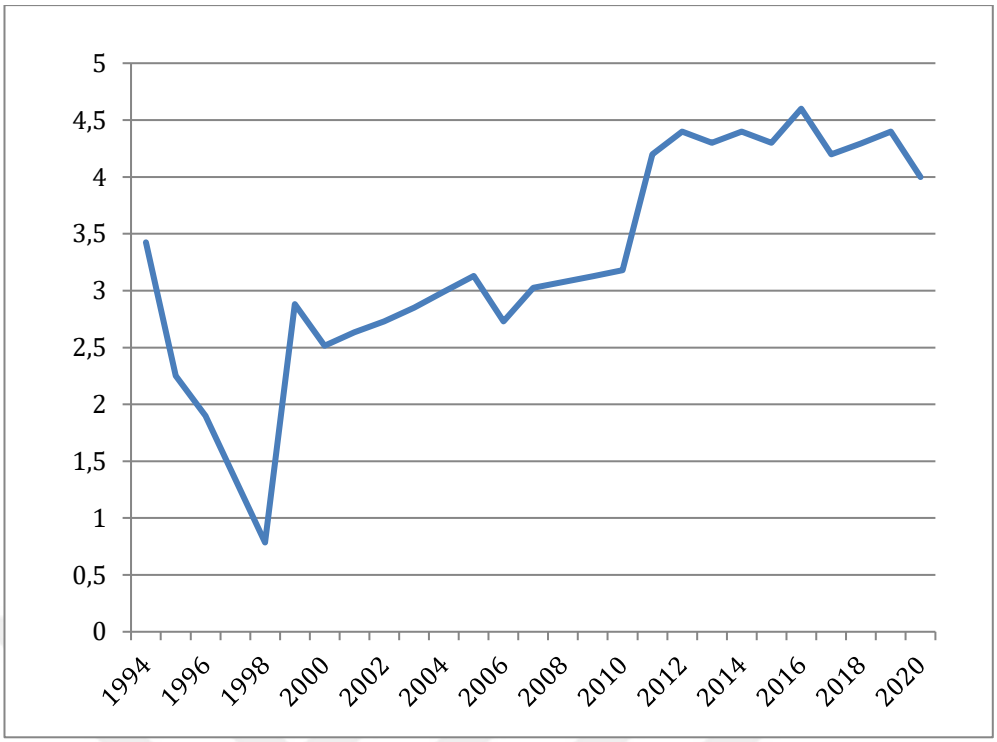

Figure 4.19. Education Expenditure (Turkey - % of GDP)

Source: World Bank

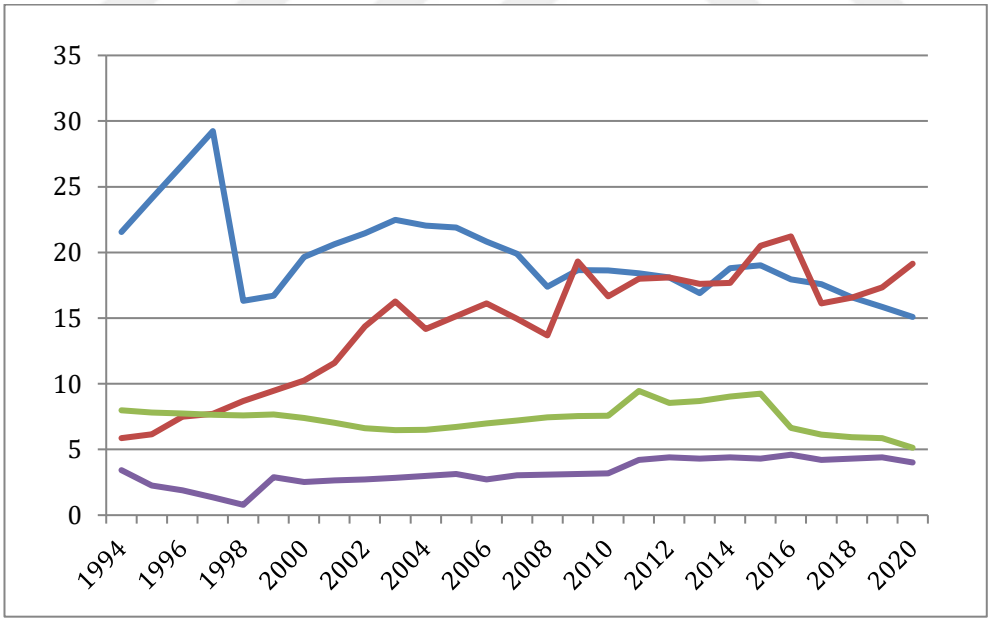

Figure 4.20. Education Expenditure (MINT - % of GDP)

Source: World Bank

4.2. Correlation Report

Table 4.2. Correlation Matrix

Correlation Probability	LNGDP	LNLABOUR	GCF	EEXP
LNGDP	1.000000			

LNLABOUR	-0.516	1.000000		
	0.0000	-----		
GCF	-0.277113	0.187974	1.000000	
	0.0037	0.0514	-----	
EEXP	0.163241	0.490457	-0.070673	1.000000
	0.0914	0.0000	0.4673	-----

Table 4.2 above shows the correlation matrix for the variables. As presented in the table, labour and capital are negatively correlated with GDP. However, education expenditure is positively correlated with GDP. Also, the matrix shows that the risk of multicollinearity does not occur between the explanatory variables.

4.3. Panel Unit Root

Table 4.3. Panel Unit Root 1

ADF - Fisher Chi-square			
	At level (statistics)	**At 1st Difference (statistics)**	**Conclusion**
ln_GDP	9.53786	18.6172 **	I(1)
ln_Labour	4.10082	23.0955 ***	I(1)
GCF	5.74710	30.5635 ***	I(1)
EEXP	7.65088	48.4666 ***	I(1)

p-values (< 1% = ***) ; (< 5% = **) ; (< 10% = *)

Table 4.4. Panel Unit Root 2

ADF - Choi Z-stat			
	At level (statistics)	**At 1st Difference (statistics)**	**Conclusion**
ln_GDP	0.35292	-2.25294 ***	I(1)
ln_Labour	0.88642	-2.57635 ***	I(1)
GCF	0.05685	-3.84883 ***	I(1)
EEXP	-0.28842	-5.57063 ***	I(1)

p-values (< 1% = ***) ; (< 5% = **) ; (< 10% = *)

Table 4.3 above shows the result of panel unit root test for the explained variables - real GDP, Gross Capital Formation (GCF) - at level. From the table, it is observed that real GDP is not stationary at level, and the reason is because its p-values 0.2990 and 0.6379 are not significant at all levels, whether 1%, 5%, or 10%. With the outcome, it means that the null hypothesis assuming the presence of unit root is not accepted. To check further, however, the panel unit root test at the first difference is carried out for the variable. Table 4.4 shows the outcome at first difference. The result is shown in the lower part of the table, and it is observed that at the first difference, real GDP is stationary as the p-values 0.0170 and 0.0121 are statistically significant at 5%. Therefore, the variable is integrated at order one - I(1).

A similar process is followed for the ln_Labour and, as represented in Table 4.3, the result of the panel unit root test for the variable at the initial level. With p-values 0.8479 and 0.8123, which are not statistically significant at any level, ln_Labour is not stationary at the initial level. The implication is that the null hypothesis of the presence of unit root is not accepted. Consequently, the panel unit root test at the first difference is carried out for the variable, which is observed in Table 4.4. The outcome, at the lower part of the table, shows that at the first difference, the null hypothesis is accepted, meaning that ln_Labour is stationary because of its statistically significant p-values 0.0032 and 0.0050. Therefore, the labour variable, just like real GDP, is integrated at order one- I(1).

To check if gross capital formation (GCF) is stationary, the same panel unit root test is followed, and the result is also presented in Table 4.3. Similar to the previous outcomes for real GDP and ln_Labour, GCF is not stationary at the initial level, given its p-values of 0.6755 and 0.5227. None of the p-values is statistically significant. Thus, the null hypothesis of the presence of unit root is not accepted, and another panel unit root test at the first difference is carried out. The result of the first difference is observed in Table 4.4. The outcome shows that at the first difference, the null hypothesis is accepted, meaning that ln_Labour is stationary because of its statistically significant p-values of 0.0032 and 0.0050. Therefore, the labour variable, like real GDP, is integrated at order one- I(1).

Education Expenditure (EEXP) is also checked for stationarity using the panel unit root test, and the result for the test, at level, is presented in Table 4.3. At the initial level, the education-expenditure variable is not stationary at the initial level because the associated p-values 0.4683 and 0.3865 were not statistically significant; thus, the null hypothesis of the presence of unit root is not accepted. To observe the variables further, another panel unit root test at the first difference is carried out as presented in Table 4.4. Results presented in the table show that at the first difference, EEXP is stationary due to the significant p-values for both methods used in the test. As a result, the null hypothesis is accepted. In addition to the observation from all other variables, real GDP, labour and capital, education expenditure is stationary at first difference, which means that the variable is integrated at order one- I(1).

From the tables above, it is concluded that all the explanatory variables are stationary at first difference. It equally indicates that performing a cointegration test is possible. Since all variables are stationary at the first difference and integrated at order one, we proceed with the cointegration test.

4.4. Cointegration Test

The cointegration test checks for the presence of a long-run relationship among variables. In this study, the cointegration test checks for a long-run relationship between economic growth, labour, capital and education expenditure. The result in Table 4.4 below confirms a long-run relationship between the variables. The Kao residual cointegration test is used; upon the assumption that there is no deterministic trend in the variables. The null hypothesis is that there is no cointegration between the variables. From the result, it is observed that there is no cointegration which implies that a long-run relationship exists among the variables. The p-value of 0.01 is statistically significant; the null hypothesis of no cointegration is not accepted. Given the presence of cointegration – long-run relationship – between economic growth and education expenditure and other variables, the individual cointegration coefficients of our variables will be estimated using the Panel Dynamic Least Squares (DOLS) and Fully Modified Least Squares (FMOLS) to determine the sign, size and significance of the long-run relationship that exists between education expenditure and economic growth in the MINT.

Table 4.5. Cointegration Test

Kao residual cointegration Test

Series: ln_GDP ln_LABOUR GCF EEXP

	t-Statistic	Probability
ADF	-2.273445	0.0115
Residual variance	0.001396	
HAC variance	0.001708	

4.5. Fully Modified Least Squares (FMOLS) Regression

Table 4.6. FMOLS

Dependent variable: ln_GDP

Method: Panel Fully Modified Least Squares (FMOLS)

Variable	Coefficient	Std. Error	t-Statistic	Probability
ln_LABOUR	1.191935	0.094423	12.62329	0.0000
GCF	-0.000783	0.002764	-0.283446	0.7774
EEXP	0.024854	0.005156	4.820088	0.0000
R-squared	0.984216	Mean dependent var		8.392932
Adjusted R-squared	0.983240	Std. Dev. dependent var		0.710934
Std. Error of regression	0.092038	Sum squared resid		0.821693
Long-run variance	0.018366			

From the result in Table 4.6, the labour and education expenditure are calculated across the panel as 1.19 and 0.02. It means that a percentage change in the labour force would affect economic growth by 1.19 per cent. Similarly, a unit percentage change in education expenditure would result in a 0.02 per cent change in economic growth in the MINT. However, based on the study's result, economic growth is not

impacted by gross capital formation. This is because, unlike labour and education expenditure, which are statistically significant, the explanatory variable capital (GCF) is not significant.

4.6. Dynamic Least Squares (DOLS) Regression

Table 4.7 shows the DOLS result for our estimated equation. Similar to the FMOLS method, the result shows that only labour and education expenditure impacts economic growth in the study area. The result, again, shows that capital GCF is not statistically significant even though it negatively correlates with the explained variable - economic growth. For labour and education expenditure, a percentage change in the labour force impacts economic growth by approximately 1.1 per cent. In comparison, a unit percentage change in education expenditure causes a 0.03 per cent change in economic growth. The results from FMOLS and DOLS are close to each other regarding their outcomes for this study. The R-squared and adjusted R-squared are both very high.

Table 4.7. DOLS

Dependent variable: ln_GDP

Method: Panel Dynamic Least Squares (DOLS)

Variable	Coefficient	Std. Error	t-Statistic	Probability
LNLABOUR	1.073390	0.113716	9.439228	0.0000
GCF	-0.004164	0.003211	-1.296988	0.2003
EEXP	0.036449	0.007975	4.570438	0.0000

R-squared	0.992087	Mean dependent var	8.395495
Adjusted R-squared	0.985816	Std. Dev. dependent var	0.709646
Std. Error of regression	0.084518	Sum squared resid	0.378593
Long-run variance	0.006939		

CHAPTER V

SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

5.1. Summary

In this study, an overview of the importance of labour and valid points towards investing in it is examined and by extension that human capital's role in how economies worldwide are being driven. While economic outcomes for many countries have taken different dimensions, Mexico, Indonesia, Nigeria and Turkey are among the countries that have been projected to have the capacity to attain significantly sustainable economic progress in the years to come. Geographically and demographically, these countries have unique economic strengths, which, if properly harnessed, may lead them to economic growth and development. In harnessing their potential, quality labour is essential; thus, there is a need for investment in human capital and education. This study, therefore, examines the relationship between education expenditure and economic growth in the MINT. A panel analysis, specifically FMOLS and DOLS regression methods, investigated the relationship between economic growth and education expenditure.

5.2. Conclusion

In this study, it is observed that expenditure on education positively affects the economy; the study findings indicated this. Therefore, investing in advancing education in the four countries – Mexico, Indonesia, Nigeria and Turkey - will raise the quality of human capital. Also, such investment will translate into improvement in many sectors of the economy in the long run. Already, this idea is recurrently suggested by development-oriented organisations across different regions and sub-regions around the world.

5.3. Recommendations

Based on the findings of this study, the following are recommended:

1. Expenditure on education should be given top priority in developing countries.
2. A significant amount of the national budget should be directed toward education consistently.
3. Policymakers should evaluate returns on education spending from time to time.

5.4. Direction for Further Studies

While the study focused on four countries given some similarities, studies on education expenditure and economic growth relationship may focus on the countries with a focus on their respective provinces or states in order to have a better insight into the individual performances of each state or province within each of the countries. Also, a similar study may be expanded to include other developing countries in Africa, Asia, and South America, where the need for development owed to education and human capital is still very much needed.

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